

**National Research Priorities on
Socio-Economics and Policy Analysis**

2017 - 2021

**National Committee on
Socio-Economics and Policy Analysis**

**Ministry of Agriculture
Sri Lanka Council for Agricultural Research Policy
114/9, Wijerama Mawatha
Colombo 07
Sri Lanka
2017**

Table of Contents

Message from the Chairman	iii
Message from the Secretary/Director	iv
Leading Scientist for the Thematic Area	v
Editorial Board	vi
Committee Members 2016	vii
1. Introduction	1
2. Productivity Issues Related to Competitiveness	2
2.1 Overview of Major Issues	2
2.2 Areas of Thrusts Where Research is Needed	3
3. Natural Resource Management and Environmental Sustainability	21
3.1 Overview of Major Issues	21
3.2 Areas of Thrusts Where Research is Needed	22
4. Technology Generation, Transfer use and Delivery of Services	29
4.1 Overview of Major Issues	29
4.2 Areas of Thrust Where Research is Needed	29
5. Agricultural Inputs, Marketing, Processing and Value Addition	35
5.1 Overview of Major Issues	35
5.2 Areas of Thrust Where Research is Needed	35
6. Agricultural Trade and Investment	46
6.1 Overview of Major Issues	46
6.2 Areas of Thrust Where Research is Needed	46
7. Employment, Labor Use, Institutions and Rural Development	57
7.1 Overview of Major Issues	57
7.2 Areas of Thrust Where Research is Needed	57
8. References	63
9. List of Participants at the Workshop held on 13th September, 2016 at Mahinda Silva Auditorium, Hector Kobbekaduwa Agrarian Research and Training Institute (HARTI)	64

List of Tables

Table 01: Priority Research Areas and Basic Issues in Productivity Issues Related to Competitiveness	4
Table 02: Priority Research Areas and Basic Issues in Natural Resource Management and Environmental Sustainability	23
Table 03: Priority Research Areas and Basic Issues in Technology Generation, Transfer, use and Delivery of Services	30
Table 04: Priority Research Areas and Basic Issues in Agricultural Inputs, Marketing, and Processing and Value Addition	36
Table 05: Priority Research Areas and Basic Issues in Agricultural Trade and Investment	48
Table 06: Priority Research Areas and Basic Issues in Employment, Labor Use, Institutions and Rural Development	58

Message from the Chairman

Agriculture Sector assumes a predominant role in Sri Lanka ensuring food and nutrition security of the nation. Similarly, its share in economic development particularly in the rural economy is very substantial. During the last decade Agricultural Sector has expanded many folds generating employment at rural and estate sub-sectors significantly contributing to nutritional security.

Well-coordinated Research and Development (R & D) activities undertaken during the last 5 years by the research institutes under the Ministry of Agriculture have generated many valuable outcomes contributing to the rapid development of this sector.

Sri Lanka Council for Agricultural Research Policy (SLCARP) among other mandates has been constantly involved in facilitating the process of R & D prioritization, including the preparation of recently completed research priorities over the last five years. Having re-visited the previous R & D prioritization, SLCARP is pleased to publish the National Research Priorities on Socio-Economics and Policy Analysis 2017-2021 prepared with the participation of all relevant stakeholders including farmers and the private sector.

The document articulates Introduction, Overview of Major Issues, Areas of Thrust that where Research is needed, and Priority Research Areas & Basic Issues. Thematic Research Areas have been mentioned as follows: (1) Productivity Issues Related to Competitiveness (2) Natural Resource Management and Environmental Sustainability (3) Technology Generation, Transfer, use and Delivering of Services (4) Agricultural Inputs, Marketing, Processing and Value Addition (5) Agricultural Trade and Investment (6) Employment, Labor Use, Institutions and Rural Development.

Adherence to the recommendations of this strategic document will certainly improve the quality of the National Agricultural Research Plan (NARP) in the ensuing years in which situation the Treasury will be convinced the limited financial resources can be utilized in a more focused and effective manner. This will ensure that the and the benefits will flow to the general public of this country, which is the ultimate objective of SLCARP.

Dr. S D G Jayawardena
Chairman
Sri Lanka Council for Agricultural Research Policy
01st January 2017

Message from the Secretary/Director

The main function of the Sri Lanka Council for Agricultural Research Policy (SLCARP) is to advise the Government on all matters regarding the organization, co-ordination, planning and execution of agricultural research in Sri Lanka. Research in the agricultural sector comprises research in the plantation, non-plantation, forestry, livestock and fisheries sectors.

Research activities on Socio-Economics and Policy Analysis related to plantation, non-plantation, forestry, livestock and fisheries sectors are mandated with the National Agricultural Research System (NARS), which is responsible for planning and implementation of research programmes according to the national needs of the above sectors. Several University Faculties and Departments, and Private Sector Organizations also undertake research on Socio-Economics and Policy Analysis. Therefore, it is necessary for all those institutions, which are involved in the NARS, to join hands to develop a long-term research programmes at National level.

The National Committee on Socio-Economics and Policy Analysis at SLCARP has decided on research projects, concepts, formats and research review formats as tools to monitor and evaluate treasury granted research in order to minimize research duplication and to accelerate the undertaking of priority research projects to derive tangible research outputs.

The Council gratefully acknowledges the unstinted co-operation received from the members of the National Committee and Chairs of the Sub-Committees in the development of the document, and Dr. Fredrick Abeyratne, Editor-in-Chief and the Editorial Board in editing this document. The Council also greatly appreciates the contribution made by the Director, Additional Director (Research) of Hector Kobbekaduwa Agrarian Research and Training Institute (HARTI) for hosting the stakeholder seminar at HARTI. Service rendered by Dr. Frank Niranjana, Secretary of this National Committee, in producing this document is greatly appreciated.

Dr. J D H Wijewardena
Secretary/ Director
Sri Lanka Council for Agricultural Research Policy
01st January 2017

Leading Scientists for the Thematic Areas

Productivity Issues Related to Competitiveness

Miss. A P P Disna, Director (Regulations), Department of Export Agriculture

Natural Resource Management and Environmental Sustainability

Prof. L M Abeywickrama, Professor, Faculty of Agriculture, University of Ruhuna

Technology Generation, Transfer Use and Delivery of Services

Mr. T H C S Perera, Director, Socio Economic and Planning Centre, Department of Agriculture.

Agricultural Input, Marketing, Processing and Value Addition

Mr. J K M D Chandrasiri, Additional Director (Research), Hector Kobbekaduwa Agrarian Research and Training Institute

Agricultural Trade and Investment

Prof. J Weerahewa, Professor, Department of Agricultural Economics and & Business Management, Faculty of Agriculture, University of Peradeniya

Employment, Labor Use, Institutions and Rural Development

Dr. I M S K Idirisinghe. Head, Agricultural Economics and Agribusiness Management Division, Coconut Research Institute

Editorial Board

Editor-in-Chief

Dr. Fredrick Abeyratne, BSc (Ceylon), PG Dip & MSc (Reading, UK), PhD (Virginia, USA). Consultant Agricultural Economist, No. 141, Kawdana Road, Dehiwela.

Editorial Board

Prof. J Weerahewa, BSc Agric (Peradeniya, Sri Lanka), MPhil (Peradeniya, Sri Lanka), PhD (Guelph, Canada). Professor, Department of Agricultural Economics and & Business Management, Faculty of Agriculture, University of Peradeniya.

Miss. A P P Disna, BSc Agric (Peradeniya, Sri Lanka), MPhil (London, UK). Director (Regulations), Department of Export Agriculture

Prof. L M Abeywickrama, BSc Agric (Ruhuna, Sri Lanka), MSc (Peradeniya, Sri Lanka), MA, PhD (Ludhiana, India). Professor, Faculty of Agriculture, University of Ruhuna

Mr. T H C S Perera, BA Hon (Peradeniya, Sri Lanka), MSc (London, UK). Director, Socio Economic and Planning Centre, Department of Agriculture.

Mr. J K M D Chandrasiri, BA (Colombo, Sri Lanka), MA(Sussex, UK). Additional Director (Research), Hector Kobbekaduwa Agrarian Research and Training Institute

Dr. I M S K Idirisinghe. BSc Agric, MSc (Peradeniya, Sri Lanka), PhD (The Czech Republic). Head, Agricultural Economics and Agribusiness Management Division, Coconut Research Institute

Dr. Frank Niranjana, BSc Agric, MPhil, PhD (Peradeniya, Sri Lanka). Senior Scientist, Sri Lanka Council for Agricultural Research Policy, 114/9, Wijerama Mawatha, Colombo 07, Sri Lanka

National Committee on Socio- Economics & Policy Analysis
Committee Members 2016

Prof. J Weerahewa	Professor, Department of Agricultural Economics and Business Management, Faculty of Agriculture, University of Peradeniya, Peradeniya(Chairperson)
Dr. Fredrick Abeyratne	Consultant Agricultural Economist, No. 141, Kawdana Road, Dehiwela
Mr. T H C S Perera	Director, Socio Economic and Planning Centre, Department of Agriculture, Peradeniya
Miss. A P P Disna	Director (Regulations), Department of Export Agriculture, 1095, Kandy Road, Peradeniya
Mr. J K M D Chandrasiri	Additional Director (Research), Hector Kobbekaduwa Agrarian Research and Training Institute, 114, Wijerama Mawatha. Coilombo 07
Prof. L M Abeywickrama	Professor, Faculty of Agriculture, University of Ruhuna
Dr. I M S K Idirisinghe	Head, Agricultural Economics and Agribusiness Management Division, Coconut Research Institute, Bandirippuwa Estate, Lunuwila
Dr. A P Keerthipala	Director, Sugarcane Research Institute, Udawalawa
Mr. J K S Sankalpa	Assistant Agricultural Economist, Rubber Research Institute of Sri Lanka, Dartonfield, Agalawatta
Dr. R D S Jayathunga	Director (Climate Change), Ministry of Environment & Renewable Energy, No. 980/4, Wickramasinghe Place, Ethulkotte, Kotte
Mr. K H M L Amaralal	Head, Socio-Economic and Marketing Research Division, National Aquatic Resources Research & Development Agency, Crow Island, Colombo 15
Dr. M Esham	Senior Lecturer, Department of Agri- Business Management, Faculty of Agricultural Science, Sabaragamuwa University of Sri Lanka, PO Box 02, Belihuloya
Prof. Y M Wickramasinghe	Professor of Agricultural Economics, Department of Agricultural Economics, Faculty of Agriculture, Rajarata University of Sri Lanka, Puliyankulama, Anuradhapura

Prof. J M U K Jayasinghe	Professor of Agricultural Economics, Wayamba University of Sri Lanka, Makandura, Gonawila (NWP)
Dr. H W Shyamalie	Senior Research Officer, Agricultural Economics Division, Tea Research Institute, St. Coombs, Talawakelle
Mr. R M Chandrasena	Livestock Economist, Veterinary Research Institute, Gannoruwa, Peradeniya
Dr. Frank Niranjana,	Senior Scientist, Sri Lanka Council for Agricultural Research Policy, 114/9, Wijerama Mawatha, Colombo 07 (Secretary)

Copy rights:

Sri Lanka Council for Agricultural Research Policy (SLCARP)

114/9, Wijerama Mawatha, Colombo - 07

Email: slcarp.agri@gmail.com

Web : www.slcarp.lk

Tel : (+94) 11- 2697103, 2697648

Fax : (+94) 11-2682951

ISBN: 978-955-9224-61-7

1. Introduction

The rural agrarian nature of the Sri Lankan economy is characterized by more than 70 percent of the people still living in rural areas whose main occupation is agriculture. Agriculture is the mainstay of the rural economy that employs about 28% of the total employed population in the country. Rural poverty is, however, a widespread persistent phenomenon. The sharp drop of rural sector poverty reported since 2002 is the main contributor for the drop of poverty at national level. However, the slight increase of poverty in the estate sector reported in 2006/07 was an eye opener towards the hardworking estate population who contribute heavily to the growth of the country's export trade. Agriculture has not been able to support the rural poor who are vulnerable to natural calamities as well as to global and localized economic strife. The growth and setbacks in the agricultural sector are directly reflected in all macro and micro economic variables as well as in the social and political sphere. This signifies the role played by the agricultural sector and poses the question whether the growth in agricultural sector has been sufficient to sustain the economic development.

As per the Budget Speech (2016) the overall policy objective is to improve local competitiveness, international trade and investments as well as skill and productivity of our people while being conscious about the developments in the global economy. According to the political manifesto of the Prime Minister, integrating farmers and small scale entrepreneurs to the global economy, encouraging foreign firms which are globally competitive to invest in Sri Lanka, empowering Sri Lankan enterprises to be competitive in the global market with higher productivity will be in the core of the development strategy. The manifesto considers "entering into the world market" as one of the key strategies in his political manifesto.

