

கால வர்தா

நிர்வாக அறிக்கை

2011

ADMINISTRATION REPORT



අපනයන කෘෂිකර්ම දෙපාර්තමේන්තුව

கூலி அபනයன வெள துலர்வன அலகயாண்ட

சிறு ஏற்றுமதிப் பயிர் ஊக்குவிப்பு அமைச்சு

ஏற்றுமதி விவசாயத் திணைக்களம்

Department of Export Agriculture web- www.exportagrdept.gov.lk
Ministry of Minor Export Crop Promotion

2011

கார்ய காதன க ஸ்ரூத் வர்காவ

செயல்திறன் மற்றும் கணக்கு அறிக்கை

Performance and Accounts Report

**அகனயன காகீகர்ம டேபார்த்மேன்ருவ
சூலி அகனயன லுெடு சூவர்கன அலாநயாண்ட**

ஏற்றுமதி விவசாயத் திணைக்களம்
சிறு ஏற்றுமதிப் பயிர் மேம்பாடு அமைச்சு

Department of Export Agriculture
Ministry of Minor Export Crop Promotion

අපේ දැක්ම

කුලඹවු හා ආශ්‍රිත නිෂ්පාදන අපනයනයෙන් විශිෂ්ටත්වය

අපේ මෙහෙවර

වැඩි විදේශ විනිමයක් ඉපයීමත්, අපනයන කෘෂි බෝග ක්ෂේත්‍රයේ නිරත සියලු පාර්ශවකරුවන්ගේ නිර්කාර ආර්ථික හා සමාජීය සංවර්ධනයත් 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 නිවැරදිකිරීම

“ව්‍යාපෘතියේ ප්‍රතිඵලයක් ලෙසින් අපනයනකරුවන්ගේ ජීවිතයන්ට හා ආර්ථිකයට හානි සිදු නොවන පරිදි සැලසුම් කිරීම”

ආපදා නිවැරදිකිරීම

“උපරි අනුමැතියෙන් සලකා බැලීමට ලක්වන ප්‍රධාන අරමුණ වන්නේ, ආපදා නිවැරදිකිරීමේ ක්‍රියාමාර්ගයක් සකස් කිරීමයි. මෙම ක්‍රියාමාර්ගයේ ප්‍රධාන අරමුණ වන්නේ, ආපදා නිවැරදිකිරීමේ ක්‍රියාමාර්ගයක් සකස් කිරීමයි. මෙම ක්‍රියාමාර්ගයේ ප්‍රධාන අරමුණ වන්නේ, ආපදා නිවැරදිකිරීමේ ක්‍රියාමාර්ගයක් සකස් කිරීමයි.”

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”

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W.D.L Gunaratne

2012.04.20

Director General,

Department Of Export Agriculture

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ABBREVIATIONS

AD	-	Assistant Director
ARP	-	Agricultural Research Project
CA	-	Chief Accountant
CARP	-	Council for Agricultural Research Policy
DD	-	Deputy Director
DD(R)	-	Deputy Director (Research)
DD (T)	-	Deputy Director (Technical)
DEA	-	Department of Export Agriculture
DS	-	Divisional Secretary
EAAS	-	Export Agricultural Assistance Scheme
EAC	-	Export Agricultural Crops
EO	-	Extension Officer
ERU	-	Economic Research Unit
Ex.O	-	Experimental Officer
ha	-	Hectare
HRD	-	Human Resource Development
IPC	-	International Pepper Community
IRD	-	Integrated Rural Development Project
ISTC	-	In-Service Training Center
PHASU-		Post Harvest Advisory Service Unit
PLASU-		Plantation Advisory Service Unit
PMU	-	Progress Monitoring Unit
PIP	-	Productivity Improvement Programme
RA	-	Research Assistance
RO	-	Research Officer
ROIC	-	Research Officer-in-charge
SDD (Dev)	-	Senior Deputy Director (Development)
SDD(R)	-	Senior Deputy Director (Research)
SLAcS-		Sri Lanka Accountant Service
SLAS	-	Sri Lanka Administration Service
SLSS	-	Sri Lanka Scientific Service
SLTS	-	Sri Lanka Technological Service
SLR	-	Sri Lankan Rupees
SPCDP-		Second Perennial Crops Development Project
SPDA	-	Southern Province Development Authority

FOREWORD BY THE DIRECTOR GENERAL

DEPARTMENT OF EXPORT AGRICULTURE



The mission of the Department of Export Agriculture (DEA) is to increase foreign exchange earnings from Export Agricultural Crops (EAC) through increasing production, productivity, improved product quality and enhancing the value addition capacity. A considerable growth has been noted in both exports volume and export earnings. This sector which comprises of Spices, Beverages crops, Industrial and Stimulant crops of perennial nature (other than Tea, Rubber, Coconut and Cashew) contributes to an average share of more than 10.3 % of the all Agricultural and Plantation export earnings during the reporting year 2011. The DEA, under the supervision of the Ministry of Minor Export Crop Promotion, has planned and implemented its research and development programmes in 2011 to achieve the mandated objectives.

2011 was one of the most profitable years for almost all EAC. Farm Gate Prices of cinnamon, pepper, clove, nutmeg and mace had increased impressively over 2010 and prices of all other commodities, except cardamom and betel, had also increased substantially.

As a policy, the DEA paid more attention to increase the Production, Productivity to sustain the producers and to improve the Quality of the products in order to meet the international standards and trade regulations, which enable to compete with other producing countries. In order to cater to the world consumer needs of safe, high quality commodities are given more emphasis. For these new challenges DEA continued its efforts in 2011 under the theme of “**A Better Quality Product**”, to ensure the implementation of food safety standards in the domestic production system, while promoting Good Agricultural Practices (GAP) and Good Manufacturing Practices (GMP).

This report summarises 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 Development, Research, Administration and Finance. It includes all activities of the department, strategies used to meet the desired goals and the progress achieved during the year 2011.

GENERAL INFORMATION -2011

➤ Growth of the EAC sector in 2011

- Percentage contribution to GDP – 0.5%
- Percentage contribution to the Agriculture export earning – 10.3%
- Export volume (Mt) – 36,363.6
- Export Value (Rs.mn.)-28,831.9
- Estimated EAC extent (ha) –100,867

➤ Department District offices, Research stations and Nurseries

A. District Offices -14 (In Following Districts)

Kandy	Matale	Nuwara Eliya	Hambantota
Kegalle	Rathnapura	Moneragala	Badulla
Kurunegale	Galle	Gampaha	Colombo
Kalutara	Matara		

B. Research Stations and Sub Units

1. Central Research Station Matale
2. Cinnamon Research Station at Pallolpitiya, Thihagoda, Matara
3. Intercropping and Betel Research Station, Dampalassa, Narammala
4. Economics and Market Research Unit, Head Quarters, Kandy
5. Mid Country Research Station, Delpitiya
6. Tissue Culture Unit, Walpita
7. Kundasale Research Sub Unit
8. Nillambe Research Sub Unit
9. Plant Protection Unit

C. Department Plant Production Nurseries

1. Serapees Plant Nursery -Polgahawela
2. Central Plant Nursery -Holongolla,Dodangaslanda,
3. Central Plant Nursery -Wennoruwa,Narammala
4. Central Plant Nursery -Blackwater,Ginihaththena
5. Central Plant Nursery -Mulhalkele ,Walapana
6. Central Plant Nursery -Elwela ,Matale
7. Central Plant Nursery -Mapalana,Kaburupitiya
8. Central Plant Nursery -Gasnawa,Kegalle
9. Central Plant Nursery -Walpita

1. Functions of DEA

1.1 Role and objectives

The major responsibility of the Department of Export Agriculture (DEA) is to make necessary actions to develop the Export Agricultural Crops. As officially defined the crops that are perennial in nature other than tea, rubber, coconut and cashew, where over 50 % of their annual production is exported and any crop that is named by the Minister in-charge to be included for department purview are classified as EACs. Under this classification DEAs' main emphasis is to improve traditional crops such as Cinnamon, Pepper, Clove, Nutmeg, Cardamom, Coffee, Cocoa, Arecanut, Citronella, Vanilla, Lemon Grass, Betel, Garcinia, Kitul, Ginger and Turmeric. The DEA is basically a technical Department and functions are focused on Research and Development activities of the EAC sector.

1.2 Major Functions

The act of Parliament of the Democratic Socialist Republic of Sri Lanka named as Promotion of Export Agriculture No. 46 of 22nd September, 1992 on the promotion of Export Agriculture embodies the functions and gives statutory status to certain functions and services mentioned below.

- Organizing and promotion of cultivation and processing of EACs
- Undertake 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, Prices etc.
- Control of importation of EAC products, planting material etc.
- Training of personal involve in EAC Production, Processing and Trading and other stake holders
- Provide advisory services for promotion of EACs in Estate sector
- Strengthening linkage among Public and Private organizations involve with EACs
- Executive authority under the Export agriculture Act No. 46 of 1992
- Technology demonstration

**கர்கால
நர்வாகம்
ADMINISTRATION**

2. ADMINISTRATION DIVISION

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

2.1 Staff Cadres

Positions of approved staff cadres and number in service are given in table 2.1.1.

Table 2.1.1 The Position of the cadres of the Department in service as at December 2011

Position	No. Approved	No. in service	No. Vacant
Director General	01	01	-
Director (Research/Development)	02	01	01
Director (Admin)	01	01	-
Chief Accountant	01	01	-
Accountant	01	01	-
Deputy Director (Technical/Research)	04	-	04
Assistant Director (Planning)	01	01	-
Assistant Director	19	17	02
Research Officer	30	25	05
Assistant Director (Development)	03	01	02
Administrative Officer	03	02	01
Translator	02	01	01
Research Assistant	14	10	04
Extension Officer	184	153	31
Librarian	02	01	01
Technical Officer	01	-	01
Development Assistant	23	17	06
Research & Development Assistant	69	65	04
Budget Assistant	01	01	-
Data Entry Operator	02	01	01
Management Assistant	73	73	-
Farm Service Assistant	38	12	26
Hostel Warden	01	01	-
Telephone Operator	01	}	}
Roneo Machine Operator	01		
Book Binder	01		
Cycle Messenger	02		
Office Assistant	02	}	}
Office Labourer	21		
Watcher	08		
Drivers	61	56	05
Lorry Cleaner	10	07	03
Driver Assistant	01	01	-
Tractor Driver	01	00	01
Watcher(Departmental)	41	39	02
Mason	01	01	-
Carpenter	01	-	01
Nursery Care Taker	02	02	-
Budder	01	01	-
Labourer – Farm	244	184	60
Labourer (Garden)	01	-	01
Labourer (Sanitary)	03	-	03
Spray Machine Operator	03	02	01
Water Pump Operator	01	01	-
Cook	01	01	-
Total	884	714	170

2.2 Senior Management Positions of the Department

Director General	-Mr. W.D.L. Gunaratne
Director (Admin)	-Mr. O.M. Jabeer
Director (Research)	-Dr. R.S. Kularatne
Director (Development)	-Mr. U.M. Gunasinghe
Chief Accountant	-Mr.R.M.K.Rajapaksha
Accountant	-Mr. R.M.D.S.S. Ratnayake
Deputy Director (Technical)	-Mr. E.M. Nawaratne Banda
Deputy Director (Technical)	-Mr .N.K.A. Rupasinghe

➤ **New Recruitments**

Research officer	04
Assistant Director	08 (4 through promotions)
Driver	10
Spray Machine Operator	01
Nursery Care Taker	01

➤ **New Arrivals**

Chief Accountant	01
Research and Development Assistant	10
Public Management Assistant Service	13
Driver	04

➤ **Transfers**

Development Assistant	06
Public Management Assistant Service	11
Driver	01
Labourer	01

➤ **Retirements**

Director (Development)	01
Deputy Director (Research)	01
Research Officer	01
Assistant Director (Development)	01
Extension Officer	06
Public Management Assistant Service	03
Driver	01
Watcher	01
Labourer & Equal Services	06

Labourer	06
➤ Releases	
Assistant Director	01
Extension Officer	04
Public Management Assistant Service	02
➤ Deaths	
Watcher	01
➤ Reinstatements	
Farm Service Assistant	01

2.3 Targets Achieved by the Administration Branch in 2011

- ❖ Upgrading the post of Deputy Director (Administration) in to Director (Administration).
- ❖ Filling 22 vacancies.
- ❖ A comprehensive restructuring proposal was submitted to Salaries and Cadre Commission through Ministry of Minor Export Crop Promotion.

2.4 Departmental Examinations

Following examinations were conducted by the Department during 2011.

