

# **Status of Extension & Advisory Services in Sri Lanka**

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Sri Lanka

**October 2015**

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**WORKING PAPER 1**

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University of Peradeniya  
Sri Lanka

**aesa**

Sharing, learning and networking  
for innovation

**Agricultural Extension in South Asia**

**October 2015**

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## **Abbreviations**

AEU	Agricultural Education Unit
AGCO	Agriculture Co-op Society
AgEDIS	Agro-Enterprise Development and Information Service Ltd
AI	Agricultural Instructor
ARPA	Agricultural Research and Production Assistants
ASD	Advisory Services Department
ASDA	Annual Symposium of Department of Agriculture
AVC	Audio Visual Centre
CBLM	Computer-Based Learning Materials
CAb	Counsellor for Agribusiness
CARP	Council for Agricultural Research
CCB	Coconut Cultivation Board
CDO	Coconut Development Officers
CEU	Cyber Extension Units
CRI	Coconut Research Institute
DAEOs	District Agricultural Extension Officers
DAPH	Department of Livestock Production and Health
DEA	Department of Export Agriculture
DoA	Department of Agriculture
DS	Divisional Secretary
EAC	Export Agricultural Crops
EAS	Extension and Advisory Services
E&E	Experiments and Extension
FEIS	Farmer Empowering Information System
GAP	Good Agricultural Practices
GAP	Granary Area Program
GDP	Gross Domestic Product
GGS	Govi Gnana Seva
HADABIMA	Haritha Danaw Bim Sanwardena Madyama Adikariya
ICTA	Information and Communication Technology Agency
IAEA	Integrated Agricultural Extension Approach
IAES	Integrated Agricultural Extension Service

IPM	Integrated Pest Management
IPNS	Integrated Plant Nutrition System
KVS	Krushi Viapthi Sevaka
LDI	Livestock Development Instructors
LDO	Livestock Development Officers
LO	Livestock Officer
MLRCD	Ministry of Livestock and Rural Community Development
MOAs	Market-Oriented Advisory services
MPI	Ministry of Plantation Industries
NADSA	National Agriculture Diversification and Settlement Authority
NIPM	National Institute of Plantation Management
NVQ	National Vocational Qualification Framework
PDAPH	Provincial Departments of Animal Production and Health
PGIA	Postgraduate Institute of Agriculture
PPP	Public and private partnership
PTWG	Provincial Technical Working groups
RDD	Rubber Development Department
RO	Research Officers
RDO	Rubber Development Officer
RPC	Regional Plantation Companies
RRI	Rubber Research Institute
RRISL	Rubber Research Institute of Sri Lanka
SAEP	Second Agricultural Extension Project
SLAEA	Sri Lanka Agricultural Extension Association
SLAS	Sri Lanka Administrative Service
SRI	Sugarcane Research Institute
TF	Thurusaviya Fund
TRI	Tea Research Institute
TSHDA	Tea Small Holdings Development Authority
TVET	Technical and Vocational Education and Training

## **Executive summary**

Agriculture continues to be the most important sector of the Sri Lankan economy. The economic performance of all sub sectors of agriculture is improving slowly with the changing technology and the improvements made to the value chains. However, the status of poverty among many rural farming communities still exists. The extension and advisory services (EAS) can play a significant role to improve this situation. The purpose of this paper is to provide a critical assessment of the present status of the pluralistic EAS in Sri Lanka. Changes needed at the policy level designing and at the field level implementation of effective EAS are also discussed.