Achieving a higher growth rate in the agricultural sector as a means to alleviate poverty and food insecurity in the country is well recognized. But, it is also to be noted that agricultural sector has hardly been competitive in the world market except for a few crops. The policy environment and the given technology make the small farmer vulnerable to sustain in a competitive trading environment. Therefore, the policy makers have to take the challenges arising from the domestic and global setting to bring the required changes to make the agricultural sector more competitive in order to achieve a higher growth rate.

Exploring the problem in its entirety has a number of dimensions. All the related issues are numerous. The main objective of this undertaking by SLCARP, National Committee on Socio Economics and Policy Analysis is to prioritize the main research areas that should be immediately addressed, which deal with the core of the problem. In the initial phase of this process the research carried out in the recent past which were compiled provide a base setting to screen new research proposals submitted to the SLCARP. This process helps to avoid research duplication and utilize scarce financial resources efficiently. However, several questions yet remain to be answered. The five main sectors in agriculture; plantation, non-plantation, forestry, livestock and fisheries are given equal importance based on its relevance to main issues addressed in the research agenda.

Basically, six main research thrust areas have been identified under the on-going research agenda; 1) Productivity Issues Related to Competitiveness, 2) Natural Resource Management and Environmental Sustainability, 3) Technology Generation, 4) Agricultural Inputs, Marketing, Processing and Value Addition, 5) Agricultural Trade and Investment, and 6) Employment, Labor Use, Institutions and Rural Development. Research areas and main issues addressed in each of these themes are exclusively discussed to highlight the important research priorities in the next chapters.

2. Productivity Issues Related to Competitiveness

2.1 Overview of Major Issues

With the process of globalization, competitiveness has become an important issue for both developed and developing countries. The present world economy largely depends on international trade, as such, export revenue is vital for a country's economic health. To be successful in this respect a country needs to maintain and enhance its competitiveness against its rivals. The failure to do so may result in eroding the market share of that country in the relevant industry and hence, declines in export revenue. Competitiveness can be assessed in three levels; at country level, industry level and firm level. Competitiveness at country level (or national competitiveness) as, "the degree to which a country can, under free and fair market conditions, produce goods and services which meet the test of international markets, while simultaneously maintaining and expanding the real income of its people over the long term." The definition for national competitiveness from the Institute for Management Development in 2003 is, "how nations create and maintain an environment which sustains the competitiveness of its enterprises." The World Economic Forum in 2003 refers to national competitiveness as, "the set of institutions and economic policies supportive of high rates of economic growth in the medium term." National competitiveness as, "a country's ability to create, produce, distribute, and/or service products in international trade while earning rising returns on its resources." Many view competitiveness and productivity as synonymous nevertheless, these two related terms are different. Productivity refers to the internal capability while competitiveness refers to the relative position against its competitors. However, the common feature in almost all definitions is that productivity is the key to competitiveness.

The Sri Lankan economy is facing many challenges within the context of globalization and trade liberalization at present. There are visible signs that Sri Lanka is fast becoming an urbanized economy, resulting in less and less people engaged in the agriculture sector. Then, there is the challenge of more and cheaper agricultural produce coming into the country. Above all, agriculture has to meet the challenges of meeting high costs of imported inputs and high cost of labor. While meeting these challenges, the agriculture sector, has to continue to contribute to the economy by way of creating employment opportunities, meeting food security needs, supplying raw materials and earning foreign exchange. In order to achieve these results, agriculture sector in the future has to be effectively competitive.

Sri Lanka has different types of agricultural systems, some of which mainly cater to international markets while some others entirely cover the domestic market. In both situations Sri Lanka is facing the challenge of reducing export competitiveness or reduced import competitiveness. Global trade is increasingly integrating by way of bilateral and multilateral agreements and Sri Lanka cannot escape from this situation. However, agriculture in Sri Lanka has still followed traditional pathways and very few efforts have been taken to understand weaknesses and inherited problems of production chains and related issues. In

that regard identifying national priorities in productivity related issues to competitiveness is important.

2.2 Areas of Thrusts Where Research is Needed

The following areas have been identified as thrust areas:

1. Increasing land and labour productivity
2. Reducing labour cost production mainly labour
3. Exploit potentials for mechanization
4. Reduced use of chemical inputs and increased use of organic materials
5. Increasing efficiency of factory operations
6. Reduce post- harvest losses

Table 01: Priority Research Areas in Productivity Related to Competitiveness

Research Issue	Government Policy	Research Gap	Priority Research Area
<p>Tea Sector Low land and labour productivity comparative to other producing countries.</p>	<p>Enhance production efficiencies, (technical efficiency and pricing efficiency) and value addition.</p>	<p>Inadequate comparative studies to learn lessons and to take corrective actions.</p>	<p>Comparative study on factors behind wide variations in productivity of Sri Lanka relative to other main tea growing countries and to identify strategies for adoption to increase productivity.</p> <p>Undertaking of ergonomic studies to improve productivity.</p>
	<p>Increase tea production and productivity throughout the Country</p>	<p>Regional productivity variations, reasons for such variations and remedial measures have not been adequately studied</p>	<p>A Study to identify factors behind inter- regional and sectoral productivity variations in the tea sector and to suggest measures to increase productivity, while reducing variations.</p>
	<p>Increase unit land productivity and profitability</p>	<p>Though recommended, only a small percentage of rubber and coconut are intercropped with tea and reasons have not properly studied.</p>	<p>An Investigation on potential for diversification of tea plantations</p> <p>An investigation on the economic feasibility of introducing different farming systems to the small holder tea sector</p> <p>A Review of the economics of intercropping of tea with rubber, coconut and Export Agriculture Crops (EAC)</p>
	<p>Increase tea production and productivity throughout the Country</p>	<p>Fertilizer use in the small holding tea sector in some areas have been reportedly low and measures have to be taken to correct the situation</p>	<p>Investigate the relationship between fertilizer use and productivity in both estates and small holding tea sectors and identify measures to optimize fertilizer use</p>

Research Issue	Government Policy	Research Gap	Priority Research Area
High cost of production, especially labor cost. Low mechanization related to high labor consuming activities and reduced efficiencies in production and processing	Use of machinery to reduce the cost of labor in tea plucking and as a measure for labor shortage	A Very small percentage of plantations adopt tea harvesting machines.	Examine the reasons for the low rate of adoption of tea harvesting machines, problems of using different kinds of machines, needed improvements and propose recommendations to improve their use.
	Introduction of appropriate mechanization and labor saving technologies	Limited studies investigating alternative technologies to reduce cost of production and to increase farm incomes. Reasons for low adoptions and feasibility for popularizing machines have not been properly identified Glyphosate was the widely used weedicide in Sri Lankan agriculture sector but the economic impact of banning it has not been studied	Examine the rate of adoption of labor saving technologies and investigate the feasibility of using capital intensive appropriate and locally produced technologies for cultivation practices Economic implications of banning glyphosate for the tea industry and profitable alternatives.
	It is proposed to establish facility centers to rent all needed machines to tea farmers at a reasonable rate	Feasibility of a such a concept have to be studied	Study the feasibility of a "Facility Centre" as a concept for renting machines for cultural practices and for harvesting.

Research Issue	Government Policy	Research Gap	Priority Research Area
	Increasing factory efficiency to increase tea production and the quality of made tea Increase made tea output per year	It is reported that tea factory efficiencies across the country are vary and reasons for this and remedial issues have not been identified More tea factories are essential to increase production but the optimum capacity to run profitably need to be studied.	Investigate factors contributing to inefficiencies in tea factories and suggest measures to increase factory efficiency. A study on the impact of closing down factories owned by the Tea Small Holding Authority (TSHA) on national tea production
	Organizing of small farmers to increase production efficiency	A large number of farmer organizations and farmer cooperatives are presently operating in the tea sector but effectiveness have not been adequately investigated	A study to investigate the current status of farmer organizations in the tea sector; success stories, factors affecting their efficiencies and effectiveness, and needed strategies to empower farmer organizations.
	Improvement of infrastructure such as roads, transport facilities, facilities for workers and storage.	Real Infrastructure needs in e the state and small holding sector have to be properly identified. (The Five year National Plan of Action (2016-2012) has identified these to some extent)	Study the infrastructure bottlenecks affecting tea production efficiencies
Crop losses are reported due to over growth during the main harvesting seasons and overloading in factories during transport.	Reduce crop losses to increase national tea output	The magnitude of crop losses in different tea growing areas and sectors have to be identified and measures to reduce losses have to be identified	Identify factors affecting crop loss, the rate of crop losses, and its magnitude and identify minimizing strategies. Determine factors affecting cost of production in different tea growing regions and the contribution of crop losses for increased cost of production Study the Economic and technical feasibility of transporting tea leaves from over loaded factories to under capacity factories during the peak season.

Research Issue	Government Policy	Research Gap	Priority Research Area
<p>Inadequate government involvement for increased production efficiency in the tea sector</p>	<p>Strengthening the government involvement through revised policies in the tea sector to increase productivity and profitability</p>	<p>Tea lands, particularly in the small holding sector, are fragmented or converted for other uses. In- adequate studies on crop losses due to land fragmentation and diversification.</p> <p>Though number of government assistance programs has been implemented, for export related crops, their impact on export growth, their effectiveness and deficiencies need to be studied for better planning and results.</p> <p>There are number of state support programs for export crops but government involvement has to be strengthened in a more meaningful way to achieve rapid export growth</p> <p>A large number of public, semi public and private sector institutions are operating for agriculture development but their real impact has not been studied adequately</p>	<p>Examine the economic implications of fragmentation of tea lands and identify legal and regulatory mechanisms to over- come this issue.</p> <p>A evaluation of the public assistance schemes operated for the tea sector over the past two decades</p> <p>Identify needs and means of strengthening government involvement mechanism for export related crops.</p> <p>Identify Structural deficiencies in the agriculture (tea) related institutions in Sri Lanka and suggest needed improvements</p>

Research Issue	Government Policy	Research Gap	Priority Research Area
<p><u>Coconut Sector</u> Low land and labor productivity comparative to other producing countries.</p>	<p>Increase coconut production and exports from Sri Lanka Increase the efficiency of local consumption share to increase exports and value addition</p> <p>Increased land productivity to increase production efficiency</p>	<p>Low productivity reduces the expansion of coconut lands. Hence, need to Identify productivity gaps, relative to management levels</p> <p>Bulk of the coconut production is used for local consumption which can be made more efficient. But no adequate research has been done on the level of local consumption</p> <p>Intercropping and intensive land use practices are better ways for increased land use efficiency but practices are very low. Reasons are not properly identified</p>	<p>Identify factors affecting low rate of re-planting and its impact on declining coconut production</p> <p>Identify inefficiency factors behind low production in coconut cultivations and especially in home gardens</p> <p>Examine the level of house hold consumption and possibilities for improved efficiency in local/ house hold consumption to increase the export share.</p> <p>In-depth study on factors affecting low rate of intercropping/intensive use, in the coconut sector and propose strategies to increase intercropping/intensive use rates.</p>

Research Issue	Government Policy	Research Gap	Priority Research Area
	<p>Introduction of efficient technologies to increase productivity and product quality</p>	<p>Reasons for poor adoption of improved varieties and management practices introduced by the CRI have not been adequately investigated. Likewise though Various new processing techniques (products) have been introduced to the Small and Medium Enterprise (SME) sector; number of such industries is low. Reasons for this situation too have not been studied adequately</p>	<p>Study the variations of land productivity in both public and private coconut estates in the main coconut growing areas and identify factors behind the issue</p> <p>Studies to establish the economic relationship of fertilizer application and mulching to increase coconut yields.</p> <p>Examine the possibilities for organic fertilizer use in coconut cultivations and its impact on yield increase and cost reduction</p> <p>A Study on technology adoption, bottlenecks and socio- economic factors affecting the low adoption of New technologies in both cultivation and the processing sectors and suggest measures to resolve problems.</p> <p>Examine farmer awareness about hybrid coconut varieties, their problems for adoption and different utilities of coconut varieties (eg. Coconut water. DC etc.)</p> <p>Identify the status of SMEs in coconut processing, adoption of available technologies and any constraints therein.</p>

Research Issue	Government Policy	Research Gap	Priority Research Area
	Introduce appropriate measures to reduce cost of production in cultivation and processing in the coconut sector	Technical and economic feasibility of using machines for cultivation practices (holing, fertilizer application, weeding) and harvesting need to be studied	Technical and economic feasibility studies towards mechanization (for harvesting as well) and use of capital intensive techniques for cultivation practices and processing using locally manufactured machines/implements
	Reduction of crop losses to increase Profitability of commercial cultivations.	It is reported that there are significant crop losses in coconut cultivations in the main growing regions due to thefts, pest and diseases, inability of timely harvesting and selling. It is necessary to estimate whether these significantly impacts profitability	Examine the rate of crop losses in commercial coconut cultivations; identify its magnitude and affecting factors.
	Increase the Desiccated Coconut (DC) and oil production and exports comparable to other producing countries such as the Philippines	Inefficiencies are reported in the coconut processing factories and reasons for such inefficiencies and remedial measures need to be identified	Investigate factors affecting the efficiency levels in the coconut Oil mills and DC factories and suggest measures to increase factory efficiency.