Examination	Date
Departmental Examination for Class I/II Officers of Sri Lanka Scientific Service	26.04.2011
Departmental EB Examination for Assistant Director (Development)	15.02.2011
2 nd EB Examination for Research & Development Assistants	26.04.2010,15.12.2011
1 st Departmental Examination for Extension Officers (SLTS) Class II “A”	26.04.2011
2 nd Departmental Examination for Extension Officers(SLTS) Class II “A”	26.04.2011
2 nd EB Examination for Development Assistants	26.04.2010,15.12.2011
National Language Test	05.01.2011,19.10.2011
K.K.S. EB Examination	19.10.2011

EB- Efficiency Bar

2.5 Foreign Scholarships & Travelling

Table2.5.1. Foreign Scholarships & Travelling during the year 2011

Officer's Name	Post	Reason	Period	Country
Mr.W.D.L. Gunaratne,	Director General	To Participate in the 39 th Annual Session of International Pepper Community	22.11.2011-26.11.2011	Indonesia
Mr. E.M. Nawarathna Banda	Director (Development) (Acting)	To participate in the official study tour related to Indian Spice Industry.	19.10.2011-25.10.2011	India
Mr. N.K.A. Rupasinghe	Deputy Director (Technical)	Workshop on Standards in Organic Agriculture and Certification Procedure.	16.05.2011-20.05.2011	New Delhi, India
Dr.M.A.P.K. Senevirathne	Assistant Director (Kandy)	To Participate in the 39 th Annual Session of International Pepper Community	22.11.2011-26.11.2011	Indonesia
Dr.A.P. Heenkenda	Research Officer			
Mrs. S.P.L. Senevirathne	Assistant Director			
Mr. J.L.K. Weeralal	Assistant Director	Training on Integrated Crop Management	24.10.2011-04.11.2011	India
Mrs. I.K. Indrasena	Research & Development Assistant	Meeting on Quality controlling in Pepper	16.03.2011-27.03.2011	Indonesia

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FINANCE

3. FINANCE DIVISION

The Annual Estimates for the year 2011 allocated a financial provision for a sum of Rs542.9 million under the Head 289 in one programme with, two Recurrent Expenditure projects and two capital Expenditure projects (Table 3.1). In addition to this Rs. 21 million were allocated to the Department from the Ministry fund (*Appiwawamu Ratanagamu Programme* and Organic Farming Programme & *Divinaguma*) during the period under review.

Total allocation of treasury funds to the development for the year 2011 has increased by Rs. Mn. 69 Over 2010 with was an 87 % increase. Out of total allocation of Rs.542mn the expenditure for the year was Rs 525mn. This was a 96.8% of the provision allocation for the year the financial performances of the project 1 and 2 were 98.2% and 96.7% of the allocated funds. Percentages of the amount spent under capital expenditure of the projects 1 and 2 for 2011 were 97.2% and 72.4% respectively and the same for the recurrent expenditure were 99.7% and 99.3%. Despite the serious man power shortages at all field level technical cadres and the financial constraints the spending of 97% of the total annual allocation for the year 2011 was an impressive achievement of the DEA.

➤ Internal Audit Inspection in 2011

Internal Audit of the Department is operated under the Director General. Eighteen Station including Research Stations, Assistant Director's Office and Nurseries of DEA were audited by Internal Audit unit during the year of 2011.

Table 3.1: Financial Provision and Expenditure-2011			
Head	-289		
Programme	-02		
Project	-01- Development of Export Agriculture Crops & Resource Management		
Item	Provision(Rs)	Expenditure(Rs)	Expenditure (%)
Capital Expenditure			
Rehabilitation and improvement of Capital Assets	15,000,000	10,786,415	71.91
Acquisition of fixed Assets	10,000,000	8,162,346	81.62
Capital Transfers			
Development Assistance(Assistance scheme for Export Agricultural crops)	220,000,000	219,998,634	100.00
Training and capacity Building	2,000,000	1,246,885	62.34
Total Capital Expenditure	247,000,000	240,194,280	97.24
Recurrent Expenditure			
General Administration	176,460,000	175,931,576	99.70
TOTAL EXPENDITURE	423,460,000	416,125,856	98.27
Project-02-Multidisciplinary research integrated Pest & Disease management of EAC			
Capital Expenditure			
Rehabilitation and improvement of Capital Assets	7,000,000	3,955,298	56.50
Acquisition of fixed Assets	22,000,000	16,775,760	76.25
Training and capacity Building	600,000	409,227	68.20
Other investment	6,000,000	4,663,235	77.72
Total Capital Expenditure	35,600,000	25,803,520	72.48
Recurrent Expenditure			
General Administration	83,845,000	83,290,563	99.34
TOTAL EXPENDITURE (pr, 11)	119,445,000	109,094,083	91.33
TOTAL EXPENDITURE	542,905,000	525,219,939	96.74
Special Allocation	20,996,219	18,186,802	86.62



காவரண அபிவிருத்தி DEVELOPMENT



4. DEVELOPMENT DIVISION

4.1 Introduction

The Development division plays a very important role of the Department. It provides farmers and other stakeholders with technical advice and guidance, planting materials and cash grant for the promotion of EAC sector. The Division is headed by Director Development and supported by three Deputy Directors (Technical), each was assigned with two provinces for the management of EAC development programme. In addition, as a supportive Staff, Research and Development Assistants are also attached to the Division. The Major functions of the Development division are,

- New Cultivation Program (New Planting, Replanting)
- Productivity Improvement Program (PIP) for the existing cultivations
- Quality Improvement of EAC Product
- Extension and Training of Stakeholders

The development activities and services of the division are mainly focused on the wet and intermediate climatic zones of Sri Lanka covering 14 districts viz. Kandy, Matale, NuwaraEliya, Kurunegala, Colombo, Kalutara, Gampaha, Galle, Matara, Hambantota, Kegalle, Ratnapura, Badulla and Moneragala. In addition several development activities carried out to introduce and popularize Turmeric, Ginger, Arecanut, Pepper and Cocoa in non-traditional areas like Anuradapura, Pollonaruwa and Ampara Districts. The special programs such as Post harvest advisory services, plantation advisory services and plant certification for quality assurance of plants and planting material, Cultivation of Export Agricultural Crops in selected village as cluster farms, were also implemented during the year 2011.

4.2. Crop Development Program

The total estimated area under EAC was approximately 100,870 ha as at December 2011. The following programs were carried out by Development Division.

- (i) New /Re-Planting Program
- (ii) Productivity Improvement Program
- (iii) Post Harvest Technology and quality improvement program of EACs.

4.3. Export Agriculture Assistance Scheme (EAAS) for new planting

This scheme was introduced in 1972 with the inception of the Department. In addition to the issuing of free planting material at the beginning and provision of technical information, this scheme provided outright cash grants for new planting and replanting for selected EACs for the successfully established cultivations at maturity. New planting scheme was confined to some selected crops economically important in the long-run. However, due to the financial constraints and precedence of the department this assistance scheme has been subjected to reversals several times. EAC Assistance Scheme for new planting programme is given below (Table 4.3.1) .

Table 4.3.1 The EAC Assistance Scheme for New Planting

Crop	Crop spacing	Free plants issued per Hectare	Investment Assistance per Hectare (Rs.)	Minimum period of Investment Assist. (Yrs)	Maximum period of Investment Assist.(Yrs)
Catimor Coffee	1.8x1.8 m	3000	35,000	03	05
Arabica Coffee	1.8x1.8 m	3000	35,000	03	05
	1.8x2.5 m	2200			
Robusta Coffee	3.0x3.0 m	1100	20,000	03	05
Cocoa	3.0x3.0	1100	40,000	03	05
Cinnamon	1.2x0.9 m	9000	20,000	02	05
	1.2x0.6 m	14000			
Black Pepper	2.4x2.4 m	1750	25,000	03	05
Cardamom	2.0x2.5 m	2000	35,000	03	05
Clove	6.0x6.0 m	250	10,000	04	06
Nutmeg	6.0x6.0 m	250	15,000	04	06
Vanilla	2.4x1.5 m	2750	5,000	03	05
Citronella	0.9x0.9 m	17500	10,000	8 Month	02
	0.6x0.6 m	30000			
Lemon grass	0.6x0.6 m	30000	10,000	8 Month	02

Extent cultivated under new planting Investment assistance scheme including the plantation sector is given below (Table 4.3.2).

Table 4.3.2 Extents Cultivated under New Planting Program in 2010 and 2011

Crop	Cinnamon	Pepper	Coffee	Cocoa	Cardamom	Citronella & Lemon Grass	Clove & Nutmeg	Vanilla	Betel	Total (ha)	Ginger	Turmeric	Mixed (Home)	Arecanut (Plants)
Extent (ha) 2011	1,248	610	113	114	70	38	123	24	1	2,339	762	227	607	387,680
Extent (ha) 2010	829	843	219	82	2	35	122	21	18	2,170	370	145	185	329,300

Number of applications received and land inspections completed under new cultivation program have been summarized in table 4.3.3.

Table 4.3.3 Applications received and land inspected in the New planting Program 2011

Crops	No of Applicati ons received	No of Application Succeeded	Extent planted	Inspections(after new Planting)					
				1 st Success		2 nd Success		4 th Success	
	Inspection	Inspection	Inspection	No:	Ha.	No:	Ha.	No:	Ha.
Cinnamon	5048	4883	1867	3380	1180	1738	663	880	348
Pepper	5768	5645	1545	2611	631	1780	425	445	114
Cardamom	81	77	24	29	17	5	1	1	1
Coffee	375	365	119	244	81	196	74	45	11
Cocoa	457	391	164	174	168	77	41	3	1
Clove	145	143	50	73	25	12	6	1	5
Nutmeg	451	416	129	221	58	88	30	17	6
Vanilla /Betel	112	112	15	44	6	9	2	1	1
Citronella	118	118	54	86	42	49	21	40	18
Arecanut	629	627	236	456	128	111	35	35	9
Ginger	5178	5088	728	2189	311	485	74	1387	229
Turmeric	1542	1523	505	784	78	64	7	267	48
Total	19904	19388	5436	10291	2725	4614	1379	3122	791

4.4. Productivity Improvement Program

Opportunities to expand Export Agriculture Crops to new lands are limited. Therefore Productivity Improvement Program (PIP) was introduced to increase the per unit area production of the existing EAC cultivations, where production is below the potential due to low crop density and poor crop management. Growers are assisted with technical advice, supplying of free planting material to fill vacancies, offering cash grants for a period of three years in order to improve the existing pepper, cinnamon, cocoa, coffee, cloves and nutmeg cultivations. Adoption of agronomic practices such as proper soil conservation measures, crop and shade tree pruning, application of organic manure and integrated pest management are required to become quality for the assistance scheme.

Table 4.4.1.Assistance Scheme for Productivity Improvement Programme (Cash granted per Hectare for each Crop in Rs.)

Crop	1 st Year	2 nd Year	3 rd Year
Cinnamon	15,000	15,000	7,500
Black pepper	15,000	15,000	7,500
Cocoa	12,000	12,000	6,000
Coffee	12,000	12,000	6,000
Clove	6,000	6,000	3,000
Cardamom	12,000	12,000	6,000
Nutmeg	6,000	6,000	3,000

The progress of PIP in 2011 is given below in 4.4.2.

Table 4.4.2 The extent of EAC developed under Productivity Improvement Program

Crop	Cinnamon	Black Pepper	Coffee	Cocoa	Cardamom	Clove	Nutmeg	Total
Extent developed (ha)	713	1,062	55	138	61	104	57	2,193

Progress of payments of rewards under PIP is given below in the table 4.4.3 in the year 2011.

Table 4.4.3 Payment of rewards for Productivity Improvement Program in 2011

Crop	Registered under PIP		Instalments paid					
			1st instalment		2nd instalment		3rd instalment	
	No	Ha	Extent (Ha)	Amount (Rs.)	Extent (Ha)	Amount (Rs.)	Extent (Ha)	Amount (Rs.)
Cinnamon	1,658	713	478	6,197,877	397	4,023,645	172	1,291,648
Pepper	2,503	1,062	466	6,572,220	37	498,000	5	52,000
Coffee	148	55	12	174,600	2	21,600	0	0
Cocoa	93	138	30	361,206	2	0	0	0
Cardamom	24	61	10	66,000	0	0	0	0
Clove	283	104	30	123,300	3.2	28,200	2	12,000
Nutmeg	139	57	6	52,200	0	0	1	1,200
TOTAL	4,847	2,193	1,032	13,547,403	441	4,571,445	175	1,356,848

4.5. Estate Sector Crop Development Program

In 1998 this program was initiated and given especial emphasis to carryout a crop diversification program with EACs in plantation sector. Estate management was helped to plan their EAC development programs by senior officers of the Department including researchers whenever necessary. The following table shows cultivated crops and respective extents under the estate program in 2011.