The survey of literature related to EAS in Sri Lanka shows that very little comprehensive research has been undertaken on the policy strategies and impacts of EAS. In this paper the status in relation to the major sectors of Sri Lankan agriculture is analysed by reviewing the recent publications and personal communication with the extension scientists. The Department of Agriculture (DoA) together with the Provincial Departments of Agriculture is leading the EAS environment on the island. The DoA has achieved many remarkable successes in increasing the production of food crops. The other major EAS responsible for the livestock, plantation and spice crops also have shown varying degrees of success. Attempts were made in the past to provide a unified EAS to farmers, most of whom are having integrated farms with various crops and livestock. However, several EAS under different ministries and institutes now provide their own services to different sub sectors. The current status of those major EAS of the state sector such as DoA (Central and Provincial), Department of Export Agriculture (DEA), Department of Livestock Production and Health (DAPH), Sri Lanka Mahaweli Authority, Sri Lanka Hadabima Authority, Tea Research Institute (TRI), Tea

Small Holdings Development Authority (TSHDA), Rubber Research Institute (RRI), Rubber Development Department (RDD), Coconut Research Institute (CRI), Coconut Cultivation Board (CCB), Sugarcane Research Institute (SRI), and the non-state sector EAS are discussed. The status of most of these EAS in relations to extension coverage, use of ICT, human resource development, participation of stakeholders, and administration of planning, monitoring and evaluation is not satisfactory.

Apparently, EAS is not prioritized in some organizations and have failed to target the needs of the farmers and the industry. The administrative arrangements of some EAS also seem to be poor. Conventional extension approaches to EAS provision of most state sector agricultural organizations have shown limited progress due to resource limitations and ad hoc policy changes. However, some EAS have begun to change their strategies towards more participatory and partnership approaches together with the increased use of mass media and ICTs. The preliminary research shows that these partnerships and ICT-based initiatives are showing potential. The private and non-government organizations have come forward to fill in the gaps that are created by the state EAS. Efforts made to integrate and make the EAS demand driven by combining the activities of DoA, DAPH, DEA and CCB, which have stakes in most integrated farming systems around the country also failed. There is little attempt to introduce a comprehensive national policy for EAS.

Human resource development and research and development activities are very important components of planning, implementation and facilitation, of EAS programs. There are no dedicated agriculture universities with EAS functions. The review of the current efforts by universities and other EAS support

organizations engaged in agricultural education services show that there is an urgent need to expand them. Although the higher education sector is offering several diploma and degree programs, some EAS have employed those having little technical knowledge on agriculture at the top and bottom levels. The curricula of some agriculture courses lack field training.

Considering the nature of farming and economies of stakeholders of EAS, both within the island and in the South Asian region, it is recommended to develop an integrated mutually beneficial EAS system,

which would gain the power to influence the national and regional policies and brings the best for all farming communities. Some attempts have been initiated to develop professionalism among the extension workers and scientists, and to develop networks. It would be necessary for these volunteer bodies to take the leading role in setting up more recognized national or regional organization with a wide participation of the extension professionals enabling them to actively engage in much needed policy advocacy and institutional reforms.

## **1. Introduction**

The purpose of this paper is to provide information on the present status of pluralistic extension and advisory services (EAS) in Sri Lanka. The focus is primarily on how the EAS implemented by the state and non-state agencies managed to face the challenges of changing national economy in the recent years. The EAS support for farmers in enhancing their income is also discussed. Based on both the primary and secondary information, the paper analyses the following:

- Strength and weaknesses of different extension strategies
- Organizational arrangements and institutional innovations.

Issues related to investments and human resources are discussed here. Specific policy and organizational changes that can address some of these issues and guidelines that can transform and strengthen the EAS provision are also presented.

This paper is organized as follows: Section 2 starts with an overview of the agricultural sector and focuses on challenges that have a bearing on the EAS system. Section 3 elaborates the present status of major EAS with a brief historical overview and some of the current strategies in the food crop and plantation sectors. The innovative support systems used by the Department of Agriculture, agencies dealing with plantation crops and other allied agencies are also presented in this section. Details of extension services of the non-state EAS actors are discussed here. A critical review of some of the generic challenges in EAS is presented in Section 4. The negative outcomes of the organizational aspects of EAS in terms of broad indicators are discussed thereafter. Some important conclusions are presented in Section 5 with specific recommendations on the way forward.