Research Issue	Government Policy	Research Gap	Priority Research Area
	Organizing small farmers to increase production efficiency's	Though a large number of farmer organizations and farmer cooperatives are operating in the coconut sector, their operations and effectiveness have not adequately identified.	A Study on the Current status of farmer organizations in the coconut sector, success stories, factors affecting their efficiencies and strategies needed to empower farmer organizations.
	Strengthen the government involvement by means of revised policies in the coconut sector to increase productivity and profitability	<p>Whether the government seedling distribution programs enhances the efficiency of planting programs has not been studied adequately</p> <p>A number of government assistance programs have been implemented for export related crops but their impact on export growth, effectiveness and deficiencies have to be studied for better planning.</p> <p>There are number of state support programs for export crops but government involvement has to done in more meaningful way to achieve rapid export growth</p> <p>Current land fragmentation rate is high in the major growing areas and annual crop losses due to falling down trees and negligence have not properly studied</p>	<p>Investigate the efficiency of the current planting programs of coconut by distributing coconut plants among households as against the planned new planting programs under official supervision.</p> <p>Study on effectiveness and impact of public assistance schemes operated for the coconut sector for the past two decades.</p> <p>Identify needs and means of strengthening government involvement mechanism for export related crops (coconut).</p> <p>Study on the level of indiscriminate fragmentation of highly productive coconut lands and identify legal and regulatory mechanism to restrict such actions.</p> <p>Identify Structural deficiencies in the agriculture (coconut) related institutions in Sri Lanka and suggest needed improvements</p>

		A large number of public, semi public and private sector institutions are operating for agriculture development in Sri Lanka but their real impact has not studied adequately	
<u>Rubber Sector</u> Low land and labor productivity relative to other producing countries and, high cost of production.	Increase natural rubber production and exports from Sri Lanka	Limited information available on low land productivity, high cost of production and on regional variations in productivity	A study to estimate land productivity of rubber and factors affecting the productivity, cost of production and regional variations.
	Government policy is to increase the productivity and profitability of the rubber sector.	Though conversion of low productive rubber lands to alternate uses is recommended, lands under high productivity too have been diversified other crops such as oil palm. Some isolated rubber lands are left without tapping and these lands could be used to alternate uses. However, information on these aspects is limited.	A Study to ascertain labor issues related to rubber tapping and to identify possible alternatives and, Identify strategies to attract youth into rubber tapping and related work. Estimate the rate of uprooting of rubber and conversion of rubber lands to alternate crops in the main growing areas and rate of abandonment (left without tapping)

Research Issue	Government Policy	Research Gap	Priority Research Area
	<p>Government plans to introduce commercial crops such as rubber, into newly liberated areas to reduce poverty and increase household income</p>	<p>Rubber is identified as a suitable crop for North and East provinces and already cultivations are being established in areas such as Ampara. Economic and social feasibility of such cultivations need to be examined for its sustainability</p>	<p>A socio-economic feasibility study of expansion of rubber into new areas (eg. North and east) aiming at increasing household incomes.</p>
	<p>Strengthen the government involvement by means of revised policies in rubber sector to increase productivity and profitability</p>	<p>A number of government assistance programs have been implemented for export related crops but their impact on export growth, effectiveness and deficiencies have to be studied for better planning. Current land fragmentation rate is high in major growing areas and annual crop losses due to falling down trees and negligence have not properly studied A large number of public, semi public and private sector institutions are operating for agriculture development in Sri Lanka but their real impact has not been studied adequately</p>	<p>A study on the effectiveness and impact of public assistance schemes operated for the rubber sector during the past two decades, in order strengthen government involvement.</p> <p>A Study to estimate the level of indiscriminate fragmentation of rubber lands and identify legal and regulatory mechanisms to mitigate this.</p> <p>A study to identify Structural deficiencies in the agriculture (rubber) related institutions in Sri Lanka and identify needed improvements</p>

Research Issue	Government Policy	Research Gap	Priority Research Area
<u>Sugarcane Sector:</u> Low land and labor productivity compared to other producing countries.	Increase productivity of sugar cane comparable to other growing areas	Low land and labour productivity relative to other producing countries	A Productivity study in main sugar cane growing areas including factors affecting land productivity
	Increase the profitability of Sri Lankan sugar cane sector and to expand the sugar cane industry	It is reported high cost of production in Sugar cane mills in Sri Lanka compared to other cane sugar producing countries. This aspect is under studied	Analyze costs and returns of sugar cane factory operations in Sri Lanka, including product and bi-product manufacturing, in comparison with the international situation
		There are reports that sugar cane mills in Sri Lanka is running under capacity and the situation has to be studied and corrective measures need to be proposed	Analyze capacity utilization of sugar mills in Sri Lanka, factors related to under capacity of usage and to propose remedial measures to increase the factory usage
		Sugarcane production in Sri Lanka is not at a satisfactory level and it has become an obstacle for the expansion of the industry. Adequate lands are available in newly liberated areas of north and east and feasibility of introducing sugar cane to new areas need to be studied	Feasibility of expansion of sugarcane cultivations into both existing and new areas and identify problems for expansion.
<u>Export Agriculture Crops (EAC) Sector</u>	Increase the export earnings of EAC to US\$ one billion by 2020 and make Sri Lanka a spice hub of Asia	Productivity of EAC in Sri Lanka is low comparative to other growing countries and a comprehensive study is needed to identify constraining factors	Studies on factors affecting low productivity of EAC in comparison to other main growing countries an in-depth study on factors affecting low productivity of cinnamon A Study on economic implications of immature harvesting of pepper and nutmeg on national production and feasibility of banning harvesting of immature pepper.

Research Issue	Government Policy	Research Gap	Priority Research Area
		High cost of labor has affected all field operations in EAC (eg. Shade control, and harvesting) and Economic and technical feasibility of mechanization need to be studied.	Examine mechanization needs in the EAC sector and identify economic implications of mechanization of cultivation and post- harvest practices.
		Cinnamon peeling is the most laborious and costly operation which has constrained the expansion of the cinnamon industry. Factory peeling is an alternative, but it has not become attractive.	A comparative study on economics of " Factory concept" for cinnamon peeling versus traditional method of peeling An Economic evaluation of cinnamon peeling using the deep freezer method
		Adoption of recommended management practices is very low in the EAC cultivations sector (eg. Fertilizer application, shade control). Factors affecting this situation need to be identified under different circumstances to strengthen technology transfer activities	Identify factors affecting low adoption of recommended technology practices in the EAC sector and suggest remedial measures
		As reported, large extents of some EAC (eg. cinnamon, cocoa, cardamom) crops are over their productive age and have led to low productivity. But farmers are reluctant to do replanting. Hence, socio-economic factors constraining replanting need to be studied.	A socio-economic study to identify factors affecting replanting of EAC crops and its implications.

Research Issue	Government Policy	Research Gap	Priority Research Area
	Mainstream discussions are underway on the impact of climatic conditions on agriculture production and mitigation measures	It is vital to understand the impact of climate changes on EAC production , flowering patterns, for forward planning	A study on the Impact of changing climatic conditions on flowering, bearing and production of EAC, and suggest measures to overcome any constraints.
	Increased opportunities for processing at rural level to enhance value addition and local consumption	There is no assessment of the current situation of EAC related SME's and the requirements and opportunities for expansion.	An Analysis of the current status of EAC related to small and medium processing enterprises in Sri Lanka (SME) and to identify development needs.
	Strengthening the government involvement by means of revised policies in the Export Agriculture Sector to increase productivity and profitability	<p>A number of government assistance programs have been implemented for export related crops but their impact on export growth, effectiveness and deficiencies have to be studied for better planning.</p> <p>Current land fragmentation rate is high in major growing areas and annual crop losses due to cutting down of trees and negligence have not properly studied</p> <p>A large number of public, semi public and private sector institutions are operating for agriculture development in Sri Lanka but their real impact has not studied adequately</p>	<p>A study on the effectiveness and impact of public assistance schemes operated for the EAC sector during the past two decades and to Identify needs and means of strengthening government mechanisms for export related crops</p> <p>A study on the level of indiscriminate fragmentation of EAC lands and identifies legal and regulatory mechanisms to mitigate the situation.</p> <p>Identify Structural deficiencies in agriculture (EAC) related institutions in Sri Lanka and identify the needed improvements</p>

Research Issue	Government Policy	Research Gap	Priority Research Area
<p><u>Food Crops Sector(Rice, OFC)</u></p> <p>High cost of production. High input support and price supports which is difficult to manage and sustain.</p>	<p>Government policy is to make country self- sufficient in several food crops, while importing produce which are not profitable to grow in Sri Lanka.</p>	<p>A series of Domestic Resource Cost (DRC) studies are needed with multiple simulations based on policy changes etc. to address the situation.</p>	<p>Continue DRC analysis and sensitivity analysis of the food crops sector (paddy and OFC) to suggest changes in the policy environment and farming practices to increase efficiency levels.</p>
		<p>Cost of labor is the key issue for low profitability in the food crop sector and mechanization has been introduced to some sectors to address this issue. But no correct assessment of current situation in this regard is available</p>	<p>Study the current level and costs of mechanization in the food crops sector and identify future requirements to increase profitability and to reduce cost of production.</p>
	<p>Government has proposed to diversify some paddy lands to other crops</p>	<p>A comprehensive study covering all aspects of the diversification issue (and future impact on producers and consumers) is needed to understand the situation to make correct policy decisions</p>	<p>A comprehensive regional, sectoral (major, minor, rain fed) and seasonal profitability studies (simulation models) on paddy production systems to identify potentials for changes of land use diversification) at different scenarios (at different input and output prices). Based on this information, identify required reforms in the use of paddy lands.</p> <p>Profitability studies on paddy versus selected short term export crops in major irrigation systems</p>

Research Issue	Government Policy	Research Gap	Priority Research Area
	Increased benefits of paddy farming as an enterprise to rural communities and to improve the living status in the farming regions	Paddy processing is largely done by few large scale millers and only a small fraction is done by small and medium scale millers. Efficiency of small and medium scale mills has to be studied and problems have to be identified	Study S-C-P conditions in rice processing and efficiency of processing in small medium and large scale mills
	A new fertilizer subsidy scheme (cash payment) for paddy has been proposed and implemented	Current and future impacts of this policy on paddy production and producers as well as on consumers have to be understood.	Investigate the impact of changes in the fertilizer subsidy schemes/and usage of organic fertilizers on paddy productivity and production.
	Mainstream discussions are underway on impact of climatic conditions on agriculture production and mitigation measures	It is vital to understand the current impact of climate changes on paddy and Other Field Crops (OFC) production with past and current data and simulate the future situation considering worldwide data	A study on the Impact of extreme weather conditions and changing climatic conditions on paddy and OFC production
	Though a Seed Act is currently implemented, there are views that more liberal policies on seed imports need to be established	Lack of information on the current status in this regard.	Review the current seed policy and examine whether its recommendations have supported to ensure the availability of high quality seeds for food crops and vegetables.
	Efficient land use, especially in the areas where land prices are high, for more investment opportunities.	A considerable extent of paddy land are left unused, minimally used or have been used illegally for other purposes. Such lands have to be identified to enable the use of these lands for intended/new purposes	A survey of abandoned and minimally used paddy lands in the Western, Southern and North-Western provinces to be conducted and to identify diversification/investment potentials.

Research Issue	Government Policy	Research Gap	Priority Research Area
	Government encourages domestic seed potato production	Cost and returns of seed potato production vs. commercial potato production and environmental cost of seed potato production is not well understood	A Study on issues related to local seed potato production, Economic and environmental related issues with reference to the proposed seed potato villages' concept
	Government plans to increase production efficiency by way of introducing new technologies and machinery	Technology adoption levels and farmer needs have not adequately identified	Identify current technology adoption rates, constraints and technology needs (varieties, machines) for the OFC sector.
	Strengthen the government involvement by means of revised policies in the food crop sector to increase productivity and profitability	A large number of public, semi public and private sector institutions are operating for agriculture development but their real impact has not been studied adequately	Identify Structural deficiencies in agriculture related (paddy, OFC and horticulture crops) institutions and needed improvements for sustainable impacts.
<u>Horticultural Crop Sector</u> (fruits, vegetables, flowers and Ornamental plants)	Increased export earnings from horticulture products and tap a higher proportion of the world demand for horticulture products	Large number of new horticulture products is exported by other Asian countries and Sri Lanka has to identify suitable ones and the economic potential.	A study on the economic/financial feasibility and social acceptability of new fruit and vegetable farming systems and value added products for the international markets and directions for investments
	Reduce post-harvest losses to increase the farmer profitability and availability of fruit and vegetables for consumers continuously	In adequate information available to reduce post-harvest losses through Public Private Partnership (PPP) methods	Examine the feasibility of public investments and public-private partnerships to reduce post-harvest losses in vegetables and fruits and suggest new approaches

Research Issue	Government Policy	Research Gap	Priority Research Area
	Reduce the agro chemical use in Sri Lanka to control hazardous environmental and health problems	Many research studies are underway on this issue causal relationships have not been established	Critically examine the agro-chemical use and causal relationships in the vegetable sector throughout the country, enabling the preparation of regulations to reduce/stop the use, importation and distribution of hazardous materials based on scientific facts.
		The limited availability of technological packages for Integrated Pest Management (IPM) and (IPNS).	An evaluation of the economic feasibility, financial viability and social acceptability of the available technological packages IPM, and IPNS and Organic Farming Technologies, and the possibility of introducing new techniques.
	Government aims to assure stable and competitive prices for agriculture produce	Over production of seasonal crops create low prices below cost of production and difficult to regulate production flow	Study on feasibility of using Geographical Information System(GIS) and digital technologies to regulate seasonal production flow of vegetables and thereby minimize farm level fluctuations
Fisheries Sector (Marine fisheries, Inland fisheries and ornamental fish sector)	Increased production and export of ornamental fish	Poor growth in ornamental fish sector is observed, but, economic problems of the industry have not studied	A study to identify problems in the ornamental fish industry: problems faced by divers, potential market information, legal issues)

3. Natural Resource Management and Environmental Sustainability

3.1 Overview of Major Issues

Agricultural activities make use of natural resources - soil, water and air - and thus impact on the environment primarily through changing land use patterns and water absorption capacities, and modifying biodiversity and landscapes. The impacts at the same time can be both beneficial and harmful on the environment through changing quality and or quantity of the local natural resources available or through global impacts such as climate change. There is a general recognition that many of the agricultural practices today have a range of adverse environmental impacts with major implications on the sustainability of the natural resources.