Table 4.5.1 Extent of crops developed (ha) under Estate Sector Development Program in 2011

District	Crop				
	Cinnamon	Black Pepper	Coffee	Cocoa	Other crops
Galle	29	-	-	-	-
Kurunegala	7	7		3	3
Matale	3	2	1	1	-
Badulla	21	4		-	2
Nuwara Elia	7	1	12	-	6
Kegalle	8	1	2	-	-
Ratnapura	5	-	8	-	6
Other Districts	9	-	-	2	3
Total	89	15	23	6	20
Grand Total (ha)	151				

4.6. Cluster Farm Development Program

The aim of this program is to promote EAC production, productivity and quality in a systematic manner in climatically suitable potential locations and to enhance the productivity of all land parcels in a selected geographical location with farmer participation. The program focuses to improve the total production of the cluster through productivity improvement of land holdings by dissemination of collectivized advisory service. Improvement of the quality of EAC produce by promoting central processing centres to meet with internationally accepted quality parameters is also an objective. The Details of clusters established and continued are shown in table 4.6.1.

Table 4.6.1 Performance of the Cluster Farm Development Program

District	Main crops of Clusters	Number of Clusters
Kurunegala	Betel/Pepper/Ginger/Lemon grass/Coffee	159
Matale	Pepper	13
Kandy	Pepper	56
Nuwara Eliya	Pepper/Kithul/Vanilla	1
Matara	Pepper/Cinnamon	3
Hambantota	Cinnamon	14
Gampaha	Pepper/Betel/Cardamom/Vanilla/Ginger	13
Kegalle	Pepper/Vanilla/Kithul	5
Other Districts	Betel/Pepper/Ginger/Lemon grass/Coffee	6
Total		270

4.7. Production and Issuing of Planting Materials

The objective of this program is to increase the production of EAC crops. Planting materials are provided free of charge to all farmers who have been enrolled in the Development assistance schemes and successfully completed the land preparation, soil conservation and other field operations as per the instruction given by DEA. Planting materials were raised in nine nurseries managed by the department and the rest through registered private nurseries under the close supervision of extension staff of the DEA (Table 4.7.1.). There were 374 private nurseries registered with the Department during the year of 2011. The distribution of private nurseries is shown in Figure 4.7.1.

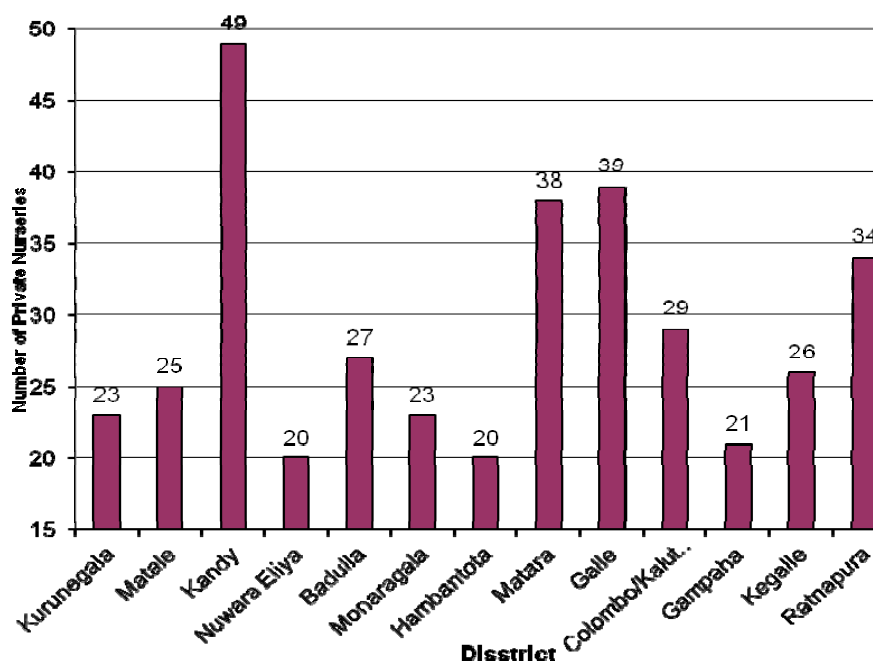


Figure 4.7.1 Registered Private Plant Nurseries and Their Distribution

Table 4.7.1 Number of Department Plant Nurseries in different Districts

District	Government Nurseries
Kurunegala	03
Matale	01
Nuwara Eliya	02
Matara	01
Gampaha	01
Kegalle	01
Total	09

The table 4.7.2 shows the prices of planting material and seed materials prevailed in 2011.

Table 4.7.2 Prices of Seeds and Planting material (Rs)

Crop	Seed material	Planting Material
Cocoa	10.00 per pod	Plant 9.00
Pepper	0.20 per 3 node cutting	Plant 13.00
Coffee	70.00per kg. of ripe berries ,Parchment 150.00	Plant 9.00
Cinnamon	80.00 per kg of seeds	Plant 8.00
Cardamom		Sucker 5.00
Areca nut	As per the market price	Plant 7.00
Vanilla	5.00 per 1m cutting	Plant 6.00
Clove		Large Plant 30.00 Small Plant 8.00
Nutmeg	3.00 per seed	Small 15.00 Large 35.00
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 Program

The objective of this program is to supply high quality plants to the growers while improving the standards of the nurseries. For the purpose of certification, a team consisting of at least three officers among them, DD (T), District AD(In charge of the District), and RO or an Extension Officer,an officer appointed by the DG visit each nursery and plants certification is done using the guidelines given by the Department.

Table 4.8.1 Details of the Plants Certified and issued in 2011

Crop	Total Number of Plants Certified	Total Number of Plants Issued
Pepper	1,869,990	3,095,156
Coffee	496,140	279,930
Cocoa	75,875	12,288
Cinnamon	12,478,093	11,982,286
Arecanut	545,454	387,680
Clove	37,410	17,930
Nutmeg	20,250	7,654
Cardamom*		62,134
Vanilla*		21,362
Citronella*		618,000
Lemongrass*		93,140
Betel*		18,756
Grand total	15,523,212	16,596,316

** Planting materials are supplied by the farmers or raised in self-nurseries with assured quality*

4.9. Issuing of Plants under the Export Agriculture Assistance schemes

Following table depicts plants issued under the assistance schemes during 2011.

Table 4.9.1 Issuing of Planting Material (in Numbers)

Crop	New Planting	Other	Total
Cinnamon	8,756,219	3,226,067	11,982,286
Cardamom	15,425	46,709	62,134
Pepper	871,821	2,223,335	3,095,156
Coffee	183,153	96,777	279,930
Cocoa	107,050	15,818	122,868
Citronella	438,000	180,000	618,000
Arecanut	260,932	126,748	387,680
Clove	8,100	9,830	17,930
Nutmeg	7,654		7,654
Betel	15,026	3,730	18,756
Total	10,667,141	5,944,768	16,592,394

4.10. Introduction of New Export Agricultural Crops

The DEA is dealing with certain crops which have a potential for enhancing foreign exchange earnings. Crops identified under this program were Vanilla, Lemongrass, Ginger, Garcinia and Kithul. Ginger and Turmeric were also added into this category in 2007. The program is being continued during the year 2011 and under this program planting materials and necessary technical advice were provided to relevant farmers.

Table 4.10.1 Progress of the Vanilla Cultivation Program in Major Growing Areas

District	Number of Cuttings distributed
Matale	15,000
Kegalle	3,575
Ratnapura	2,000
Other Districts	787
Total	21,362

During the reporting year, 665,023 Kg of Ginger and 151,680 Kg of Turmeric seed tubers were distributed among the growers.

4.11. Export Agriculture Assistance Scheme for Post Harvest Activities

Post Harvest advisory Service was initiated in 1998 and the main objective of this program was to upgrade the quality of the Export Agricultural products. The Export Investment Assistance Scheme for Post Harvest Practices was subjected to revise since June 2007 and a set of three assistant schemes suitable for stakeholders of different levels was introduced. The main objective of these assistance schemes was to maintain the quality of the product and to facilitate trade affairs. Elucidations of the three assistance Schemes are given below.

i. Group Processing Units

The Farmer Organizations registered with the Department are eligible for this assistance scheme and under which machinery required for processing is issued free of charge. The responsibility of managing the processing unit and handling of the machines should be held by the Farmers' Organizations. In addition identifying buildings required for installing the machinery and searching lands for establishing sheds should be performed by the Farmers' Organization itself. The Department staffs help the Farmers Organizations with knowhow for continuing of these processing centres.

ii. Central Processing Units

This assistance scheme has been introduced for applicants who are capable of investing more than one million Rupees and instigating a large scale processing measure. The investor is entitled for a cash grant of 25% of the total investment not exceeding 0.5 million Rupees, under this scheme. Profits will be conferred after the investment, made under the approval of the department.

iii. Individual Processing Units

Applicants who wish to set up a private processing unit for post harvest processing facilities are eligible to apply for this assistance scheme. They are entitled to obtain subsidies for relevant machinery or post harvest processing facilities approved by the Department.

Table 4.11.1 Assistance Scheme for Post Harvest Activities

	Type of investment	Assistance grant per unit (Rs)
01	Processing of Black Pepper a) Blancher b) White Pepper processing Machine c) Pepper Thresher ➤ Manually Operated ➤ Electrically operated ➤ Engine Operated d) Green pepper seed sorting Machine e) Grader	1,000 25,000 10,000 20,000 22,500 8,000 15,000
02	Processing of Coffee ➤ Coffee pulping Machine ➤ Manually Operated ➤ Machine/Electrically operated ➤ Coffee Huller	5,000 15,000 10,000
03	Processing of Cocoa ➤ 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 ➤ For new constructions ➤ For repairs	75,000 75,000 (maximum)
05	Processing Centre – Minimum 400 Square feet ➤ Cinnamon ➤ Other Crops	40,000 25,000
06	For Dryers ➤ Multi functional Dryers (Capacity - 250 Kg or more) ➤ Solar Dryers (100 Square feet) ➤ Protected threshing floor ➤ Dryers set above the ground level	100,000 10,000 (maximum) 25,000 MaximumRs 25 /feet ² Minimum 200 feet ²
07	Vanilla – fermentation (Minimum Capacity - 20 Kg per day)	10,000

Table 4.11.2 Performance of the Post Harvest Assistance Scheme

Item	Number of units granted
Distillation Units	22
Pepper Threshers	28
Dryers	10
Pepper Blanchers	49
Processing Centres/Units	95

4.12. Organic Farming Program

Considering the growing demand for organically produced food in the international markets, Department initiated the promotion of organic farming in the year of 1998.

Major role of the Department was to educate growers on principles behind organic farming, encourage them for record keeping, promotion of the use of organic manure and integrated pest management. Another objective was to extend support for clean processing, storage and link the growers with exporters, who pay a reasonable price.

Table 4.12.1 Extent of crops established under Organic Farming Development Program in 2011

District	Crop	Ha
Monaragala	Pepper	34
Matale	Pepper	30
Kandy	Pepper/Nutmeg	80
Ratnapura	Cinnamon	25
Other Districts		167
Total		336

4.13. 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 agricultural practices in cultivation and processing of EAC. Required Resource personals and other services received from the Research Division to conduct the training programs. Details of the training classes conducted in the year reviewed are given in table 4.12.

Table 4.13.1 Progress in Farmer Training -2011

Activity	Number of programs	Number of beneficiaries
Farmer Training Classes & Field Days	3324	86,062
Training of Cinnamon Peelers	154	934

4.14. Demonstrations

The entire field level Extension Officers were mandatory to establish and maintain one or more field demonstrations to educate growers on Good Agricultural Practices (GAP) to increase crop yield and to reduce the Cost of Production (COP). Field demonstrations are used for training programs and for dissemination of technology too. The details of demonstrations established are shown in table 4.14.1

Table 4.14.1 Demonstrations established and maintained in different Districts in 2011

District	Number of Demonstrations
Kurunegala	33
Matale	22
Kandy	22
Nuwara Eliya	0
Badulla	4
Monaragala	1
Hambantota	10
Matara	5
Galle	6
Colombo/Kalutara	0
Gampaha	46
Kegalle	10
Ratnapura	05
Total	164

4.15. In-Service Training Center Matale

In-Service Training Center of Department of Export Agriculture conducts training programmes for farmers, DEA officers, officers of other government and non government institutes, University students, Students of Agriculture Training colleges, Agriculture teachers and other stake holders on every aspect of EAC production and processing. Training Center is headed by an Assistant Director who holds the responsibility of overall management of the training center. It has residential facilities 30 trainees at a time. Duration of the training programmes varies from one day to five days depending on the subject covered. A series of training programmes on social mobilization for DEA officers and empowerment programmes for farmers were conducted in 2011. Trainings were conducted during the reporting year on the different topics.

Table 4.15.1. Farmer training programs conducted at ISTC – Matale on Subject wise

Subject Area	No. of Classes	No of beneficiaries	Man days
EAC Production	13	289	301
Farmer Empowerment	03	85	109
Post Harvest Technology	01	23	46
Entrepreneurship Development	01	21	42
Total	18	418	498

Table: 14.15.2 shows the details of training programs conducted for the benefit of officers

Table: 4.15.2 Training Programs Conducted for DEA officers and officers of other Institutes

Type of Trainees	No. of Classes	No of beneficiaries	Total man days
DEA officials			
Extension Officers	03	48	138
Extension Officers & Research and Development Assistants	05	114	424
Farm Service Assistants	01	06	18
Programme Assistants	01	14	56
Assistant Directors & Research Officers	03	67	236
Officers from Other Institutes			
Officers of Coconut Research Institute & Hadabima Authority	01	22	44
Officers of Agrarian Services Department	01	15	15
Officers of CIC Company	01	06	12
Forest Officers	01	32	32
Officers of Estate Sector	01	25	75
School Teachers	01	22	44
Prison Officers	01	22	66
Civil Security Officers	01	30	60
Students			
Agricultural School Students	01	26	47
School Students	02	101	101
Seminars and Workshops	05	156	156
Total	29	706	1524

Following Subject Areas were covered at training sessions for the officers

- EAC production
- Post harvest technology
- Nursery management
- Extension programme planning with participatory rural appraisal
- Training methodology and techniques
- Preparation of Visual Aids
- Marketing extension
- Farmer empowerment
- Positive thinking
- Pest and disease control
- Social mobilization
- Entrepreneurship development
- Computer technology
- Integrated nutrient management
- Administration and accounting
- Preparation of Marketing Plans
- Seed certification and tissue Culture plant production
- 5 S Concept & human resource management
- Home gardening

4.16 Communication Division

Communication Division of Department carried out various tasks in electronic & print media with the objective of making awareness among all the stakeholders who are engaged in EAC sector. Following communication programmes were carried out during the year 2011.

Electronic Media

- TV

‘Sengawunu Kahawanu’ was the only documentary type TV programme of its kind to discuss about our heritage crops, spices. This was the final outcome of many years of hard work and dedication. Entire production of the programme was done by the staff of communication division, unfortunately programme was terminated in April due to deviation of financial allocations. 13 programmes were telecast during the year 2011.

- TV News

TV News were made and handed over to Rupavahini, I.T.N. and Swaranavahini TV stations with timely messages very vital to the spice sector. Nine news clips were broadcast during the year.

- DVD Production

DVD was produced at the communication division on following themes.

1. One million domestic economic units. (*'Divi Neguma'*)
2. Documentary on Spice Parks (*'Kulubadu Arana'*)

- Radio

Radio programe titled 'Deye Urumaya' was broadcast on Swadeshi, Ruhuna and Rajarata Sevaya on every Monday at 7.00 p.m. This programme has caught the listener's attention. The response from the general public was commendable. Fifty two programmes were broadcasted during the year 2011.

Print Media

- Brochures

A brochure titled 'A spicy treat from Sri Lanka' was scripted and designed at the communication division in English language to promote the spice sector to the international community. Brochures were designed and published by the communication division in Sinhala language on following themes.

1. Cocoa under Rubber
2. Deye Urumaya
3. Ginger Cultivation
4. Turmeric Cultivation

Brochures (Ginger, Turmeric, and Our Heritage) were published in Tamil language as a result of promoting spices to Northern Province.

- Book covers and DVD covers–

Book covers and DVD covers were designed and printed for various purposes.

- Digital Boards –

Large format digital boards were designed and printed to be used for exhibitions.

- Digital flex prints –

Large format digital flexes were printed in all three languages especially for the exhibition held at Vavuniya.

- Web site Development-

Updating of the official web site of Department of Export Agriculture was continued by the Communication Division in 2011.

- **Exhibitions**

Exhibition stalls were designed and installed by the Communication Division at following mentioned National level exhibitions.

1. 'Deyata Kirula' Exhibition at Monaragala
2. Agricultural Exhibition at Kinniya
3. Farmers' Week Exhibition at Vauniya
4. Prisoners' Day Exhibition at Matara



കർഷേജ് **ഔരായ്‌പ്പി** **RESEARCH**



5. RESEARCH DIVISION

5.1 Technical functions and organization of Research Division

The Research Division operates under the supervision of the Director (Research) and consists of 3 main units: Commodity Research Unit, Economic Research Unit and Plant Protection Unit. Main Research Station (Matale) and other six sub stations continued to develop appropriate technology to solve farmers' problems and enhanced the production, productivity and quality of Export Agriculture Crops. The location of Research stations and their functions are given bellow.

- Central Research Station, Matale
- Cinnamon Research Station – Pallolpitiya, Matara
- Intercropping & Betel Research Station – Narammala
- Tissue culture laboratory and Plant Nursery – Walpita
- Sub Research Station – Kundasale
- Sub Research Station – Nillambe
- Sub Research Station – Delpitiya
- Economic Research Unit – Head Office, Peradeniya

Central Research Station and Plant Protection Unit were functioned under the Deputy Director (Research) and other sub research stations were under the supervision of the respective Research Officers in- Charge. The progress of the research conducted in 2011 at the main research station and other sub stations are described below according to the crop and discipline basis.

5.2 Research achievements on EAC's during the year of 2011

5.2.1 Cinnamon

✓ Agronomy

- An Investigation was carried out to develop a suitable vegetative propagation technique with three or more healthy plants in a bag. Results showed that $\frac{3}{4}$ leaf size with 1.4 cm above and 2.5 cm below from the semi hard wood, single node with 9.5 mm diameter cuttings gave higher performance in shoot initiation. However, shoot initiation was not dependent upon the ratio of above and below lengths.
- Quality analysis was done for the cinnamon species available in Sri Lanka, including true and wild cinnamon. Results showed that there were different major leaf compositions in each species as *Cinnamomum zeylanicum* Blume – Eugenol (80%); *C. dubium* Nees – β pinene (42%); *C. litseaefolium* Thw. – Linalool (22%), Borneol

(20%); *C. citriodorum* Thw. – Citronellal (66%), citronellol (21%); *C. capparucoronde* Kostermans – Citral A (19%), Benzyl benzoate (15%); *C. rivulorum* Kostermans – 1.8 cineole (27%).

- Cinnamon (*Cinnamomum zeylanicum* Blume) flowers are naturally pollinated resulting 16% of fruit -sets and it can be increased up to 20 % by artificial crossed pollination by using fresh pollen. However, under normal situation only 1% of self pollination fruit is achieved.

✓ **Genetics and Plant Breeding**

- Seven form ten selected cinnamon lines of the Cinnamon research station, Matara are grown under coconut. According to the growth performances and yield, for five year period observed, Lines presently performing better under coconut are CRS 317(Sri Vijaya) and CRS 40 (Sri Gamunu) further examinations are being continued.

✓ **Crop Protection**

- Different control measures such as earthing up, chemicals (Clorfyrifos) and pheromone traps alone and with combinations were tested to manage cinnamon Wood Boring Moth (WBM) and compared with control (without using any control measures). Significant achievements were observed in combining several methods instead of single method in controlling cinnamon WBM. Best performance was given earthing up once a year, with using chemical and pheromones in peak period of pests and followed by only earthing up twice per year.

✓ **Soil and Plant nutrients**

- There was no significant response to fertilizer treatments composed of inorganic, organic and their combinations with respect to plant height and diameter of the stem at the age about 27 months. However the maximum diameter (31.5mm) of the stem was observed with the application of compost alone made by using cinnamon leaves at the rate of 20 tons per ha.
- Application of either Dolomite or Kieserite to young cinnamon plants grown on acid soils did not show any response in growth parameters at the age about one year. However, the greatest plant height (67.7 cm) was recorded by the recommended fertilizer mixture applied together with Dolomite at the rate of 500 Kg/ha.
- Use of sub- soil, cow dung, sawdust at a ratio of 6:1:1 with PSB (Prosperous Solubilizing Bacteria) and *Trichoderma* spp markedly improved cinnamon seedling growth comparable to DEA recommended nursery mixture showing the possibility of substitution of subsoil for top soil in making cinnamon potting mixture.

- **Combine effect of mycorrhizal inoculation and P fertilizer on cinnamon seedling growth and soil P availability.**

The results show an increasing trend in rhizosphere P levels due to AM (Arbuscular micorrhizae) in cinnamon seedlings within a short period of time. These observations certainly warrant further investigations on rhizosphere chemistry of cinnamon with application of rock phosphate, P fertilizer and AM.

5.2.2 Black Pepper

✓ Agronomy

- **Effect of support tree pruning on root behaviour of both Black pepper and support tree (*Gliricidia*)**

Behaviour of root systems of Black pepper and support tree (*Gliricidia*) was studied between two consecutive support tree pruning cycles. It clearly showed that *Gliricidia* reduced their fine roots progressively after punning and the reduction of total fine roots (root length) was approximately 80% at six weeks after pruning. Simultaneously, Pepper increased their fine roots as the same trend and it doubled the total fine root length at three weeks after pruning. Therefore, results indicated that support tree pruning enhanced the root activity of pepper and reduced the root competition between support tree and black pepper plants.

- **Relationship between canopy PAR (Photosynthetically Active Radiation) distribution and conversion ratio of fresh berry weight to dry berry weight of black pepper**

PAR absorption and conversion ratio of fresh berry weight to dry berry weight were observed at different levels of plant canopy for different pepper local selections. Percent PAR absorption was significantly and negatively correlated with the above conversion ratio for all pepper selections examined. It convinced that more light interception facilitates more dry matter production and partitioning into pepper spikes. Comparison of AM isolates for inoculating ability of black pepper under different P levels. Local and exotic AM can be successfully inoculated with black pepper cuttings at nursery stage. Highest shoot and root growth were observed for local AM and exotic AM at the rate of P 50 and 5 $\mu\text{g g}^{-1}$ soil respectively. However, the impact of both inoculates was not significant at 12 weeks after inoculation for the growth of pepper cuttings.

- Comparison of Bamboo Rapid Multiplication System (BRMS) and Serpentine method for plant production was done. After six months vine length, number of leaves, number of nodes and diameter were higher in BRMS than serpentine method.

Effect of different types of Pepper cuttings on initial growth and subsequent canopy development was investigated. Objectives of the study were:

1. To find out the best type of branch on plant production of black pepper at nursery stage
2. Comparison of canopy development and growth habit of different type of cuttings
In Nursery stage, after five months highest survival rate (94%) and highest number of leaves more than five per plant were recorded in Rapid multiplication bamboo method.

✓ **Genetics and Plant Breeding**

Forty seven accessions of black pepper collected from different locations were field established at the Research Station, Matale to evaluate its performances under uniform conditions and to compare with introduced varieties, Panniyur – 1 and Kuching. Chemical components of them were analyzed to select the best accession/s. Results revealed that the accession BD/MW24 has high amounts (dry basis) of volatile oil (4.15 %), Oleoresin (18.20 %) and piperine. (11.92 %) contents. For the oil content, accession, BD/MN42 has the highest amount (4.24 %) whereas the local accessions BD/KG38, BD/MW24, RP/NA1, MN1, BD/MW23, KWW10, BD/HM37 and MT/RT2 have more oil contents than the introduction, Kuching (3.60 %). Oleoresin content of local accession, BD/ST1 (21.95 %) is the highest and BD/MW24 also contained (18.20 %) more oleoresin content than the introduction, Kuching (17.55 %). Local accession BD/MW24 showed the highest amount piperine content, (11.92 %) whereas MN1, RP/NA1 and BD/MW23 also contain above 11 %. Accessions, BD/WA2, BD/GM29, KWW10, WGB1 and RP/KO3, recorded higher piperine contents than the introduction, Kuching (7.91 %). Introduced cultivar Panniyur 1 showed low amounts of volatile oil content (dry basis) (3.14 %), oleoresin (14.55 %) and piperine (7.73 %) when compared to the local accessions. Therefore, the selected local accessions can be used in hybridization programmes to incorporate better yield and quality characteristics.

Crossing of wild *Piper* spp. with *Piper nigrum* was started. In-order to fulfil this task *Piper siriboa* and *Piper chuyva* were crossed with MB 12 local selection and seeds

obtained from those crosses were planted for raising seedlings. For the molecular characterization, DNA extraction activities were also done.

Pepper hybrid lines 2/1 and 14/2 performed well giving higher yields after 5 years (1.4 and 1.34 Kg/ Dry seeds/ vine/year) compared to the Panniyur-1 variety.