The increased demand for food worldwide will require the agri-food industry to double its output over the next half-century to meet the requirements. Meeting this demand efficiently and sustainably is the challenge that agriculture is facing at present. The historical response to meet increasing food demand has been the evolution of agriculture through a process characterized by farming practices that rely heavily on the use of agricultural chemicals, biological technology, machinery and knowledge. Due to these processes, some of the main environmental impacts of agriculture are evident in the following spheres:

Soil quality: *Erosion, declining soil fertility, stress on moisture balance, increased salinity, desertification*

Land quality: *Ecological management of agricultural land, agricultural waste disposal*

Water quality: *Nutrient (e.g. Nitrogen) and pesticide loading, sediment runoff and leaching, salinity*

Consumption and use efficiency of water resource depletion/retention capacity, flood prevention.

Air quality: *Loading of dust, odours, greenhouse gases, absorption of carbon dioxide*

Biodiversity: *Farm and indigenous fauna and flora diversity*

Wildlife habitats and landscapes: *Diversity of animal and plants habits associated with farming, threats from wild life growth imbalances*

Rural landscape: *Alteration of the landscape (extreme events etc.)*

Contribution to the global environmental problems: *Climate change - green house gases*

3.2 Areas of Thrusts Where Research is Needed

Finding solutions to environmental problems arising from agriculture is closely entwined with sustainable development concerns that extend deep into disciplines of resource consumption. It is also a global concept that recognizes flow of resources between and across sectors and economics through trade and markets that transmit appropriate signals to producers and consumers. It is also a multi-dimensional phenomenon encompassing economic, environmental and social aspects. Due to this complexity, a practical approach is necessary to adopt local perspectives in addressing many of the agro-environmental concerns, even when such have global impacts. Also, there are other concerns that are quite global in impact for which solutions have to be found in a global context, e.g. global change including climate change, nutrient and sediment transport and accumulation across continents, and the spread of invasive species.

The resulting intensification of agriculture has not been able to keep pace with the changes in the global economy leading to a crisis even in places where agriculture was considered to be highly efficient. Water pollution due to agricultural activities has not been globally abated, nor has nutrient enrichment, in particular due to high levels of use of nitrogen. The choice between expanding or intensifying agriculture is a difficult one – the continued conversion of land to agriculture is not possible in many places while intensification runs the risk of increased pollution, and the introduction and unwanted spread of genetically modified organisms. The trade-offs and balances between these choices are not adequately addressed nor considered at a landscape scale.

There is a trend in cultivation using traditional knowledge known as nature farming which is environment friendly. Research is needed to ascertain its viability. The loss of biodiversity as a consequence of agricultural expansion and intensification is well known and continuing. The consequences of this loss are less well known; there is increasing evidence of negative feedback to agriculture and fisheries, e.g. from the loss of soil micro-organisms, or natural pollinators, or the removal of predation. At the same time we are witnessing increasing occurrences of irreversible and non-linear environmental change in, for example, coastal waters and lakes due to excessive nitrogen loading, and the loss of fisheries, or soil structure and fertility. The interactions between these changes are complex; the challenge is to avoid them through changes in agronomic and fishery practices and yet produce more food. The balance has not been achieved – the environment that supports so much of our food production is not limitless – necessitating priority research into a wide scope of issues.

Priority thrust research areas were identified through the stakeholder meetings under six sub-themes:

- (1) Changes of land use patterns (land, water, air, biodiversity),
- (2) Climate change and its impacts,
- (3) Agricultural waste management,
- (4) Environment literacy and measurements
- (5) Institutional settings and
- (6) Use of traditional knowledge systems.

Table 02: Priority Research Areas in Natural Resource Management and Environmental Sustainability

Research Issue	Government Policy	Research Gap	Priority Research Areas
<p>1.Changes of Land Use Patterns</p>	<p>Resources such as land, water, air, minerals and biodiversity will be managed in a manner consistent with the viability of ecological processes.</p> <p>In addition to protecting the environment from abuse, management systems will take into account the need to restore environments damaged in the past.</p>	<p>Lack of information on environmental impacts of different land use patterns</p> <p>Limited knowledge about how to utilize the degraded lands and ecosystems due to human activities and natural phenomena</p>	<p>Content analysis of past research findings. (Methods to solve the problems)</p> <p>Studies on environmental impacts of different land use patterns, optimal land use patterns and models for different ago-ecological zones and interaction between ecosystems for sustainability.</p> <p>Estimation of the patterns of use of NPK fertilizers agrochemicals and micronutrients and their socio-economic impacts</p> <p>Finding ways and means to utilize marginal lands which are not used, using both modern technologies and indigenous knowledge.</p> <p>Studies on the impact of agriculture activities on biodiversity, socio-economic impacts of government forest policies and alternatives.</p> <p>Studies on the permit systems /management for extraction of non-timber forest products, (including Bamboo) and the socio economic impacts.</p> <p>Investigate the potential for cultivation and marketing of medicinal plants,</p> <p>Socio-economic impacts of agricultural related forest</p>

			<p>encroachments</p> <p>Socio-economic impacts of human-animal conflicts and the effectiveness of live fences for elephants (Bee keeping, jute, lime trees etc.)</p> <p>Impacts of invasive plant species in water bodies (irrigation systems, canals etc.)</p> <p>Identification of environment parameters of different agro-ecological zones</p> <p>The potential of using of GIS and Remote Sensing to study changes of land use patterns.</p> <p>Studies associated with trade- off between different aspects of agricultural policies for sustainable agriculture</p> <p>Studies on the socio-economic impacts of the government policies on the use of agrochemicals and fertilizers</p>
--	--	--	--

Research Issue	Government Policy	Research Gap	Priority Research Areas
2.Climate Change and its Impacts	Environmental management systems will be encouraged to be flexible so as to adapt to changing situations (e.g. climate change, invasive species and genetically modified organisms) and adoption of precautionary principles.	Limited information on the impact of invasive alien species on the environment, Changes of biodiversity due to climate change. Impact on productivity of resources due to changes in environmental parameters	Investigation of the socio economic impacts of climate change, Studies on the impacts of invasive species on agriculture and environment, Investigate the possibility of including adoptive/adaptive and migratory measures to reduce the impacts of climate change. A study on Methane emissions and its impacts on climate change. Identify different climatic regions suitable for new varieties of floriculture.
3.Agricultural Waste Management		Limited information on waste management and environmental externalities related to agriculture	An in-depth study on resource conservation and waste management measures for sustainable use of land resources. A study on the use of polythene / plastic and its impacts on the environment. An investigation in to livestock waste management, including swine management in urban areas, biogas slurry and their use, Efficiency of feed conversions, and, Methane emissions and related legal aspects. Studies on the technical feasibility and economic viability of conversion of agro-wastes in to animal feeds

			Develop a policy for managing agricultural wastes, including Incentive systems,
4.Environmental Literacy and Measurements	<p>The economic value of environmental services will be recognized so as to assure the Sustainability of such services for the benefit of the people.</p> <p>The state of the environment will continuously be assessed and reported on, through an appropriate institutionalized monitoring framework based on a comprehensive set of indicators.</p>	The lack of effective environmental indicators and data (physical, biological and social), and a formal mechanism for development of such a database, which is needed to face the challenges of climate change.	<p>Development of an appropriate environment data base using relevant and significant indicators, and development of forecasting models</p> <p>Developing and use of valuation techniques to measure importance, endangered and sensitive species and systems.</p> <p>A study to investigate the levels of environmental loadings on land, water bodies, atmosphere and on different ecological systems.</p> <p>Developing physical, biological and social indicators to understand the health status of the ecosystem.</p> <p>Periodical assessment of the vulnerability and adverse impacts of climate change on the socioeconomic conditions of the people on different environmental sectors.</p>

Research Issue	Government Policy	Research Gap	Priority Research Areas
5. Institutional Setting	<p>The institutional framework for sound environmental management will be Strengthened through capacity building, legislative instruments and improved inter institutional coordination and linkages.</p> <p>"Life cycle" and 'cleaner production' principles will be applied to improve the efficiency of natural resource use and to improve environmental quality. Responsible public private and community partnerships and linkages will be promoted at all levels of environmental management and conservation.</p> <p>Education at all levels, together with research, will be promoted in a manner designed to increase the level of awareness of all aspects of the environment and its care and management among all stakeholders.</p> <p>Socially responsible behaviors will be encouraged and further developed through an</p>	<p>The lack of an efficient institutional framework to address issues related to environmental degradation</p> <p>The lack of models for application of life cycle and cleaner production principles</p> <p>The lack of community awareness on management of agriculture, municipal and household waste.</p> <p>The lack of studies on industrial emissions, especially in the plantation sector</p>	<p>Investigate the possibility of developing an interactive platform and a framework, to coordinate various institutions engaged in addressing environmental problems related to agriculture.</p> <p>Investigate the possibility of developing and application of a continuous</p> <p>Integrated, preventive strategy to processes, products and services so as to increase efficiency and to reduce the risks to people and the environment.</p> <p>Investigate the possibility of developing market and non-market based mechanisms, appropriate to national conditions, to reduce green- house gas emissions and to improve adaptation measures.</p> <p>Develop approaches to enhance knowledge, skills and positive attitudes of different stakeholders at all levels, to address multifaceted, current and emerging issues of climate change.</p> <p>Introduce attitude change in agricultural friendly behaviors: Models to educate school children and communities.</p>

	<p>effective framework of awareness building, incentives and enforcement.</p> <p>Environmental management will be through participatory, transparent, predictable and accountable decision making processes at all levels.</p>		
6. Use of Traditional Knowledge Systems		<p>Unrevealed and non-use of traditional knowledge for sustainable use of natural resources and adoptive and migratory measures for environmental changes (Preparedness, Coping, Mitigation)</p>	<p>In-depth research to understand traditional knowledge systems with respect to sustainable use of natural resources.</p> <p>Use of traditional knowledge for water conservation, management and for health issues.</p> <p>Estimation of agricultural impacts of using traditional systems on different communities</p>
7. Fishery resource management	<p>Establishment of conservation zones</p>	<p>Lack of research base evidence</p>	<p>Management of lobster fishery resources in conservation zones</p>

4. Technology Generation, Transfer, Use and Delivery of Services

4.1 Overview of Major Issues

Budget speech 2016 highlights improvements towards rural economy in line with technology generation and transfer as “A knowledge based social market economy built on social justice principles must be fostered”. One of the key approaches to develop the rural economy is to establish 2500 state rural development centers by grouping of many villages under a single economic centre. The Center would have access to fully equipped rural economic market units. Further, the Government has proposed to strengthen and build rural infrastructure facilities, complying with the concept where technology generation and transfer matters, with specially built-up of cold stores etc. Government is also considering transferring and delivering services via developing “large scale agriculture enterprises” in which farmers are members and to initiate competitive agriculture markets and review exports of agro products”.

In terms of land ownerships the Government plans to encourage and empower landowners in investing in new technology and new farming lands.

4.2 Areas of Thrust Where Research is Needed

Based on the above policy framework of the Government, the following thrust areas have been identified.

1. Identification of National priorities for Agriculture and the institutional set-up
2. Dissemination techniques for new innovations
3. Use of ICT for technology generation
4. Entrepreneurship development
5. Rural financing
6. Increased returns to research
7. Sustainability of integrated farming Systems

Table 03: Priority Research Areas in Technology Generation, Transfer, Use and Delivery of Services

Research Issue	Government Policy	Research Gap	Priority Research Area
Limitations in Dissemination of Agricultural Innovations	Establishment of a sound extension system	Inadequate communication and coordination among stakeholders	<p>An investigation into Identify the yield gap and reasons.</p> <p>Studies to identify technology bottlenecks and technology adoption rates in the agriculture sector and the possibility of promoting user friendly innovations.</p> <p>Evaluate the current agricultural extension system in meeting current demand and the potential to introduce a para-extension system.</p>
		Inadequate monitoring systems	<p>Identification and Establishment of a better monitoring system of the extension programs</p> <p>An Evaluation of technology transfer capabilities of extension workers through farmer perception</p>
		Non-implementation of Good Agricultural Practices (GAP)	Identification of reasons for non-adoption and promotion of GAP

Research Issue	Government Policy	Research Gap	Priority Research Area
		Constraints to productivity growth in the existing and for potential crops and livestock products, under different farming conditions.	
The need for more efficient use of ICT for technology dissemination in agriculture	Exploit the potential for ICT for dissemination of agriculture technology and strengthening the dissemination mechanisms using ICT technologies.	Inadequate information and communication technologies introduced as an input for quality maintenance of technology transfer systems	<p>Study the value of a real time production monitoring system</p> <p>Identify need and develop methods for strengthening the input delivery system for supply of quality inputs, using ICT.</p>
		Constraints in value chain management of agricultural input delivery systems.	<p>Research on technical and economic feasibility of low-external – input farming systems and integrated agriculture, to enable transfer of low input agriculture techniques.</p> <p>Studies on extension and training bottlenecks, current status of application of ICT and mass media for Extension & Training (E&T) and identify needed improvements to increase production, productivity and quality.</p>

Research Issue	Government Policy	Research Gap	Priority Research Area
Lack of Information on Returns to Research and Development Investments made by Commodities and Commodity Groups	Devise a mechanism for rapid assessment of returns to agriculture R&D investments by commodities and commodity groups	<p>Lack of research on public-private partnerships in agriculture for selected products</p> <p>Limited ongoing monitoring and evaluation of research and development projects</p> <p>Inadequate information on national benefits from agriculture sector</p> <p>Lack of Information on trade-offs of private profitability vs. social benefits.</p> <p>Lack of evaluations of different options available for private sector participation in the area of agricultural technology transfer in selected crops/livestock enterprises including privatization of extension</p>	<p>Review of public expenditure in agriculture research, extension and other services</p> <p>Review of returns to agriculture research, extension and other services.</p> <p>Analysis of the social benefits from the agriculture sector</p> <p>Develop better models for public-private partnerships and to engage the private sector for technology transfer, based on information related to returns to agriculture</p>
Inadequate Agricultural Credit System.	Establishment of an institution and policy framework on agriculture lending and risk management applied to small scale farming communities	<p>Lack of effective credit and insurance systems for small farmers</p> <p>Improper use of agriculture credit</p> <p>Lack of Studies on feasibility of crop insurance and other risk management options</p> <p>Problems related to credit repayment/defaulting</p>	In-depth studies related to credit screening, risk management, defaulting and to develop a framework for a better lending mechanism with credit plus services and institutionalize a farmer friendly agricultural credit and insurance system.

Research Issue	Government Policy	Research Gap	Priority Research Area
The Limited Emergence of Agriculture Entrepreneurs	<p>Establishment of state rural development centers by grouping of several villages under one economic centre. The Center would have access to fully equipped rural economic market units</p> <p>Large scale agriculture enterprises are developed in which farmers are members and initiate competitive agriculture market and review export of agro products.</p>	<p>Lack of studies on feasibility of different contractual arrangements in farming, and the extent to which they are legally binding.</p> <p>Inadequacy of legislation pertaining to enforcement of contractual relationships</p> <p>Limited information on the export potentials and availability of external markets for locally grown products.</p> <p>Limited information on value addition potentials and potential markets for such products</p>	<p>An investigation to support new entrepreneurs in agriculture through different business models, including contractual agreements.</p> <p>Identification of models for vertical and horizontal integration of crop and livestock product sectors (adequacy of rural entrepreneurial program)</p> <p>Identification and promotion of new products with value addition, and connecting to markets</p>
Weak Coordination among Multiple Institutions in the Agriculture Sector	Develop strong institutional collaboration mechanisms and effective dialogue among institutions in agriculture sector	<p>Lack of sector development models for product development including value chain approaches</p> <p>Non-existence of a mechanism/legal frame work to strengthen collaboration among institutions</p>	An in-depth study to understand constraints for coordination among institutions and strengthen institutional collaboration through legally binding frameworks.

Research Issue	Government Policy	Research Gap	Priority Research Area
Deterioration of Sustainability in Integrated Farming Systems	<p>Strict Implementation of the soil conservation act</p> <p>Encourage and empower land owners in investing in new technology and new farming systems</p>	<p>Limited studies on natural resource management in agriculture</p> <p>Uncertainty of land tenure, limiting use of resource with sustainability</p> <p>Low productivity in resource usage</p>	studies on resource conservation measures and sustainability
<p><i>Aquatic Resources</i></p> <p>User acceptance of new technology</p>	Mechanization and its impact	Studies on Rate of adoption of innovation in fisheries sector is lacking	Study on user acceptance and affordability of new technology development in fisheries industry of Sri Lanka

5. Agricultural Inputs, Marketing, Processing and Value Addition

5.1 Overview of major issues

The present regime has looked into the issues in the relevant area from a novel perspective and implementing new policies to address those. Accordingly, instead of more government intervention in producing seed, providing marketing and storage facilities and other services it is expected to seek adequate private sector involvement and for that private – public partnership is expected to be promoted.

The new policies and strategies on production, marketing as well as value addition are directed towards producing and supplying products compatible with popular concepts such as environmental sustainability and organic products that have more demand locally and globally.

5.2 Areas of Thrust Where Research is Needed

1. Establishing public-private partnership in seed production
2. Changing subsidy policy of fertilizer towards encouraging farmers to apply the prescribed variety and the quantity of fertilizer for minimizing environmental risks and assuring human safety
3. Encouraging the banks to provide more credit for agriculture, SMEs, youth and women
4. Establishing warehouses to purchase and store products during in peak production periods to minimize post-harvest losses and provide more benefit to farmers
5. Promoting private sector competitiveness in the paddy market

Table 04: Priority Research Areas in Agricultural Inputs, Marketing, Processing and Value Addition

Research Issue	Government Policy	Research Gap	Priority Research Area
<i>Agricultural Inputs</i>			
<p><u>i.Seeds</u> Local seed industry is still not developed to produce enough high quality seeds</p>	<p>Promotion of collaboration between private and government sectors to produce high quality seeds.</p>	<p>Limited information available on the existing barriers in promoting government and private sector partnership for seed production</p> <p>Limited information available on the impact of government support in promoting public private partnership in seed production?</p>	<p>An analysis of barriers for establishing public private- partnership in quality seed production and ways and means of promoting it.</p>
<p>With provision for importation seeds, there is concerns about the existence of the local seed industry</p>	<p>To promote this, the 2015 budget proposed underutilized government lands be provided to the private sector to utilize them for seed production. In addition seed producing companies are to be provided a concession to utilize greenhouse technology and drip irrigation methods.</p>		<p>A study on the socio-economic impact of providing underutilized government land and other concessions for use of modern technologies in seed production</p>

Research Issue	Government Policy	Research Gap	Priority Research Area
Inadequate availability of hybrid coconut seeds.	Provision for importation of seeds Under seed policy.	Lack of information about the likely impact of seed imports on the local seed industry limited information about the possibility of promoting private sector to produce hybrid coconut seeds	A Study on the impact of importing seed on the local seed industry. A study on the feasibility of a joint venture between local or foreign (Indian) companies to produce hybrid coconut seeds.
<u>ii.Issues relevant to use of organic fertilizers.</u> What is the most suitable strategy to reduce high fertilizer cost: (a) in the absence of technical information on organic fertilizer use,	Encouraging the farmer to utilize organic fertilizer through giving a handout of cash payment, in lieu of supplying inorganic fertilizer at a subsidized price.	Limited information on how farmers would respond to this policy, with regard to adequacy of the cash payment, the limited availability of organics and recommendations, especially with regard to use of organics. Secondly, how this policy would affect the productivity of paddy, OFCs, and plantation crops and farmers' income are issues.	3. A study on farmers' response and practical constraints of the implementing the new fertilizer subsidy policy (availability, affordability and recommendations) 4. A Study on the impact with reference to operational issues of implementing the new fertilizer subsidy programme, transport, incorporation, machinery availability. 5. A study on the impact of new fertilizer subsidy programme on productivity and income of paddy and OFC farmers.
(b) inadequate availability of organic fertilizer at a competitive price (c) transportation and application issues of using organic fertilizers		2. Limited information on the national level gains of the new fertilizer subsidy scheme, in terms of minimizing environmental damages, productive use of government funds and reduction of farmers' dependence on subsidies.	6. A study on the impact of the new fertilizer subsidy on economic, social and environmental aspects.

Research Issue	Government Policy	Research Gap	Priority Research Area
There are contradictions regarding the implementation of the new fertilizer policy.		<p>What is the progress (and constraints) so far of farmers application of organic fertilizer?</p> <p>Lack of information about how different circulars affect for farmers cultivating different crops</p> <p>Lack of information about micro nutrient applications</p>	<p>A Study on the important of new fertilizer subsidy on application and Organic Fertilizer to identify any constrains and bottlenoses.</p> <p>A study on the impact of different interpretations of various circulars about the new fertilizer subsidy scheme.</p> <p>A study about micro nutrient applications and their recommendations</p>
<p><u>iii. Pesticides and Weedicides</u></p> <p>What are the implications of not using recommended dosage of pesticides and weedicides?</p>	Banning and discouraging the use of agrochemicals and encouraging farmers to apply minimum quantities of agrochemicals with other combinations such as use biological as well as integrated pest management methods	Lack of information with reference to implications of not adhering to recommended dosage of chemicals and their impact on the environment.	<p>Identification of impact on the environment of pesticide and weedicide use.</p> <p>Change in attitudes, behavior of paddy/OFC farmers in application of pesticides and weedicides</p>
The impact of banning the use of agrochemicals.		Lack of information on weather agrochemical banning has negatively affected the tea, rubber and food crop sectors	A study on the implications banning some agrochemicals on tea, rubber and food crop sectors

Research Issue	Government Policy	Research Gap	Priority Research Area
<p><u>iv. Credit</u></p> <p>What changes (& envisaged) have occurred in the credit market associated with smallholder farmers after introducing the new regulations for commercial banks and other licensed banks by the budget 2015?</p>	<p>2015 budget proposed that all banks should lend at least 10% of their loan portfolio to be allocated to agriculture, 5% to SMEs and another 5% to women and youth. Meanwhile it has limited pawning, which is one of the prime credit sources of poor farmers to 5%.</p>	<p>Lack of information on the reaction of the banks (State and non-state) on the proposed policies (Since these were suggested earlier also)</p> <p>Limited information whether the smallholders are able to obtain agricultural loans from banks easily, under the new policy or has it further distanced them from banks due to the absence of the prevailing easy credit obtaining opportunities such as Pawning.</p>	<p>A study on the impact of recent changes of bank regulations on smallholder farmers' access to credit, Identification of constraints and make recommendations based on the response by the banks.</p> <p>A study on the impact of the informal credit sources on both fisheries and livestock sectors.</p>
<p>How does the informal credit systems in fisheries and livestock sectors affect the farmers</p>		<p>Limited information about benefit/dis-benefits of the informal credit sources on fisheries and livestock farmers</p>	
<p>Some farmers are not targeted under some credit systems</p>		<p>Lack of information about coverage of all sectors, farmers and segments under formal credit systems</p>	<p>A review on all credit, insurance and other incentive systems available to, cover farmers in different sectors identify their gaps in terms of coverage all farmers.</p>

Research Issue	Government Policy	Research Gap	Priority Research Area
<i>Marketing</i>			
1.Continued high post-harvest losses of fruit and vegetables		Despite the infrastructure development in the country, post- harvest losses are estimated to be high as 40%. This estimate, though quoted heavily, is highly questionable,	Estimate and analyze change of post -harvest losses under improved market infrastructures, roads and transport facilities and value addition.
OFC and vegetable growers are also badly affected by price reduction during the harvesting time	2015 budget proposals: Proposed to establish and expand warehouse facilities to provide opportunity for farmers to store their excess products during peak harvesting periods	Limited information on how the proposed cold stores can be managed to provide a better service to farmers and consumers?	Evaluate the economic viability, including management practices, of storing farm products in recently established government warehouses, their impact on post-harvest losses, farmers' income and consumers prices.
During peak periods farm gate prices of paddy goes down discouraging paddy farmers and in lean periods rice prices goes up badly affecting consumers. Possibility of selling excess local rice in international markets	Proposed to construct 5 cold rooms close to major dedicated economic centers Proposal to establish a Agricultural Marketing Authority	Poor performance by already existing marketing authorities, raises questions	A study on the role, economic feasibility, management and social acceptability of the proposed cold storage facilities to stock excess produce. A feasibility study to establish a an “Agric Marketing Authority” given poor performances by such authorities