Hybridization of Black Pepper with wild *Piper* spp. was successful and obtained two F1 populations from *Piper nigrum* X *Piper walkeir* and *P. sylvestre* X *P. nigrum* crosses.

✓ **Crop Protection**

- **Use of *Beauveria bassiana* for the control of pepper lacebug and coffee berry borer**

Objective: To investigate the possibility of use of entomopathogenic fungi for the control of pepper lace bug and coffee berry borer in the field. Insecta®, a synthetic product of chitin destructor of insect was mixed with *B. Bassiana* conidia and tested against pepper lacebug. No difference was observed on the mortality of lacebug among treatments.

- **Quick wilt disease of black pepper: isolation and identification of pathogen and control of the disease** Morphological characteristics of the causal fungi confirmed *Phytophthora capsici* as the causal agent of black pepper quick wilt in Sri Lanka.

Recommendations to control the pathogenic fungus are:

- Obtain disease free planting material in healthy potting mixture
- Frequent observation for typical symptoms
- Maintain field sanitation
- Avoid water logging condition
- Avoid sharing farm tools for both healthy and diseased holdings
- Prune the lower branches up to 30cm height from the base
- Remove infected parts of the vine and apply Bordeaux paste
- Drench soil with Metalaxyl (Ridomil)

✓ **Physiology and plant production**

- The plant production programme was started using two high yielding local selections i.e. GK49 and MB12 under “Bamboo Rapid Multiplication System” in 2006. Plants with 6-7 leaves were issued to Central / registered nurseries for further multiplication. In 2011, about 2,850 of GK49 and about 1,500 of MB12 plants produced 2,100 of GK49 and 750 of MB12 were kept for exhibition. Total of 16,976 plants were produced and distributed from 2006-2011. Two new high yielding local selections GM28 and BD/MN/41 were established for initial multiplication in the BRMS for future distribution.

***In- vitro* propagation of Black Pepper**

Objective: Selection of media for development of somatic embryos.

Woody plant medium(basal) supplement with BA (**0.05 mg l⁻¹**) and TDZ (**0.025 mg l⁻¹**)

was selected as suitable media for embryo development and germination.

5.2.3 Cocoa

✓ Genetics and Plant Breeding

- Eighty five cocoa lines available in the research station Matale are being characterized using morphological characters. For the study, 325 no. of root stock was prepared while bud grafted plants were planted in the field. Leaf characters were studied from 43 accessions while the bearing habits are being recorded. Study of the pod characters showed that WK2 (1078g), SCS6xICS6 (759.5g), ICS6xSCA6 (757.5g) higher pod weight than other selections. ICS6xNA32 (52), NA32xUIT1 (50), W6/457 (50) selections show the highest number of seeds whereas WK2 (93.75g), SCA6xICS6 (75.7g), ICA6xSCA6 (70.6g) show the highest seed dry weight.
- Mother Plants of cocoa originated from open pollinated F1 generation of SCA 6 X ICS 6 seed garden were evaluated. Plants were evaluated according to the characters of yield, pod value, number of pods per year and continuous bearing pattern. Cocoa plants of No. 01, No. 06 and No. 24 were selected as high yielding trees.

✓ Crop Protection

▪ A study on cocoa die-back disease

Koch's postulate confirmed *Lasiodiplodia theobromae* syn. *Botrydiploidia theobromae* as the cause of the disease. Fungicides tested were, thiophanate methyl 70% WP (w/w), Captan 50% WP (w/w) and 50% Carbendazim. Spraying Carbendazim @ 7g in 10 litres of water found to be the best in controlling the disease. Before spraying, removal/pruning of affected plant parts have to be done. Further, it is recommended to destroy affected branches by burning, in other words the affected plant parts have to be removed from the plantation.

5.2.4 Coffee

✓ Genetics and Plant Breeding

Aarabica coffee variety catimor, S9, HDT with local selections S9(K), H(K) are evaluating with Indian introduction S4711 for high elevations (800m AMSL). Apart from that Indian Introduction CxR (a robusta variety) also included. According to the results,

the best performing line is the local selection, H(K) giving the highest parchment coffee average yield (2502 kg ha⁻¹yr⁻¹) whereas the introduction S4711 showed the statistically similar yield (2409 kg ha⁻¹yr⁻¹). Catimor has given 2223 kg ha⁻¹yr⁻¹ while CxR and S(K) have about 2000 kg ha⁻¹yr⁻¹. The highest diameter (1.4 cm) of fresh berry was observed in Catimor while the longest fresh berry (1.5 cm) was S4711. Line H(K) has the highest dry seed weight (0.288 g) as well as lower fresh berry : dry weight ratio (5.11 : 1). Leaf characters show that the hybrid CXR has the largest leaves with highest leaf area (124.14 cm²), petiole length (1.1 cm), leaf length (19.27 cm) and leaf width (9.23 cm). Therefore, the local selection, H(K) and introduction S4711 could be recommended as the best yielding Arabica coffee lines for the mid country wet zone of Sri Lanka.

Another trial was established in a tea estate of up country wet zone, to evaluate the tea/coffee intercropping system. Results show that the introduction S4711 performed better giving more than 2600 Kg/ha while the local selection H (K) has given 2500 Kg/ha of parchment coffee yield. Tea yield data of the tea x coffee intercropping system were also collected and observed that no significant effect from coffee trees to the tea yield when compared to the tea yield with *Erithrina* shade.

Diallele crossings were carried out and individual plants from F1 were field evaluated. At the same time, seedlings of selected IMY plants are also being evaluated. From the yield data, seven lines were selected and back crossings were done with the vegetative propagated plants obtained from those promising lines.

✓ **Post Harvest Technology**

A fixed recipe was developed for Coffee cream as a value added product. This product was used as a ready to serve beverage, Three tea spoons of coffee cream was added to 125ml hot water.

5.2.5 Cardamom

✓ **Agronomy**

- **Effect of supplementary irrigation and planting pit dimension on growth of Cardamom during an intermittent dry period in the mid country intermediate zone.** Supplementary irrigation increased the development of new suckers and new racemes of cardamom but pit size did not show any significant effect on growth of suckers or racemes.

✓ **Genetics and Plant Breeding**

Seedling plants obtained from the best performing and well adapted cardamom plants of the second generation were field established at the Elston Estate, Avissawella. Growth and yield

data were recorded. Line no. 3-1-6, 3-1-7, 3-1-21, 3-7-7, 3-6-3 and 3-6-8 showed more than 30 pseudostems per clump. The line No. 3-1-10, 3-2-3, 3-2-33 and 3-7-4 show over 25 panicles per clump while the line no. 3-3-2, 3-2-3, 3-6-6 and 3-7-2 yielded over 75 g/clump/yr.

✓ Crop Protection

▪ Management of cardamom thrips

Objective: Suppress the thrips population below the economic injury level in biological means

Population distribution of the pest

Seasonal distribution of thrips was monitored at Kabaragala Estate, Elamulla, Nuwaraeliya. Recommended insecticides [Actara (Thiomethoxam)] and Provado (Imidocloprid) were applied at the beginning of population increase at Kabaragala Estate Elamulla. This was done from June to October at monthly interval.

Numbers of thrips on two pseudostems from randomly selected 100 bushes were recorded from insecticide applied area and unapplied area in monthly interval.

The data showed that the greater number of thrips per pseudostem was observed both in the sprayed and unsprayed areas January and August (Figure 1), but insecticides applied are showed significantly lower number of thrips (Table 1.). Since flower and new pods initiation is high in Maha season it could be recommended to start insecticide application in May June period.

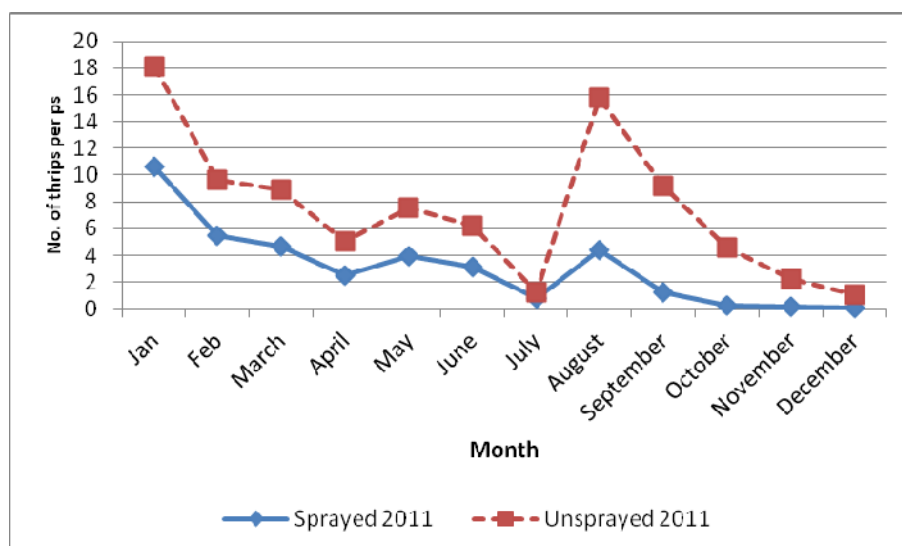


Figure 5.2.5.1 Population distribution of cardamom thrips

Table: 5.2.5.1 Effect of insecticide application on cardamom thrips

Treatment	Number thrips per pseudostem	Percentage pod damage at the harvesting stage
Control	7.9	74.2
Insecticide treated	2.65	5.56

▪ **Effect of insecticides on soil fauna**

Species diversity is being monitored in insecticide treated and untreated cardamom fields at Kabaragala Estate, Elamulla. The data showed that application of insecticide reduced the species diversity of soil fauna.

5.2.6 Nutmeg

✓ **Physiology and plant production**

Field evaluation of grafted nutmeg (*Myristica fragrans*) selections

Selection of high yielding nutmeg mother trees and grafting were carried out in 2003. These grafted plants were used for field evaluation in Matale Research Station (10 selections) and Gasnawa Central Nursery (8 selections) in 2005. Plants showed bushy appearance and average height of 211.9 cm and lateral spread of 156.2 cm in Matale and average height of 324.7 cm and lateral spread of 276.7 cm in Gasnawa. Very first flowering and fruit set was observed after two years and more flowering and fruit set was observed in subsequent years.

5.2.7 Arecanut

✓ **Genetics and Plant Breeding**

Evaluation of arecanut germplasm for mid country intermediate zone was carried out at the Research Station, Matale with 1296 lines. Arecanut line J 22 yielded 1419 nuts/tree from 5 bunches and line D1-38 yielded 1027 from 6 bunches for the year 2011. Other good lines were A 11, F 34, I 32, G 24, J 13, M 24, N 22, R 36, V 31, C1 21, D1 41 and F1 36 which were yielded over 850 nuts/tree/yr. According to the cumulative yield of past ten years the tree J 22, F 34 and G 24 are the best performing arecanut lines yielded over 800 average number of nuts/tree/yr.

Seedlings of the selected arecanut trees are being evaluated mainly for the adaptability to dry zone ecological conditions. Arecanut plants were established along the

irrigation canals of the paddy fields in 2006. It was observed that some plants had reached to flowering stage with over 350 cm height and 50 cm girth at the base.

Seedling plants obtained from selfing of 10 best yielding trees were field planted at the Research Station, Matale. Growth and yield data were recorded. The line no. 8-3 shows 450 nuts/tree/yr whereas the line no. 11-4 shows 350 nuts/tree/yr for the third fruiting year.

Seedling plants obtained from hybridization among the 10 best yielding trees were field planted at the Research Station, Matale. Growth and initial yield data were recorded. The line No. F3 recorded 1134 nuts/yr from 7 bunches whereas line H 8 recorded 740 nuts/yr from 6 bunches. Other good lines were G 2 and J 7 which were yielded over 600 nuts/yr.

5.2.8 Garcinia (Goraka)

✓ Physiology and plant production

High yielding Goraka mother trees were selected in Ovilikanda, Gasnawa and Aranayake and wedge grafting was carried out in 2004. These grafted plants were used for field evaluation in Matale Research Station (four selections) and Gasnawa Central nursery (five selections) in 2005.

Increasing trends were observed in overall plant height and lateral spread. Average height and lateral spread of grafted plants in 2011 were 158.4 cm and 110.1 cm in Matale and 239.7 cm and 262.1 cm in Gasnawa. Flowering and fruit set was started after 4 years.

5.2.9 Ginger

✓ Agronomy

▪ Ginger cultivation under pepper new planting

Objectives:

To find out the best spacing of Ginger under Pepper

Different Ginger spacing taken as treatment

Local ginger gives better performance when intercropped with pepper at the spacing of 30 X 30 cm. Chinese ginger gives better performance when intercropped with pepper at the spacing of 45 X 30 cm.