Research Issue	Government Policy	Research Gap	Priority Research Area
	Government promotes private sector competition in purchasing and processing of paddy. For that purpose loans are also provided every year to stock paddy.	Lack of adequate data on paddy milling industry is an issue to operationalize the government policy effectively. . Data on number, type (small, medium, large),operation (which varieties produced to which markets etc.) are not available covering the whole country	Comprehensive study, including a census, on the rice milling industry that focuses special attention on large scale millers' influencing the rice market
Lack of understanding in consumer buying behavior		A good demand has been created for traditional rice varieties from local and international markets, but current situation and potentials have not properly understood	A study on the economic potential of cultivation and value addition of traditional paddy varieties to increase farmer incomes.
Availability of low quality and unsafe products in the market Export Agriculture crops.	Increase the value of paddy output, add value to paddy in domestic and international markets and increase farmer income. Government policy is to promote export market of Sri Lankan rice	4.A recent investigation revealed that in some Asian as well as African countries some of the Sri Lankan Rice varieties are more grown, but no one has examined whether there is a possibility to export Sri Lankan rice varieties (other than traditional or organic varieties)to non-traditional markets.es	A study on the possibilities of marketing Sri Lankan rice varieties in non-traditional international markets, especially in countries where Sri Lankan rice varieties are grown (several varieties have been released to many Asian and African countries)

Research Issue	Government Policy	Research Gap	Priority Research Area
		<p>With differences in markets, the quality of products and their prices how the different consumers behaved has not been studied</p>	<p>A study on the buying behavior of different consumers in different markets</p>
		<p>A study on the buying behavior of different consumers in different markets</p>	<p>A study on the availability and impact of operating quality and safety measures on agricultural product value chain</p> <p>Studies on SPS and TBT issues for export of suggested agriculture products</p> <p>Examine overseas market promotion needs for increased horticulture exports</p> <p>A Study on the economic, social and national implications of importing coconut for industrial purposes and suggest needed institutional framework</p> <p>A Study on the cost of in compliance of Sri Lankan EAC exports for international standards and identify regulatory needs, roles of growers, exporters and the state on assuring quality</p> <p>Feasibility of “spice hub” concept for increased export earnings of EAC</p>

Research Issue	Government Policy	Research Gap	Priority Research Area
<i>Processing and Value Addition</i>			
The weak progress of establishment of processing and value adding business ventures.	To encourage small and large scale farmers and entrepreneurs to participate in the global economy (value system) it is proposed to establish of 2500 rural development centers. Towards this infrastructure facilities will be provided. Also a mechanism is proposed to encourage and empower landowners investing in new technology and new farming methods. They will be assisted with land and the necessary capital benefits.	No information available of past programmes on state support for commercial agriculture (long term land leases) and for value addition ventures. Also information on potential market demand for value added products is also not available	Conducts feasibility studies on the proposed mechanisms and assess the potential impact of agro processing and value added new initiatives under the proposed rural development centers and the enterprise development programme An evaluation of the past state programmes on leasing out land for large scale agriculture ventures 3. A study of the potential markets for value added products from Sri Lanka, to make it a demand driven initiative.
Slow progress of value addition industries specially in the coconut, tea and spice sectors		Lack of information about the progress of promoting the organic tea market, associated with smallholders	Investigate the problems associated with popularizing organic tea cultivation and marketing , as a value addition technique, in the Small holder tea sector

Research Issue	Government Policy	Research Gap	Priority Research Area
		Lack of information about avenues for improving the efficiency of value chains for fruit and vegetables and possibilities for networking	Examine avenues for improving the efficiency of value chains for fruit and vegetables and possibilities for networking
	To encourage export of spices, lifting of the cess imposed on pepper, cloves and nutmeg has been proposed.	Lack of information about the impact of the removal of the cess on value added products, export of pepper, cloves and nutmeg exports	A study to investigate the impact of the removal of the cess on value added products, export of pepper, cloves and nutmeg exports
		Lack of information about problems in the value chain, which hinder the competitiveness of Sri Lankan floriculture/horticulture industry	Identify problems in the value chain, which hinder the competitiveness of the Sri Lankan floriculture/horticulture industry and suggest measures to increase exports.
Export Agricultural Crops		Lack of information about potentials for value addition, hi-tech value addition needs, niche markets and niche products, potentials for trading inherited characteristics and medicinal properties and international market promotion needs.	International Market studies on potentials for value addition, hi-tech value addition needs, niche markets and niche products, potentials for trading inherited characters and medicinal properties and international market promotion needs
		Lack of information about weaknesses of value chain segments and value chain relationships and constraints for value chain development.	Analysis of weaknesses of value chain segments and value chain relationships and constraints for value chain development.

Research Issue	Government Policy	Research Gap	Priority Research Area
Rubber		Lack of information about feasibility to increase production of high value value added products in Sri Lanka, in-terms of competitiveness and there- by to increase the farm gate price of rubber	Technical and Economic feasibility to increase production of high value added products.
Tea		Lack of information about the impact of promoting organic fertilizers	Study the current status of organic fertilizer use as a value added strategy, in the tea sector and identify measures to increase use organic fertilizers
Coconut		Lack of information about value chain variables in the coconut industry	Value chain analysis of king coconut/coconuts and different products
Animal Husbandry Animal feed as well as medicine cost (imported) is very high		No information about possibility of using local available feeding material to reduce cost	<ol style="list-style-type: none"> 1.A study on examine the possibility of using only locally available feeding material to produce low cost animal feed 2.A study examine using of by- products of other industries as hybrid animal feeds 3. Study on possibility of using alternative / indigenous medicines for animal diseases 4. Study examine the possibility of introducing organic livestock products 5. Feasibility study in promoting agro tourism in different sectors including, crop, fisheries and livestock
Aquatic Resources Innovative financial management and value chain analysis	Establishment of innovative financial management and value chain analysis	Limited information for decision making	<ol style="list-style-type: none"> 1.Study in innovative financial mechanisms for suitability of fisheries industry 2. Value chain analysis of fish and fishery products of Sri Lanka

6. Agricultural Trade and Investment

6.1 Overview of Major Issues

Sri Lanka's agricultural economy in its various dimensions has been the subject of intensive inquiry both in academic and in policy making circles for a long time in keeping with research trends in the country and elsewhere. Most of such studies dealt with commodity specific demand, supply or policy issues. Some dealt with sub-sectoral or overall developmental issues. However, agricultural trade and investment issues did not attract the attention of researchers very much except as a subject of secondary inquiry under overall trade policies of Sri Lanka in its various dimensions.

Being a small country which adopts an open economic policy, international trade in goods and services plays an important role in the economy by directly and indirectly influencing the price levels of the country and hence, allocation of various resources. Prices of tradable commodities are directly determined by the world market prices levels subjected to trade policy regime of the government of Sri Lanka. The price levels of non-tradable commodities are also determined up by the prices of tradable commodities and hence, international trade has a direct influence on income of factor owners and income distribution.

The government of Sri Lanka directly intervenes in agricultural trade through various border measures. The objectives of such policies include raising competitiveness, stabilizing prices, protecting domestic producers, and earning revenue from taxes. In addition, a number of non-tariff measures have been used to regulate trade. The following thrust areas have been proposed in order to articulate an appropriate trade policy framework for the country.

6.2 Areas of Thrust Where Research is Needed

The government of Sri Lanka has always considered export promotion as one of the key strategies to acquire gains from international trade. During the past few decades, agricultural products have entered into new markets and at the same time Sri Lanka has lost traditional markets. Scientific research needs to be carried out to investigate underlying reasons for such changes and potential niche markets.

Agricultural trade policy and investment issues attracted much attention internationally, particularly after the Uruguay Round of General Agreement of Tariff and Trade (GATT) negotiations concluded in 1994 primarily because agriculture trade was brought under the World Trade Organization (WTO) discipline, though countries still have to work more towards reaching finality in many aspects. There is a dearth of understanding of the implications of the Agreement on Agriculture (AOA), Sanitary and Phyto-sanitary Agreement (SPS) and Trade Related Intellectual Property Right Agreement (TRIPS). Agricultural development officials as well as trade and macroeconomic officials need to assess the economic and administrative implications of the AOA, SPS and TRIPS.

Sri Lanka has relied more on unilateralism over the years in trade policies yet one of the preoccupations trade policy making in Sri Lanka at present is the overall importance attached to preferential trade policies. Sri Lanka is a signatory to three functional preferential trade agreements –the Bangkok Agreement (BA), SAARC Preferential Trade Agreement (SAPTA), Indo-Lanka Free trade Agreement (ILFTA), where agriculture is generally put on the negative list. There are no impact studies done in relation to preferential trade policies and agriculture. Further, it is necessary for policy makers to be acquainted with the implications of preferential trade policies on agriculture and on the farming community.

Agricultural trade policy issues are an integral part of general trade and developmental issue in the country at present. Government intervention to support the sector is still extensive and includes measures such as protection through tariffs, price support, subsidies, concessionary credit etc. The expectation is to achieve a better resource allocation by lowering protection, thus raising productivity and levels of living standards. Despite the overall changes in protections over the years, agriculture continues to enjoy in general relatively a higher level of protection. Understanding of the effects on the farming community and the consumers of changing protection is shallow in policy circles.

Furthermore, detailed investigations are required to assess the effects of Non-Tariff Barriers (NTB), issues with respect to trade facilitation and trade promotion. Global value chains have been considered as one of the key areas. There is a dearth of studies with respect to macro-economic fundamentals and policies affecting trade and investment.

Table 05: Priority Research Areas in Agricultural Trade and Investment

Research Issue	Government Policy	Research Gap	Priority Research Area
<p>Inadequacy of information on emerging Trade patterns and trade dependency</p>	<p>Expedite the enactment of the necessary regulation for Anti-dumping and countervailing</p> <p>Cordial relations will be strengthened with India, China, Pakistan and Japan, and the principal countries of Asia, while improving friendly relations with emerging Asian nations such as Thailand, Indonesia, and Korea without differences. Our Indian policy will take into due consideration the diversity of India. Closer relations with an attitude that would be neither anti-Indian nor dependent</p>	<p>What are the emerging patterns and trends in agricultural imports and exports? How diversified is the export basket of Sri Lanka? How competitive are we in the world market? Will the continuation of the existing patterns help in promoting inclusive growth? Who are the rivals of Sri Lanka?</p>	<p>Assessments of the potential for Export diversification across products and markets</p> <p>Analysis of issues with respect to balance of payments, trade deficit etc.</p>

Research Issue	Government Policy	Research Gap	Priority Research Area
<p>The existing Trade agreements with countries in South Asia (SA) has not significantly improved bilateral trade with SA partners</p>	<p>Exploit Sri Lanka's potential and improve its relative position through export diversification and bilateral regional trading agreements</p> <p>Enter into Free Trade Agreements (FTA) with countries such as United States, China, South Korea, Singapore, Australia, South Africa and Japan, and also to enhance exports to EU through the GSP+ scheme</p>	<p>What exactly are the commitments with the World Trade Organization (WTO) and Regional Trade Agreements (RTA) Which agreements helped in improving bilateral trade relationships? What are our success factors? Why did we fail?</p>	<p>Evaluations of the outcomes of the existing trading agreements and potential for further agreement</p>

Research Issue	Government Policy	Research Gap	Priority Research Area
<p>Issues related to regressive and ad-hoc trade taxes, which have inhibited trade expansion</p>	<p>Amalgamation of certain taxes which have failed to generate the expected revenue and to improve the revenue collection of the country.</p> <p>Elimination of certain non-relevant nuisance taxes that prevail in the system which would benefit the tax payer as well as the business community</p> <p>Strengthen tax administration and create a tax regime based on strong reforms.</p> <p>Reduce import taxes on machinery and equipment related to the dairy industry</p>	<p>What are the existing border taxes to improve trade in agricultural commodities? How complex and ad-hoc are they? To what extent special commodity levies helped in making the taxes uniform? To what extent taxes are evaded? By whom? What measures can be taken to improve tax administration, with reference to agriculture related taxes?</p>	<p>An in-depth analysis of the exiting tax system related to agriculture covering complexity of taxes, tax rates, tax changes and tax evasions</p>

Research Issue	Government Policy	Research Gap	Priority Research Area
<p>The existence of Non Trade Barriers (NTB), which have impeded external trade</p>	<p>Introduce a new legislation replacing the existing Imports and Exports Control Act that will create an improved level playing field for domestic industries and ensure a more efficient import export system in the country</p> <p>Government effort to achieve higher economic growth through bilateral agreements</p>	<p>What are the current issues with respect to import licensing requirements? How restrictive are they?</p> <p>Do SPS regulations act as barriers to trade?</p> <p>What measures can be taken to reduce delays and costs in processing and movements of goods? Impact of proposed Economic and Technical Cooperation Agreement (ETCA) agreement on the tea, rubber and Coconut, EAC, annual food crop sectors are yet to be studied</p>	<p>An in-depth analysis of merits and demerits of import licensing requirements, SPS arrangements, and Technical Barriers to Trade (TBT)</p> <p>A Study the impact of proposed ECTA (Trade and Service agreement) on labor and land productivity and on the export market of agricultural products</p>
<p>The existence of poor practices which restricts Trade Facilitation</p>	<p>Government will remove restrictions on Global Logistics Companies, which have the scale, capacity, capital and knowledge to expand services using Sri Lanka as the hub, they should be able to invest, acquire and operate within a reasonable tax regime where new capital, business and employment is generated to the local economy via global trade</p>	<p>The degree of inefficiency in the systems, and methods to reduce inefficiencies.</p>	<p>An in-depth analysis of the operations in the port, customs and the regulatory environment related to agricultural trade.</p>

Research Issue	Government Policy	Research Gap	Priority Research Area
Trade Institutions	<p>Incorporate an International Trade Agency</p> <p>Establish a "one-stop-shop" at Sri Lanka Customs, which provides all the necessary permissions, clearances and approvals at a single window platform. Authorized officers from relevant government agencies, including Department of Import and Export Control, Sri Lanka Standards Institution, Consumer Affairs Authority, Inland Revenue Department, Department of Commerce, Department of Registrar of Companies Department of Agriculture, Department of Animal Production and Health etc., will be housed at the "one-stop shop"</p>	The absence of a framework for institutional reforms to increase the efficiency of the system to trading system	An in-depth analysis of the Inter and intra institutional issues with respect to agricultural trade, and feasibility assessments on proposed institutional reforms.
The absence of strategies for Trade promotion.	It is proposed that Sri Lanka become a member of the Madrid System for international registration of trademarks, a body administered by the International Bureau of the World Intellectual Property Organization	What products are to be promoted? In which markets? Using which strategies?	An in-depth analysis of the existing aspects in reference to market penetration, brand promotion (Sri Lanka logo), importation for re-exports etc.

Research Issue	Government Policy	Research Gap	Priority Research Area
<p>The poor connectivity global value chains</p>	<p>Global value chains, manages different raw materials and competencies of different countries successfully. Augment the capacities of the enabling environment to so as to connect local and global investors in Sri Lanka to this chain</p> <p>Develop and promote new methods or processing of agro-harvests, value addition to agro-products, storage and transport</p>	<p>What prevents connecting our small entrepreneurs to global value chains? What are the problematic interfaces of global value chains?</p>	<p>A baseline study of the existing global value chains related to local agricultural products and raw materials, and strategies to connect small farmers and agri-entrepreneurs to the export market and Global value chains</p>

Research Issue	Government Policy	Research Gap	Priority Research Area
<p>Other macro-economic fundamentals and policies affecting trade.</p>	<p>The exchange rate will not be mismanaged but be allowed to be decided on fundamentals.</p> <p>To attract Business Process Outsourcing (BPO) and Knowledge Process Outsourcing (KPO) into the country, the archaic labour law has become a hindrance. It is time that we address these issues, and in doing so our government will introduce necessary legislations.</p> <p>I increased state interventions and investments to expand the use of traditional seeds that favour cultivation suitable to our environment, to improve the knowledge and abilities of agro-technological institutions and to prevent the acquisition of a monopoly in seeds by corporations. State patronage will be provided for the production of pest control liquids or powder utilizing in herbal extracts. I initiate measures to formulate a time frame for the gradual elimination of the use of chemical fertilizers and agro-chemicals</p>	<p>How would the reforms in exchange rate policies, labor laws and environmental policies influence trade in agricultural products? Who will be the gainers and losers of such policy changes?</p>	<p>An analysis of the impacts of reforms in the area of exchange rates, labor laws and environmental policies on agricultural production and productivity</p>

Research Issue	Government Policy	Research Gap	Priority Research Area
<p>The existence of barriers for large scale Agricultural Investments, enabling commercial agriculture ventures</p>	<p>A new Act named 'Foreign Exchange Management Act' will be introduced to facilitate foreign investments.</p> <p>Encourage commercial scale dairy farming on a Public Private Partnership (PPP) arrangement.</p> <p>Remove the tax imposed on the leasing of land to foreigners and also to consider the removal of restrictions on ownership on identified investments imposed through the Land (Restrictions on Alienation) Act</p> <p>Government lands and investment related tax concessions will be provided to investors who invest in lagging regions of the country</p> <p>Encourage the expansion and modernization of existing business by investing in machineries</p> <p>A National Land Commission will be established to suspend the</p>	<p>Why do foreign investments limited in the agricultural sector? What are the attractive projects for foreign investors? What the determinants of foreign direct investments.</p>	<p>An Analysis of the existing strategies in relation to Foreign Direct Investments, Partnership arrangements and for Private-Public Partnerships that constraints large agricultural investments</p>

	autocratic transfer of land to foreign companies for development activities harmful to the environment and to provide opportunities for petty farmers to use land for cultivation purposes		
--	--	--	--

7. Employment, Labor Use, Institutions and Rural Development

7.1 Overview of Major Issues

The ‘Green Revolution’ changed world agriculture, opening a new journey for the farmers to gain higher yields and incomes from agriculture. Increased income contributed to uplift the living standards of the stakeholders of the farming sector as well as it helped to modernize most of the operations. Also it helped to satisfy the increasing food demand in the world. Even though some negative impacts are present, none of the countries will be able to go back fully to the traditional practices and therefore, it is essential to address the issues of modern agriculture in relation to employment, labour use, related institutions, among others, while reaching development goals.

The second important consideration should be the ‘Sustainable Development Goals (SDG’s)’ identified by the United Nations Summit held in 2015. Hence, the key areas of people, planet, prosperity, peace and partnerships should be addressed to meet the SDG’s specified in the summit. The next important aspect is the rapid changes that are occurring in the world such as; new technologies especially use of green energy, mechanization of most of manual practices, genetically modified foods, urbanization and labour migration towards skilled jobs, and world oil price reduction, their impact on the production of agricultural products. These changes are very critical in relation to sector development. Today, another critical factor is climate change and its impact on agricultural production and on people.

With regard to employment; labour use, institutions and rural development, one needs taken re-consider the new developments that have taken place after the war. As Sri Lanka needs to develop a long-term policy for agriculture, it is very essential to identify contributing factors by considering these new developments and research findings with the aim of facilitating this new development process.

7.2 Areas of Thrust Where Research is Needed

At present agrarian societies are changing at a very rapid rate. With that rapid change, especially the agriculture sector has reached a critical stage mainly, due to labour migration to other sectors. With all these constraints, policy makers intend to transfer the subsistence-oriented cultivations to highly market oriented agriculture while encouraging growers to move into value added crops. Therefore, it is very essential to investigate whether the agrarian sector is ready to accept these changes and to fulfill the government’s objectives. It is necessary to note that agrarian changes has been continued in the country subjected to different processes during various political regimes from the colonial time to today’s liberal market economy. This transformation has been heterogeneous and contradictory and has varied from region to region. Changes that have brought about in the agrarian structures are sometimes widespread, including problems such as indebtedness, increased land parceling etc. On the other hand, the economies of large scale operation have spilled over to polarization of political power in the hands of input suppliers, credit suppliers and buyers. Therefore research must be undertaken to study this transformation process to derive reform measures that are required to adjust the transformation process pertinent to rural development.

Table 06: Priority Research Areas in Employment, Labor Use, Institutions and Rural Development

Research Issue	Government Policy	Research Gap	Priority Research Area
<p>Food insecurity and relative high rural poverty</p>	<p>Development of rural economies through empowering people to deliver globally competitive products and services to the international market.</p> <p>Create the background needed to enter into the global value systems</p> <p>Promotion of large scale agricultural enterprises in which farmers can be members, will be established under the plan to develop the rural economy</p> <p>Establishment of 2,500 state rural development centers and grouping villages under each unit</p>	<p>Reasons for low rural incomes, skewed and widening income disparities.</p> <p>Inadequate resources availability and how to optimize resource use</p> <p>Lack of studies on the possibility to enter into large scale agricultural investments catering to the global markets.</p> <p>How rural development centers could contribute to promote rural level production, productivity and food security</p>	<p>Identification of income disparities in rural economies</p> <p>Mapping the growers according to the rural poverty levels and identifies issues therein.</p> <p>Explore opportunities of introducing large scale agricultural investments, including pre-requisites, in collaboration with agrarian societies</p> <p>Identify the reasons for continuing traditional cropping practices and reluctance to change, and how to optimize the resource use.</p> <p>Global changes in trade related aspects and demand for products and its impact on agrarian societies.</p> <p>Identification of willingness of agrarian societies to change and identification of contributory factors for food insecurity,</p> <p>Rural poverty and level of technology adoption</p>

Research Issue	Government Policy	Research Gap	Priority Research Area
Land ownership/land reform	Empower 3 million citizens to become land and home owners. Especially transfer the ownership of the lands those who operate lands with Government permits.	How tenure and ownership issues, have impacted on production and productivity and whether, ownership transfer has/would change the situation.	A comparative analysis of impact of tenure and ownership issues on production and productivity, compared to lands that have already gone through programmes such as <i>Swarnabhoomi</i> .
With the transformation of the economy, the issue of labour shortage and high labour wages	Ensure a minimum wage for the working population	Transitions, labour migration and shortage of labour Un-availability of skilled labour	<p>Identification of diversity of needs and the labour availability to match these needs.</p> <p>Impact of increased use of machinery to match labour demand and its implications on the rural labour market.</p> <p>Impact of mechanization on small scale farming, on incomes, and demand for hired labour</p> <p>Study labor shortage patterns in the tea, coconut, rubber and the sugar cane sector and economics of mechanization of labor consuming practices</p> <p>Identification of labour attractive mechanisms and /or incentives to attract youth to stay in to the agriculture sector</p> <p>Labour mobility and its effect on rural agriculture</p> <p>Estate workers and current status of labour distribution and migration out of estates.</p> <p>Labour migration and feasibility of transforming agriculture into out grower systems</p>

			<p>An analysis of the Labour saving technologies, acceptance level and reasons for low adoption rates</p> <p>Investigation on socio- economic feasibility of alternative worker deployment models (feasibility of formation of labour groups to supplement the labour shortage)</p> <p>Feasibility of re-allocation/consolidation of agriculture lands to facilitate machinery use</p> <p>Investigate the current situation of labor market for plantation crops (both estate and small holding sector), identify measures to attract labor and improve the current levels of labor efficiency.</p>
--	--	--	---

Research Issue	Government Policy	Research Gap	Priority Research Area
Gender issues in agrarian practices	Review the possibility of providing economic empowerment for women	<p>Role of women in food crops production sector and range of non agric. products</p> <p>Impact of changing role of women in agrarian society</p>	<p>Review the possibilities of economic empowerment through agriculture based investments</p> <p>Investigate gender based demand for rural labour and wage rate disparities</p> <p>Gender, decision making power and impact on the agrarian society</p> <p>Asses the willingness and skills required to engage in agri-based industries and gender</p> <p>Female labour use and its impact on family activities and income</p>
Economic transformation towards services and industries and its impacts on the agriculture sector	<p>Policy on more commercialized agriculture and incentives towards that.</p> <p>Attracting Foreign Direct Investments for industries and services as well as for commercial agriculture.</p>	<p>Impact of the suggested economic transformation in the short run and long run on the agriculture sector in the areas of land fragmentation, parceling and land consolidation.</p> <p>The likely change in infrastructure and on living standards</p>	<p>An analysis of the impact of the diverse nature of economic transitions on different agrarian societies</p> <p>Labour migration due to the economic transformation and its impact on the agriculture sector</p> <p>A Study on forward and backward linkages of agrarian societies, within the context of economic transformation, to link to the global markets.</p>

Research Issue	Government Policy	Research Gap	Priority Research Area
	Allocate lands for landless people and re-organize the sectors for proper use of resources	Lack of information on the availability of water in newly developed/rehabilitated schemes, water use rights, and methods to optimize water and land use	An analysis of the extent existing/proposed policies have assisted in optimizing the proper use of land and water.
The mixed results of the impact of rural development projects	Establishment of 11 business and technology development areas Establishment of information and agricultural technology zones in Kandy	Limited information available on the viability of establishing technology development projects and its linkages to global markets and value chains	Feasibility of establishing technology development projects to rural livelihoods and rural development Feasibility of introducing of new crops, linking to global value chains to non-traditional areas
Institutions and rural poverty		Lack of proper understanding and mechanism to facilitate agriculture	Institutional constraints in facilitating agriculture development and its impact on the agriculture industry. Impact of existing rules and regulations on performance of the industries
Economic transformation and agrarian development	Empowering the present society through latest communication facilities	Lack of information on impact of newly introduced communication technologies on rural development	Assess the impact on the agrarian societies of transformations to modern technology