▪ **Effect of time of planting (month of planting) on growth and yield of Ginger**

Objectives:

1. To study the effect of planting time on (month of planting) growth and yield of ginger
2. To study the effect of planting time on ginger germination

Planting time was taken as treatment. Ginger were planted February, April, June, August and October. According to the result April to June is the best time for ginger cultivation.

✓ **Soil and Plant nutrients**

✓ **Fertilizer studies of Ginger**

Application of *Gliricidia* at the rate of 10 t/ha/month for first five months after planting gave the highest ginger yield of 66 t/ha followed by Indian recommendation (55.7t/ha). Application of paddy husk and paddy straw at the rate of 10t/ha gave 49t/ha and 47 t/ha of rhizome yield respectively. Application of gliricidia mulch is recommended for organic ginger cultivation over the application of paddy husk and paddy straw.

Fertilizer	Recommendation (Kg/ha)		
	Basal	45Days	90Days
Compost	30t/ha	-	-
Urea	-	82	82
TSP	100	-	-
MOP	-	42	42

✓ **Physiology and plant production**

▪ ***In- vitro* propagation of Turmeric**

Objective: 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

✓ **Crop Protection**

▪ **Study on major diseases of ginger**

Seed rhizomes storage test was carried out. Seed treatments used were 0.2% copper oxhychloride and 0.3% mancozeb. When rhizomes were treated with above chemicals, drying and deformations during storage period were significantly lower than the untreated rhizomes. Treated rhizomes showed higher germination percentage than the control and rhizome rot infection was not found.

✓ **Post Harvest Technology**

Volatile oil and oleoresin content of ginger varieties

Parameter	Local	Chinese	Rangoon
Moisture content %	11.50	11.50	13.50
Oil content on db %	1.68	1.43	1.53
Oleoresin content db %	8.84	6.46	8.85

Method for bleached/limed ginger

Soaked immediately peeled ginger in 4 % lime solution (40 g of Calcium Oxide dissolved in one liter of clean water) for six hours before drying.

Drying method for sliced dried ginger

The optimum tray (thin layer) drying temperature of sliced (3 mm thickness) ginger is 70 °C.

5.2.10 Kitul

✓ **Genetics and Plant Breeding**

Developed a medium height kithul hybrid variety using tall and dwarf kithul trees as parents. Average height of the hybrid tree was 8.8 m and the sap yield was four liters per day.

5.3. On going Research during the year 2011

5.3.1 Cinnamon

- Studies towards site-specific fertilizer recommendation for cinnamon (*Cinnamomum zeylanicum* Blume).
- Development of crop health based Integrated Pest management (IPM) package for managing major pests of cinnamon.
- Investigation on Three Major Leaf Types of Cinnamon (*Cinnamomum zeylanicum* Blume).
- Determination of Relationship of Cinnamon Bark Yield, Bark and Leaf oil Contents with Yield Component.
- Design and Development of Seed Separator for Cinnamon.
- Design and Development of a Marking Tool for Standard Grade Quill Preparation.
- 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.
- Selection of suitable mulching technique to cover the cinnamon (*Cinnamomum zeylanicum* Blume).
- Improvement of cinnamon (*Cinnamomum zeylanicum* Blume) peeling method with using cooling and thawing techniques.
- Evaluation of elite cinnamon lines as an intercropping under coconut in Intermediate zone.

5.3.2 Black Pepper

- Field evaluation of M₀ V₃ progenies of black pepper.
- Study the potential use of Coconut tree as supporting material for Pepper (*Piper nigrum*).
- Effect of Different Pruning Levels on Canopy Development and Yield of Pepper. (*Piper nigrum*)
- Studies on variation of flowering, fruit setting and yield of black pepper (*Piper nigrum*) under different agro-ecological zones.
- Comparison of black pepper (*Piper nigrum* L) yield per unit area of plants originated from orthotropic and plagiotropic branches.
- In-vitro propagation of high yielding pepper local selections.
- Comparison of growth and yield of pepper (*Piper nigrum* L.) raised from tissue cultured plants and single nodal cutting plants of GK49

- Production and distribution of high yielding two local pepper selections (GK49 and MB12) through central nurseries.
- In vitro clonal propagation of pepper (*Piper nigrum* L.) local selections with high yield and quality.
- Preparation of a bio fertilizer (Arbuscular Mycorrhizae-AM) and bio control agents (*Trichoderma* spp, and *Pseudomonas fluorescens*) for the nursery and field level applications in black pepper (*Piper nigrum* L.)
- Detection of microbial contaminations at different stages of post harvest practices of black pepper (*Piper nigrum* L.) and their control
- Evaluation of pepper germplasm from the local gene pool
- Evaluation of pepper introductions
- Evaluation of selected cocoa lines for mid country intermediate zone under Rubber
- Hybridization of local pepper selections (PNM-1) with Panniyur -1 and Kuching
- Evaluation of Black Pepper mutants for the drought tolerance
- Multi-faceted crop improvement project on Black Pepper
- Characterization of wild relatives of Black pepper and establishment of a field gene bank
- Investigation of effect of Mg on growth and yield of pepper
- Investigation of possibility of substitution of ERP for IRP for pepper
- Field evaluation of potential use of green manure as a source of fertilizer for pepper in different agro climatic conditions
- Site specific fertilizer recommendation for pepper
- Impact of organic farming in comparison to conventional practices on soil properties and yield
- Investigation of effect of source of nitrogen on growth and yield of black pepper
- Effect of cover crops on soil properties, growth and yield of pepper
- Determination of oil, oleoresin and piperine content of pepper from different locations of Sri Lanka.
- Mass propagation and field evaluation of native VAM inocula for black Pepper
- Effect of micro-irrigation on plant establishment, growth and yield of black pepper.
- 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

- Comparison of the use of gliricidia loppings and inorganic fertilizer mixture for Pepper cultivation. (Demonstration)
- Investigation of the effect of light berry harvesting on subsequent yield of black Pepper
- Evaluation of local pepper varieties under organic conditions.
- Study the effect of light berry harvesting of black pepper under organic conditions
- Evaluation of selected accessions of black pepper
- Use of *Beauveria brassiana* for the control of pepper lace bug
- Evaluation of the degree of pepper lace bug (*Diconocoris distanti* (Drake) damage in organic and conventional pepper farming
- Study of Pepper vine borer, biology, damage and control
- Field evaluation of bush pepper (Local and Pannyur)

5.3.3 Cocoa

- Studies on rehabilitation of old cocoa
- Evaluation of field performance of rooted cocoa (*Theobroma cacao* L.)
- Production of organic fertilizers from cocoa and coffee crop waste
- Increase of the productivity and profit of cocoa growers through inter-planting of rubber/coconut with good agricultural practices and integrated soil fertility management
- Selection of cocoa (*Theobroma cacao*) mother plants for mixed cropping
- Evaluation of selected cocoa lines (*Theobroma cacao* L.) for mid country intermediate zone.
- 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
- Screening of capsid bug (*Helopeltis ceylonensis*) resistant /tolerant cultivars of cocoa

5.3.4 Coffee

- Evaluation of coffee germplasm for mid country intermediate zone
- Evaluation of coffee germplasm for intercropping with tea in up country wet zone
- Evaluation of coffee germplasm for mid country wet zone
- Selection, hybridization and evaluation of coffee

- Evaluation of arabica coffee accessions for yield, quality and resistant to major pest and diseases
- Use of *Beauveria brassiana* for the control of coffee berry borer diseases
- Investigations of biological control agents of coffee berry borer
- Strategies for organic cultivation of arabica coffee
- 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.
- Productivity improvement of cardamom using better cultural practices (supplementary irrigation and pit size)
- Biological control of cardamom thrips
- Development of control measures for cardamom thrips

5.3.6 Betel

- Evaluation of department fertilizer mixture for single supporting system in betel (*Pipper betle L*) cultivation.
- Collection and evaluation of betel (*Piper betel L.*) germplasm for high yielding betel cultivars with promising leaf quality characters.
- The effect of different combinations of green manure, cow dung and Department recommended fertilizer mixture, on quality and yield of betel (*Piper betle*)

5.3.7 Ginger

- Effect of different type of mulches on growth and yield of ginger
- Evaluation of ginger (*Zingiber officinale*) germplasm under coconut cultivation.
- Fertilizer studies on Ginger

5.3.8 Turmeric

- Fertilizer studies on Turmeric
- Effect of the size of planting material on the yield and quality of Termaric (*Curcuma longa*)

5.3.9 Kitul

- Investigation of the potential of flour extraction from kuru kithul (*Caryota mitis*)

5.3.10 Other

- Preparation of bio fertilizer (Arbuscular Mycorrhiza-AM), Bio control agents (*Trichoderma spp.* *Pseudomonas fluorescence*) and mass culturing.
- Production of organic fertilizers from cocoa and coffee crop waste or husks
- Development of an integrated nutrient management system for Export Agricultural Crops by increasing the nutrient uptake efficiency using mycorrhizal associations.
- Home garden model of Export Agricultural Crops at Matale
- Development of tray drying technology to improve quality of Export Agricultural Crops

5.4 Progress of Other Activities of the Research Division

5.4.1 Planting material issued by the Research Division

Cinnamon	-	262,579
Pepper	-	82,185
Coffee	-	1959
Cardamom	-	13,185
Vanilla	-	16
Cocoa	-	50
Nutmeg	-	303
Kitul	-	1,939
Arecanut	-	25,007

5.4.2 Maintenance of Germplasm / Seed garden

Establishment of isolated seed garden at Nillambe

Isolated seed garden of improved cinnamon variety (1400 plants) was established

5.4.3 Field visit (Plant Protection Unit)

The officers attached to plant protection unit had visited following areas for investigating of pest and disease problems mentioned below.

Wahacotte, Rathota, Kandy– Pepper quick wilting, pepper slow wilting

Kegolle, Badulla, Monaragala– Pepper stem borer,

Dodangaslanda, Elkaduwa, Wattagama, Gampola– Clove stem borer, Leaf fall disease

Kandy, Matale, Kurunegala– Nutmeg leaf fall disease

Kurunegala, Dodangaslanda - Bacterial and fungal damage, Ginger Shoot borer

Kurunegala,–Turmeric stem borer

Madolkale – Cardamom thrips problem

Matale – Cocoa dieback, Scale insect damage

5.4.4 Pest and Disease control

The following activities have been done by Plant Protection Unit

Field visit – 370

Farmer training class – 34

Field day – 17

Divinaguma programme – 14

Nursery inspections – 160

Television programme – 01

Radio programme - 02

5.5. Economics & Market Research on EAC

5.5.1. Studies and Surveys

5.5.1.1 Economic Analysis of Forward Marketing Arrangements for Ginger in Kandy District

External and internal marketing channels for EAC produced in Sri Lanka has been operating in the traditional way as it had been operated for hundreds of years. No significant breakthrough can be notified in internal or external marketing systems of major EAC in the recent past comparative to marketing systems of other major export crops such as tea, rubber and coconut which had responded promptly to the dynamic and rapid world market changes. However a novel concept of marketing is practiced for ginger, a new member of EAC family, by a several producer groups in the Kandy district. Forward market contracts had been operating by producer groups in Pujapitiya, Hatharaliyadda and Udunuwara DS divisions since 2004 to supply ginger to the Elephant House, a pioneer soft drink producer in the country, with the facilitation of the Regional Development Bank. Under those agreements about 35-40mt. of dry ginger had been supplied in 2010 and nearly Rs. 24 mn. had been distributed among farmers. A study was planned to identify the positive features and advantages of such forward marketing arrangements and to understand whether such concept can be applied to other EAC. The Research is in progress.

5.5.2. Estimation of Average Annual Productivity Levels of EAC at the field level

Economics Research Unit is responsible for collection and compilation of all sort of data related to EAC. Export, import and international prices of all EAC were collected

from secondary sources and weekly farm gate prices in all major growing districts are collected from field surveys. Annual production and extent of EAC are estimated as it is difficult to collect correct figures from the field due to the complex nature of EAC cultivations. Annual production is estimated taking export as a proxy and adding domestic consumption at the household, industrial and service level and deducting the import figure. However the figure gives a national estimate and regional disparities are not reflected. The production of pepper, clove and nutmeg in major growing areas had declined in last two years and an irregular bearing pattern was reported due to recent climatic changes. Therefore it has been felt that the current production estimate does not reflect the actual situation and annual productivity figures should be collected from the ground level. Because of that a productivity survey has been planned in last year to collect actual production levels of EAC from the field in two harvesting seasons in all main growing districts. Information on harvesting seasons of EAC was collected at the EO range level and Extent figures were collected at the Divisional Secretary level. Proportionate to the EAC extent in DS divisions of main growing districts, a sample containing 946 farmers has been selected for the survey. The research is continuing.