Research Issue	Government Policy	Research Gap	Priority Research Area
<u>Aquatic Resources</u>			
Indian Sri Lankan fishing dispute	Review the possibility of providing solution to the fishing dispute	Lack of evidence based research for decision making	Study on social and economic impact of Indian Sri Lanka fishing dispute
Livelihoods development of fishers	Alleviate poverty status of fishers	Very few studies conducted in North and East	Socio-economic impacts of aquaculture development in North and East of Sri Lanka for the livelihoods and economy of people
Harnessing traditional knowledge in fishery management	Optimization of traditional knowledge	Lack of research evidence	Study on optimization of traditional knowledge in fisheries management of Sri Lanka
Identification of institutional barriers	Provide solutions to the institutional issues	Lack of evidence based research on institutional barriers	Study on identification of institutional barriers in development of aquaculture industry of Sri Lanka
Review policy framework of fisheries sector	Requirement of policy framework for sector development	Policy research on the fisheries sector is limited	Review and analysis of existing policy framework for the sustainable development of fisheries industry of Sri Lanka
User rights in fisheries sector	Welfare of the fishing community	Limited studies on user rights	Territorial user rights in fisheries industry
Mechanization of shrimp farming and its impact	Conflict resolution	Very few studies conducted on this issue	Conflict resolution between traditional non-mechanized trawl fisheries and mechanized trawl fisheries for shrimps in Negombo
Subsidy schemes and its impact in the fisheries sector	Minimizing subsidy programmes	Limited studies on subsidy programmes	Investigation of the impact of subsidy schemes on fisheries and aquaculture development

List of Participants at the Workshop held on 13th September, 2016 at Mahinda Silva Auditorium at

Hector Kobbekaduwa Agrarian Research and Training Institute (HARTI) Colombo 07

List of Farmers

No.	Name	Mobile No.	No.	Name	Mobile No.
01.	D.H.A.S. Edirisinghe	0717871376	15.	M.A.S.W. Attanayake	0777802521
02.	A.R.D. Darmasiri Dayananda	0728392809	16.	P.A.S. Pinnawala	0715211232
03.	S.S. Sudath	0779202167	17.	R.D. Jayaweera	0768710427
04.	W. AmithTissera	0778365550	18.	E.M.S. Ekanayake	0777147080
05.	T.K.P. Mendis	0777341888	19.	M.H. Ranjith	0662221145
06.	O.H.J. Gunawardene	0772708955	20.	S.A.M.A.A.D. Alagiyawatta	0714719605
07.	W.A.N. Wijerathne	0771700744	21.	S.A. Janith G Perera	-
08.	A.M. Nimal	0715393279	22.	R.M.C. Siriwardene	-
09.	U.C.S. Wikramarachchi	0779137110	23.	W.R.S. Fernando	-
10.	A.S.M. Dayananda	0777895370	24.	R.H.P.S. Sumanarathna	-
11.	P.H.S. Silva	0773994079	25.	N.R.Thanuweera	-
12.	R. D. A. Silva	0716002037	26.	Upul Weerasingha	-
13.	Sunil Govinnage	0718089292	27.	Lionel	0712783447
14.	H.P. Premalal	0771128895			

List of Officers

No.	Name	Designation	Institute	Mobile No.	Email
1.	I.U. Mendis	Provincial Director	P.D.O.A (WP)	0718031049	-
2.	E.M.H.B. Ekanayake	Assistant Director	DOA	0718326258	herath . ekanayake@yahoo.com
3.	E.M.A. Jayalal Sarm	-	-	0775364762	-
4.	R.L.W. Jayathissa	Research Assistant	HARTI	0724385223	Jayathissa @.yahoo.com

5.	S. Epasinghe	Senior Research Officer	HARTI	0718878419	
6.	Shamini K. Kumara	Research Associate	HARTI	0758759594	Sharwin.kk@gmail.com
7.	Chinthaka Jayasingha	Research Officer	HARTI	0718000360	Chinthakahj@gmail.com
8.	G.G.L. Samarasingha	Senior Research Officer	HARTI	0718078209	geeahan@gmail.com
9.	R.P. Kasthuriachchi	Assistant Director	ETC, DOA	0715203663	rkasthorachchi@yahoo.com
10.	A.U.Warnakulasooriya	Additional Director	SEPC, DOA	071448790	-
11.	R.M. Heratha	Deputy Director	SEPC, DOA	07144989	-
12.	M.C.W. Wickramasingha	Additional Director	Botanical Gardens	0718345249	Kusal21@yahoo.com
13.	R.A.P.L.S. Dharamadasa	Senior Lecturer	Uva Wellassa University of Sri Lanka	0714664876	sdharmadasa@gmail.com
14.	D.P.W. Ponnawela	-	-	0714444853	pottawaladpw@gmail.com
15.	E. Pathiraja	Research Officer	Coconut Research Institute	0766741234	erandathep@yahoo.com
16.	G.C. Prasadi	0	ARS,Thlijjawila, DOA	0771134825	arstslk@gmail.com
17.	W.P.A.N.Weerawardhane	Deputy Director	SLEDB	0776063363	achini@edb.gov.lk
18.	A.H. Sandika	Senior Lecture	University of Ruhuna	0718180670	sandikan@ages.ruh.ue.lk
19.	L.M. Abeywicarama	Professor	University of Ruhuna	0779229011	
20.	S. Perera	-	-	0714493165	Sanjikapera@gmail.com
21.	W.A.N. Wijesooriya	Research Officer	HARTI	0772213557	-
22.	S.M.A. Samarakoon	Head/HRID	HARTI	-	-
23.	A.D.N.Chandrasinghe	Consultant	-	-	-
24.	J.R. Subasinghe	Assistant Director	ETC, DOA	0718353388	-
25.	J. Weerahewa	Professor	University of Peradeniya	0773982161	jeevikaw@pdn.ac.lk
26.	S.R. Ginige	Senior Lecturer	University of Sri Jayawardanapura	0714463954	snginige@sjp.ac.lk
27.	H.A. Mahindaratna	Provincial Director	-	0714448011	-
28.	E.H. Liyanage	-	Central Bank of Sri Lanka	-	-
29.	K.A.S. Gunasekara	Provincial Director	-	0718142851	-
30.	T.H.C.S. Perera	Director	SEPC, DOA	0776285552	-
31.	I. Edirisinghe	Research Officer	HARTI	0722919793	indikake@yahoo.com

32.	A.T. Sooriyaarachchi	Assistant Director	SEPC/DOA	0759749183	-
33.	D.W.L.U.De Silva	Scientist	NARA	0716572154	-
34.	T. Wijesinghe	-	-	-	-
35.	N.S.J.K. Nissanka	-	HARTI	0714434594	Susanthanissanka@gmail.com
36.	J.D.H.Wijewardena	Director/Secretary	SLCARP	-	-
37.	N.P. Liyanage	Assistant Director	-	0718428015	-
38.	P.S.R. Premarathna	Assistant Director	FRDI,Horana	0718687458	-
39.	J.M. Seneviratne	Deputy Director	DEA	0715940525	-
40.	P.A.J. Champike	Research Officer	HARTI	0713425609	-
41.	A.M.B.K. Attanayaka	Senior Lecturer	Sabaragamuwa University of Sri Lanka	0777950547	-
42.	Asitha.K. Senaviratne	Additional Secretary (Policy)	Ministry of Industry and Commerce	0722869161	-
43.	M.S. Senanayake	Head	HARTI	0714483567	-
44.	I.W.K. Imbulgoda	Deputy Director (IP)	Polonnaruwa	0714394374	-
45.	I.N.S.K. Edirisinghe	Head / Agricultural Economics Division	Coconut Research Institute	0777148945	-
46.	M.W. Amali De Silva	Senior Lecture	University of Sri Jayawardanapura	0718576851	-
47.	H.B.S. Ramanayaka	-	-	0718004078	-
48.	A. Dissanayaka	-	-	0777344840	-
49.	N.P.S.A. Menike	Economics Assistant	RARDC-Makandura	0718603988	Mnelumdeniga65@gmail.com
50.	W.H.D. Priyadarshana	Head, MFPAD Division	HARTI	0718694708	-
51.	K.A.C.D.B. Weerasingha	Assistant Director	SEPC/DOA	0776598210	-
52.	J. K. Galabada	Assistant Director	SEPC/DOA	0714805722	jalinikg@yahoo.com
53.	T. Ambepitiya	Senior Lecturer	Sabaragamuwa University of Sri Lanka	0714244009	-
54.	S.D.G. Jayawardena	Chairman	SLCARP	0714245823	-
55.	P.P.K. Muthukumarana	-	-	0714211060	-
56.	W. Wijesingha	Principal Research Officer	RRISL	0772954819	-

57.	M.D. Susila Lurdu	Senior Research Officer	HARTI	0775778172	susilalurdu@yahoo.com
58.	J.C. Edirisinaghe	Senior Lecturer	-	0712920578	-
59.	A.P.P. Disna	Director (Regulations)	DEA	0726420987	-
60.	R. Vidanapathirana	Senior Research Officer	HARTI	0777330733	-
61.	J.P. Jayasinghe	Research Officer	HARTI	-	jayasinghejp@gmail.com
62.	G.A.P. Wimalarathna	Deputy Director	Anuradhapura	0718163927	
63.	W.A.R.Wicramashinhage	Senior Research Officer	HARTI	0771345328	wikramasinghe@yahoo.com
64.	D. Hirimuthugodage	Research Officer	IPS	0773634660	dilani@ips.lk
65.	J.K.S. Sankalpa	Research Officer	RRISL	0719073212	ssankapala@gmail.com
66.	A.G.C. Babu	Assistant Director	Provincial DOA Nuwara Eliya	0777840405	-
67.	A. Dissanayaka	Head of Division	Rubber Research Institute	0714398897	anuraRdo@gmail.com
68.	S.H.P. Malkanthi	Senior Lecturer	Sabaragamuwa University of Sri Lanka	0718618229	Malkanthi9@gmail.com
69.	H.W. Shyamalie	Senior Research Officer	Tea Research Institute	0718579141	rchamale@yahoo.com
70.	E.M.D. Alawathugoda	Conservator of Forest	Forest Department	0718479800	Fdst.research@gmail.com
71.	L.U.N. Sumanasekara	Additional Secretary	MOA	0718155010	-
72.	K. Herath	Senior Lecturer	WUSL	0711150962	kamindaherath@gmail.com
73.	L.G. Hettiarachchi	Research Officer	SLCARP	0713023601	Lakshikagihan02@gmail.com
74.	B.M.U.S. Basanayaka	Technical Officer	SLCARP	0715532573	sandainfo@gmail.com
75.	D.M.D.D.N. Abeyrathna	Technical Officer	SLCARP	0776560991	damithabeyrathna@yahoo.com
76.	W.A.R. Hansini	Office Assistant	SLCARP	-	-
77.	F. Niranjana	Senior Scientist	SLCARP	0712787260	Niranjanafr_03@yahoo.com
78.	J.K.M.D. Chandrasiri	Additional Deputy Director	HARTI	0771482125	Chandraliyanage@gmail.com
79.	F. Abeyratne	Consultant	-	077102583	-
80.	W.M.W. Weerakoon	Director	FCRDI	0715337037	WeerakoonWMW@gmail.com
81.	R. Saparamadu	-	-	0713308502	Ranjan. Saparamadu@gmail.com
82.	P.C.J.de Silva	Senior Research Officer	HARTI	0718462779	Cgathura1@yahoo.com
83.	H.N.J.K. Herath	Senior Research Officer Senior Research Officer	HARTI	0718999012	herathda@yahoo.com

84.	M. Rambodagedara	Research Officer	HARTI	0774364651	Malathiie1@gmail.com
85.	T. Munaweera	Research Officer	HARTI	0775577085	thilanimunavra@gmail.com
86.	S.R. Atapattu	-	-	0766904202	Atapattu.ccb@gmail.com
87.	S. Bandara	Senior Research Officer	HARTI	0773992939	-
88.	N.M. Pushpanandana	-	-	0723557070	-
89.	I.P.P.M. Wijesingha	Research Officer	HARTI	0714483556	-
90.	W.A.J. Subasinghe	APD	APEH(WWP)	0714489809	Janakasubasinghe@yahoo.com
91.	O.P. Kithsiri	-	-	0714461840	-
92.	G.A.A. Gunasingha	Assistant Director	DOA	0711040075	-
93.	S. Mathagaweera	Assistant Director	DOA	0714156670	mathangaweera@yahoo.com
94.	H. Dharmasena	Director	HARTI	0719992770	-
95.	R.D. Wijesinghe	Research Officer	HARTI	0718725075	rasikawijesinghe@yahoo.com
96.	Dr. G G Jayasinghe	Deputy Director	Cinnamon Research Centre	0718265036	-
97.	R.N.K. Rambukwella	Senior Research Officer	HARTI	0773828303	roshinibbs@gmail.com
98.	R.M. Chandrasekara	Economist	DAPH	-	-
99.	S. Bammunuarachchi	Research Officer	HARTI	-	-
100	W.H.A. Shantha	Senior Research Officer	HARTI	0712783447	-
101	S. Wijesinghe	-	-		-