5.5.3 Extent of EAC

The extent of new planting of EAC in 2011 was computed considering the 3rd successful inspections done under the New Planting Assistance Scheme (table 5.5.3.1). In 2011 new planted extent was 875.8 ha from which 416 ha of cinnamon and 361ha of pepper.

Table 5.5.3.1 Newly Planted Extent of EAC by Districts – 2011

District	Cocoa	Coffee	Cinnamon	Cardamom	Pepper	Clove	Nutmeg	Total
Kandy	2.8	18.2	8.7		70.5	0.1	6.5	106.8
Matale	5.2	5.7	17.8		50.1	2.0	0.9	81.7
Nuwareliya		3.6	3.4		5.2			12.4
Kurunegala	7.0	0.6	10.4		15.1		0.2	33.1
Badulla		0.5	1.2		5.4			7.1
Monaragala	4.7		0.8		1.0			6.5
Kegalle		0.4	19.3	0.3	117.4			137.4
Ratnapura			73.1		60.5			133.6
Colombo			17.6		0.2			17.8
Kalutara			94.8		3.7			98.5
Gampaha		1.5	20.2		17.8			39.5
Galle			60.8		2.8			63.6
Matara			41.9		7.1			49.0
Hambantota			45.6		0.9			46.5
Total	19.7	30.5	415.6		357.7	2.1		833.5

Source: Monthly Progress Reports of the ERU

Considering above performances and taking ‘Agriculture Census 2002’ as the base line district wise extent figures and total extent of EAC in 2011 were estimated. (Table 5.5.3.2)

Table 5.5.3.2 Estimated Extent of EAC by Districts - 2011 **Hectares**

District	Cocoa	Coffee	Cinnamon	Cardamom	Pepper	Clove	Nutmeg	Areca nut	Betel	Citronella	Total
Kandy	259	1,288	86	719	5,742	2,995	767	2,145	68		14,069
Matale	1,042	645	219	1,129	6,173	667	65	1,135	57		11,132
Nuwaraeliya	5	1,063	32	116	868	337	3	490	28		2,942
Kurunegala	151	704	132	8	2,960	403	50	857	1,024		6,289
Badulla	30	325	162	10	2,446	55		1,308	54		4,390
Monaragala	596	192	58		1,766	6	1	867	70		3,556
Kegalle	173	594	204	434	2,949	1,701	43	1,670	205		7,973
Ratnapura	23	226	3,839	338	3,158	403	6	1,895	132	386	10,406
Colombo	2	58	202	1	240	59	2	215	77		856
Kalutara	4	139	3,229	3	308	130	4	737	290		4,844
Gampaha	8	367	206	2	1,614	114	6	1,041	522		3,880
Galle	3	107	11,009		457	192	2	711	187		12,668
Matara	4	171	8,224	34	769	489	5	920	88		10,704
Hambantota		111	2,921	1	1,786	54		456	44	788	6,161
Other Districts		50			60			647	240		997
Total	2,300	6,040	30,523	2,795	31,296	7,605	954	15,094	3,086	1,174	100,867

Sources: Dept. of Census & Statistics /Monthly Progress Reports of the ERU

5.5.4. Production Trends in 2011

Due to the non availability of accurate on site farm level data on extent and annual productivity the production was 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), imports and withholding stocks in the market channel. Substantial amounts were allocated for unreported exports too (table 5.5.4.1).

Table 5.5.4.1 Estimated Production (Mt.) of EAC s – 2008/2011

Crop	2008	2009	2010**	2011*
Cocoa	624	467	520	525
Coffee	3,081	3,125	3,163	2,974
Cinnamon	14,691	15,765	16,435	18,250
Pepper	12,897	15,767	17,332	10,800
Cardamom	70	61	48	57
Clove	8,553	3,032	9,551	5,533
Nutmeg (& mace)	2,259	1,740	2,376	2,116
Areca nut	24,955	23,540	24,361	24,485
Betel	30,571	30,454	30,046	30,645
Citronella oil	22	7	18.6	9
Ginger	10,053	10,780	12,052	12,500
Turmeric	7,135	7,747	8,304	8,500

Source: Dept. of Census & Statistics & DEA data base. * Provisional ** Revised

5.5.5. Trends in EAC Exports and Export Earnings

The year 2011 was not impressive in terms of Export Volume of EAC when compared with the 2010 though the export earnings reached to the highest ever figure in its' history. The export volume in 2011 was 36,364mt with foreign exchange earnings of Rs.28, 810mn and the growth of the earnings over 2010 was around 20% (Annex I).

Crops showed mixed performances with declined export volume of spices, In the spice category only cinnamon and cardamom had showed slight increases. Export volumes and values of pepper and clove, which performed well in last year, had declined by more than 50% mainly due to poor harvests of 2010 Maha and both seasons in 2011. It was even reported that depleted market stocks of pepper and clove also affected to the declined export volumes despite the highest ever prices recorded for both crops in 2011. Export of spice oils and export earnings had increased but citronella industry had continued to decline. Coffee had become an insignificant export crop with just 10.4mt. of export in 2011 but cocoa exports had been increasing significantly since 2008 mainly due to the export of cocoa butter and other value added product which may have produced from imported beans (Annex iii). The

noteworthy features in the exports of EAC in 2011 were increased exports of ginger and turmeric for which DEA had made significant investments for development activities.

5.5.6. Behaviour of Prices

2011 was one of the most profitable years for almost all EAC. Farm Gate Prices of cinnamon, pepper, clove, nutmeg and mace had increased impressively over 2010 and prices of all other commodities, except cardamom and betel, had also increased substantially (Annex II). Spot prices of clove and pepper in some weeks of 2011 reached to Rs. 2200 and Rs.1200 per kilo respectively and those were the highest ever values received for those commodities in the history. However prices of ginger and turmeric had shown a decline over 2010.

5.5.7. Trends in EAC Imports in 2011

In 2011 Sri Lanka imported almost all Export Agriculture Crops at least in minor quantities. Total import of EAC in 2011 was 15,315.6mt. to which cocoa, turmeric and ginger accounted to 10,555mt., 4266mt. and 258.7mt.respectively (Annex III). None of other item exceeded 100mt. though the amount is increasing year by year. Comparative to 2010 imports in 2011 increased by 24% mainly due to the increased import of cocoa beans for value addition and re-exports. Total import cost in 2010 was Rs. 4400mn increase over 2009 was 111.3%. About Rs.5980mn was spent to import cocoa and Rs. 796mn was for import of turmeric.

5.6 Publications

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- Silva S. I. C., Weerasena O.V. D. S. J., Gunawardena D. Senavirathne J. M. Differentiation of selected *Piper nigrum* L (black pepper) cultivars in Sri Lanka using morphology and AFLP markers. Presented at *National Symposium on Agricultural Biotechnology*. Sponsored by National Committee on Agricultural Biotechnology, Council for Agricultural Research Policy, Held at Rice Research and Development Institute, Bathalagoda, December 16.
- Seneviratne J. M., Premakumara K.V.S., Rajapakse I.G.M. and Idamekorale P.R. Development of medium height Kithul (*Careota urens* L.) variety. Presented at *National Symposium on Agricultural Biotechnology*. Sponsored by National Committee on Agricultural Biotechnology, Council for Agricultural Research Policy, Held at Rice Research and Development Institute, Bathalagoda, December 16.
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- Pradeep V.P.P., Subasinghe H.M.P.A., Chandrasena G. and Withanage N.S., (2011), Study on changes in root systems of black pepper (*Piper nigrum* L) and support tree (*Gliricidia sapium*.) between two consecutive support tree prunnings. Proceedings of the Annual Symposium of Uva Wellassa University.
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Annex I: Export Volume and Value of Export Agriculture Crops – 2010/11

Commodity	Units	2010*	2011**	Growth% 2010/11
Cinnamon	Vol (mt.)	11,779.1	13,515.7	14.7
	Val (Rs.mn)	9,370.0	13,378.6	42.8
Cinnamon Leaf Oil	Vol (mt.)	155.4	231.2	48.8
	Val (Rs.mn)	244.4	498.6	104.0
Cinnamon Bark Oil	Vol (mt.)	26.0	30.1	15.8
	Val (Rs.mn)	251.6	351.0	39.5
Clove	Vol (mt.)	6,846.0	3,570.5	-47.8
	Val (Rs.mn)	4,090.2	3,676.3	-10.1
Clove stems	Vol (mt.)	1,482.9	1,624.9	9.6
	Val (Rs.mn)	137.2	235.3	71.5
Clove Oil	Vol (mt.)	14.7	13.0	-11.6
	Val (Rs.mn)	41.1	45.6	10.9
Cocoa & Cocoa Products@	Vol(mt.)	4,175.7	5,190.3	24.3
	Val (Rs.mn)	2,089.7	2,688.5	28.7
Coffee	Vol(mt.)	157.5	10.4	-93.4
	Val (Rs.mn)	38.1	8.7	-77.2
Pepper	Vol(mt.)	12,218.9	5,056.6	-58.6
	Val (Rs.mn)	4,824.8	3,391.4	-29.7
Pepper Oil	Vol(mt.)	5.3	8.6	62.3
	Val (Rs.mn)	41.6	151.2	263.5
Cardamom	Vol(mt.)	6.9	11.5	66.7
	Val (Rs.mn)	30.6	65.4	113.7
Cardamom Oil	Vol(mt.)	0.3	0.1	-66.7
	Val (Rs.mn)	16.7	7.0	-58.1
Citronella	Vol(mt.)	18.5	11.7	-36.8
	Val (Rs.mn)	44.1	28.6	-35.1
Nutmeg	Vol(mt.)	1,952.0	1,669.0	-14.5
	Val (Rs.mn)	1,358.7	2,067.9	52.2
Mace	Vol(mt.)	244.8	205.0	-16.3
	Val (Rs.mn)	445.3	756.0	69.8
Nutmeg Oil	Vol(mt.)	13.0	22.2	70.8
	Val (Rs.mn)	94.3	235.5	149.7
Arecanut	Vol(mt.)	1,984.1	2,176.4	9.7
	Val (Rs.mn)	246.6	273.8	11.0
Betel	Vol(mt.)	2,246.4	2,845.0	26.7
	Val (Rs.mn)	576.1	758.8	31.7
Vanilla	Vol(mt.)	0.3	0.2	-21.3
	Val (Rs.mn)	4.7	5.3	11.9
Vanilla Oil	Vol(mt.)	0.01	2.1	20,990.0
	Val (Rs.mn)	0.03	3.3	10,900.0
Lemon Grass Oil	Vol(mt.)	1.9	1.31	-31.6
	Val (Rs.mn)	6.4	4.6	-28.1
Total EAC	Vol(mt.)	43,329.7	36,195.9	-16.5
	Val (Rs.mn)	23,952.2	28,631.4	19.5
Ginger	Vol(mt.)	36.7	138.8	278.2
	Val (Rs.mn)	46.5	152.0	226.9
Ginger Oil	Vol(mt.)	0.9	1.1	22.2
	Val (Rs.mn)	14.4	17.7	22.9
Turmeric	Vol(mt.)	13.3	31.1	133.8
	Val (Rs.mn)	11.2	30.8	175.0
Total (Ginger & Turmeric)	Vol(mt.)	50.9	171.0	236.0
	Val (Rs.mn)	72.1	200.5	178.1
Total (with Ginger & Turmeric)	Vol(mt.)	43,380.6	36,363.6	-16.2
	Val (Rs.mn)	24,024.3	28,831.9	20.0

Source: Sri Lanka Customs

* revised

** provisional

@ with re-exports

Annex II: Average Prices of Export Agricultural Crops (Rs/Kg) in 2008/11

Crop	Price	Year				Growth % 2010/11
		2008	2009	2010	2011	
Cocoa	FG	154.61	210.41	282.49	322.13	14.0
	AU	196.34	268.60	359.78	347.16	-3.5
	WM	279.08	326.01	354.60	332.71	-6.2
Coffee	FG	265.45	220.92	223.63	234.09	4.7
	AU	372.51	293.85	268.00	266.16	-0.7
	WM*	255.58	193.75	207.72	282.20	35.9
Pepper	FG	324.92	287.43	342.14	691.90	102.2
	AU	341.71	294.69	364.31	703.46	93.1
	WM	414.43	326.98	451.94	726.58	60.8
Clove	FG	471.97	484.66	542.99	1,250.35	130.3
	AU	518.75	529.67	592.13	1,376.14	132.4
	WM	479.40	534.69	594.37	1,291.82	117.3
Cinnamon Quills	FG	664.35	621.95	726.57	921.85	26.9
	AU	634.08	558.82	589.02	822.82	39.7
	WM					
Nutmeg	FG	316.23	331.87	459.62	742.53	61.6
	AU	341.70	367.71	513.37	790.02	53.9
	WM	963.21	1,018.44	1,430.92	2,442.44	70.7
Mace	FG	820.70	857.37	1,716.73	2,847.77	65.9
	AU	887.26	936.99	1,999.13	3,092.01	54.7
	WM	1,040.29	1,103.21	2,304.88	3,758.72	63.1
Cardamom	FG	1,718.27	1,732.32	3,320.96	2,713.12	-18.3
	AU	2,019.79	1,926.97	3,592.12	2,482.81	-30.9
	WM					
Betel (Rs./1000 leaves)	FG	1,937.00	1,383.33	2,208.29	2,042.19	-7.5
	AU	-				
	WM	-				
Areca nut	FG	113.24	107.28	115.28	215.31	86.8
	AU	124.33	115.27	128.63	226.46	76.1
	WM	-				
Vanilla	FG					
	AU	425.00				
	WM	3,135.00	3,391.00	2,800.00	2,848.00	1.7
Ginger (Raw)	FG	100.00	130.61	114.67	76.51	-33.3
	AU	-				
	WM	-				
Turmeric (Raw)	FG	25.00	31.02	50.75	47.70	-6.0
	AU	-				
	WM	-				

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

* Robusta coffee

Annex 111: Import Volume and Value of Export Agriculture Crops – 2010/11

Commodity	Units	2010	2011*	Growth% 2010/11
Cinnamon	Vol (mt.)	14.83	44.49	200.0
	Val (Rs.mn)	9.86	45.38	360.2
Cinnamon Leaf Oil	Vol (mt.)	0.02	0.01	-50.0
	Val (Rs.mn)	0.12	0.06	-50.0
Cinnamon Bark Oil	Vol (mt.)	0.48	0.26	-45.8
	Val (Rs.mn)	1.82	1.12	-38.5
Clove	Vol (mt.)	10.00	25.93	159.3
	Val (Rs.mn)	6.41	15.55	142.6
Clove Oil	Vol (mt.)	0.17	0.02	-88.2
	Val (Rs.mn)	0.32	0.72	125.0
Cocoa & Cocoa Products	Vol(mt.)	7,614.48	10,555.67	38.6
	Val (Rs.mn)	3,201.33	4,895.31	52.9
Coffee	Vol(mt.)	93.26	36.37	-61.0
	Val (Rs.mn)	25.47	30.67	20.4
Pepper	Vol(mt.)	62.27	34.92	-43.9
	Val (Rs.mn)	14.50	15.97	10.1
Pepper Oil	Vol(mt.)	0.03	0.07	133.3
	Val (Rs.mn)	0.60	0.74	23.3
Cardamom	Vol(mt.)	15.44	6.32	-59.1
	Val (Rs.mn)	8.70	7.16	-17.7
Cardamom Oil	Vol(mt.)	0.36	0.67	86.1
	Val (Rs.mn)	11.79	27.20	130.7
Citronella	Vol(mt.)	1.94	2.60	34.0
	Val (Rs.mn)	2.98	3.43	15.1
Nutmeg	Vol(mt.)	7.62	9.76	28.1
	Val (Rs.mn)	8.81	19.09	116.7
Mace	Vol(mt.)	74.77	0.90	-98.8
	Val (Rs.mn)	22.08	1.95	-91.2
Nutmeg Oil	Vol(mt.)	1.08		
	Val (Rs.mn)	7.77		
Arecanut	Vol(mt.)		72.01	
	Val (Rs.mn)		7.95	
Betel	Vol(mt.)		0.02	
	Val (Rs.mn)		0.01	
Vanilla	Vol(mt.)	0.12	0.01	-91.7
	Val (Rs.mn)	0.35	0.01	-97.1
Vanilla Oil	Vol(mt.)	8.35		
	Val (Rs.mn)	11.20		
Lemon Grass Oil	Vol(mt.)			
	Val (Rs.mn)			
Total EAC	Vol(mt.)	7,905.2	10,790.0	36.5
	Val (Rs.mn)	3,334.1	5,072.3	52.1
Ginger	Vol(mt.)	240.69	258.67	7.5
	Val (Rs.mn)	78.85	112.43	42.6
Ginger Oil	Vol(mt.)		1.7	
	Val (Rs.mn)		13.9	
Turmeric	Vol(mt.)	4,196.10	4,266.87	1.7
	Val (Rs.mn)	992.04	795.97	-19.8
Total (Ginger & Turmeric)	Vol(mt.)	4,436.8	4,527.2	2.0
	Val (Rs.mn)	1,070.9	922.3	-13.9
Total (with Ginger & Turmeric)	Vol(mt.)	12,341.99	15,317.2	24.1
	Val (Rs.mn)	4,405.00	5,994.6	36.1

Source: Sri Lanka Customs

* provisional

Annex IV: Deployment of Extension Officers -2011

Kandy	EO's Range	Kegalle	EO's Range
	Galagedara		Mawanalla
	Udunuwara		Ussapitiya
	Kurunduwatta / Rambukpitiya		Pinnawala/ Daliwela
	Gampola/ Delpitiya		Kegalle
	Galaha/ Talatuoya		Warakapola
	Pujapitiya		Daraniyagala
	Theldeniya		Dadigama
	Udadumbara		Batuwatta/ Yattogoda
	Rambukpitiya		Aranayake
	Yatinuwara		Ruwanwella
	Wattegama, Huluganga		Yatiantota
	Kundasale		Panawela
	Hatharaliyadda		Bulathkohupitiya
	Harispaththuwa / Alawathugoda	Colombo	
	Medapitiya		Avissawella
Matale			Homagama
	Palapathwala	Kalutara	
	Ukuwela		Maduruwela
	Thanna		Bandaragama
	Rattota		Kaluthara
	Weragama		Mathugama
	Yatawatta		Horana / Ingiriya/ Bulathsinghala
	Hunukatala		Iththapana
	Pallapola		Baduraliya
	Wahakotte		Agalawatta
	Alugolla		

Nuwara Eliya EO's Range

Ginigathhena
 Kothmale
 Rikillagaskada/ Hanguranketha
 Walapane

Gampaha EO's Range

Dompe Dekatana
 Udugampola
 Gampaha
 Mahara
 Urapola
 Wake
 Badalgama
 Bemulla
 Pallewela
 Biyagama
 Meerigama
 Divulapitiya
 Minuwangoda

Kurunegala

Polgahawela,
 Dodamgaslanda
 Mawathagama
 Rambadagalle
 Karandagolla
 Malsiripura
 Dambadeniya
 Katugampola/ Kuliypitiya
 Alawwa
 Bingiriya/ Udubaddawa
 Wariyapola

Hambantota

Okewela
 Beliaththa
 Middeniya
 Katuwana
 Walasmulla
 Thangalla
 Weerakatiya

Badulla

Soranatota Badulla
 Haldummulla Haputhale
 Nikapotha/ Bandarawela
 Uwaparanagama/ Walimada

Galle**EO's Range**

Aluthwela
Hiniduma
Habaraduwa
Ambalangoda
Balapitiya
Akmeemana
Athkandura
Alpitiya
Karandeniya
Baddegama/ Hikkaduwa
Niyagama
Yakkalamulla

Matara

Deniyaya
Akurassa
Pasgoda
Hakmana
Waligama
Devinuwara
Deiyandara
Kamburupitiya
Malimbada
Matara

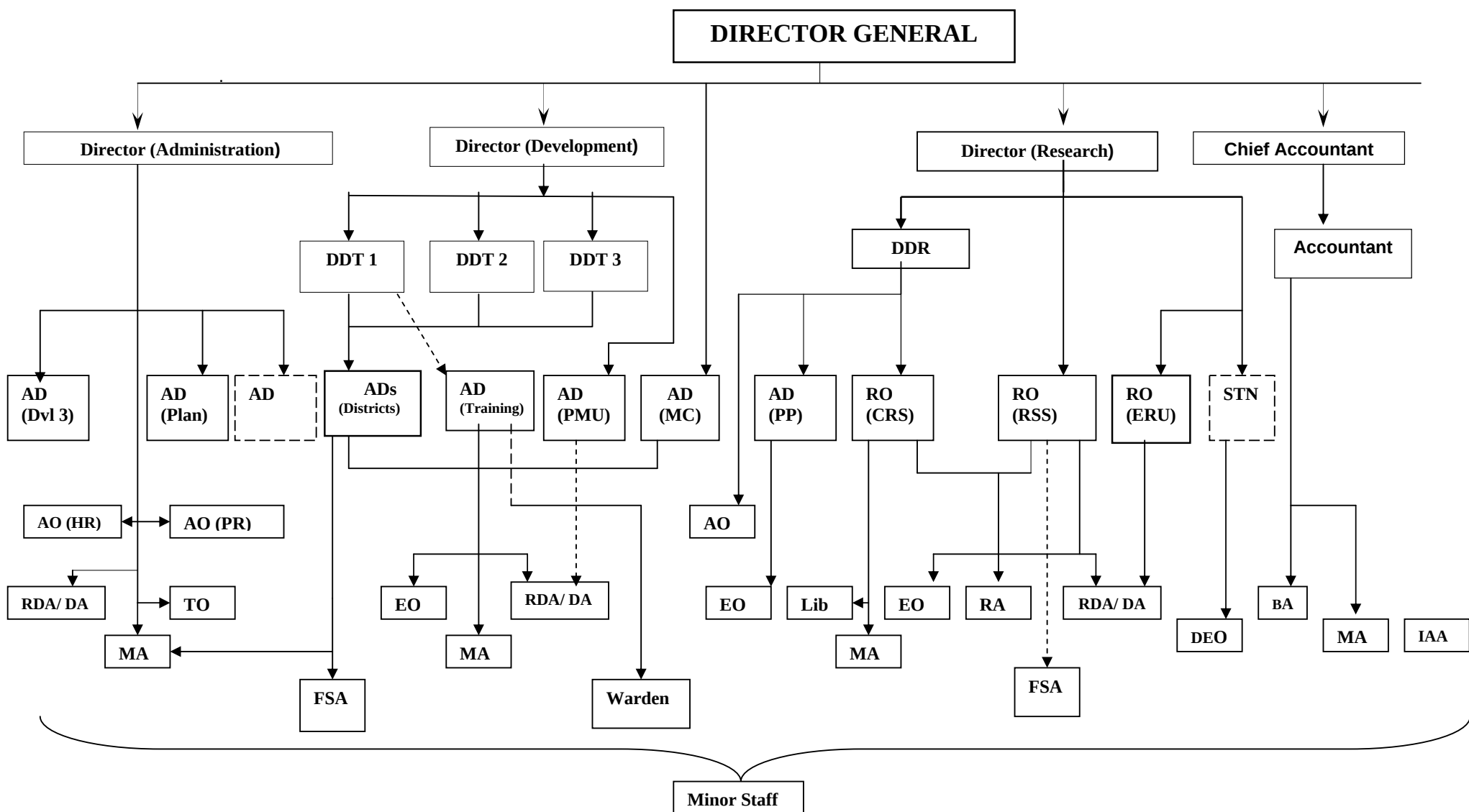
Monaragale**EO's Range**

Bibile
Monaragala/ Buttala
Badalkumbura
Madulla
Hingurukaduwa Wallawaya
Madagama
Padiyathalawa

Ratnapura

Waligepola
Ahaliyagoda
Kolonna
Ayagama
Godakawela
Kalawana
Palmadulla
Balangoda

Annex IV -ORGANIZATION CHART -DEPARTMENT OF EXPORT AGRICULTURE -2011



DDA- Deputy Director Administration , **DDT**- Deputy Director Technical, , **DDR**-Deputy Director Research, **DDF**-Deputy Director Finance , **AD** - Assistant Director, **Dvt**-Development, **Plan**- Planning, **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, **RDA**-Research and Development Assistant, **DA**- Development Assistant, **BA**-Budget Assistant, **TO** -Technical Officer, **MA**- Management Assistant, **IAA**-Internal Audit Assistant, **Lib**-Librarian, **EO** – Extension Officer, **RA**- Research Assistant, **DEO**-Data Entry Operator ,**FSA** –Farm Service Assistant.



අපනයන කෘෂිකර්ම දෙපාර්තමේන්තුව - අතමිටි කරු හෙට දිනකට

ஏற்றுமதி விவசாயத் திணைக்களம் - வளமான எதிர்காலத்திற்கு

DEPARTMENT OF EXPORT AGRICULTURE - FOR A PROSPEROUS FUTURE