## **2. Challenge in Sri Lankan agriculture and its implications for organising EAS**

### **Significance of agriculture sector in the economy of Sri Lanka**

Agriculture continues to be the most important sector of the Sri Lankan economy. Even though its contribution to the Gross Domestic Product (GDP) has declined substantially during the past four decades

(from approximately 29 per cent in 1970 to 10.8 per cent in 2013), it still is the most important source of employment for the majority of the Sri Lankan workforce. Approximately 38 per cent of the total labour force was engaged in agriculture in 2013 (Central Bank, 2014). The country's agricultural policy continued to focus on increasing domestic food production to enhance food security, reduce import expenditure and promote agricultural exports (Box 1).

#### **Box 1: Agricultural sector in Sri Lanka**

In the food crop sector, rice is the main crop and rice farming is the most important economic activity of the majority of people living in rural areas. The stagnated rice production and average yield until the 1990s changed since the turn of the century. Sri Lanka achieved the long awaited self-sufficiency in rice production in 2007 and the national average yield, which remained around 3.5 t/ha, increased up to 4.3 t/ha by the year 2012 (Visit <http://www.statistics.gov.lk/agriculture/Paddy>). The major factors for this increase were as follows:

- Application of recommended levels of fertilizers through the fertilizer subsidy scheme
- Use of organic manure to improve soil fertility
- Cultivation of abandoned rice lands (especially in the Northern & Eastern provinces)
- Cultivation of high yielding varieties
- Use of proper crop establishment methods
- Timely cultivation
- Proper land preparation
- Adoption of good pest management practices
- Use of proper post-harvest technology
- Favourable marketing facilities to obtain reasonable income

The economic importance of other agricultural crops (field crops, fruits, vegetables and spices) is steadily increasing. The percentage of agricultural export earnings from the other agricultural crops (except main plantation crops) in 2004 was 15.2 per cent. An increase in the export earnings (25.5 per cent in 2012) shows unprecedented importance received by the non-conventional agricultural exports (Central Bank Reports). The major plantation crops viz. tea, rubber and coconut continue to figure prominently in the economy of Sri Lanka. However, the contribution of these commercial crops to GDP declined from 11.5 per cent in 1970s to 1.9 per cent in 2013 (Central Bank, 2013).

The Minor Export Agriculture Crop (EAC) sector, which includes spices, coffee, cocoa, essential oil producing grasses, betel, arecanut etc., is an important sub sector in the Sri Lankan economy. More than 60 per cent of EAC produce is exported and this contributes to approximately 11 per cent of agricultural export earnings. In 2013, about 57,032.2 Million tons of EAC products were exported with Rs. 48,308.1 million foreign exchange earning (Department of Export Agriculture, 2014).

Even though agriculture still provides employment for nearly 30 per cent of the labour force, the income earning potential is not increasing when compared with the non-agriculture employment. Consequently, the rural agricultural communities tend to consider the off-farm employment opportunities, because these opportunities provide better livelihoods with higher social status and stable income. This situation has led to attract the better-educated and enterprising youth out of agriculture. However, considering the contribution of agriculture to the GDP, production volumes and the labour force involved, Pinnawala and Herath (2014) have shown that there is a marginal improvement of the status of poverty among those engaged in agriculture as an economic activity, despite a slight increase in food insecurity due to recent droughts.

### **Implications of present status of agriculture for organizing extension and advisory services**

*Low productivity-* According to Pinnawala and Herath (2014: 8), “the available data on productivity reveals that Sri Lanka’s agricultural productivity is low compared to the major Asian producers and, the World and Asian average productivity levels” (Annexure 1 and 2). The data also shows that except for a few crops, the country’s productivity of most other crops is far below those for China and Japan. This scenario of low productivity of agricultural enterprises and consequent poverty levels show enough proof to assume that the agricultural development strategies implemented so far have not made sufficient progress to make Sri Lanka a steadily developing nation.

*Low adoption of improved technologies:* Sri Lankan agriculture is comparatively highly diversified despite the land mass being

smaller than many developing countries. The well-established agricultural research institutes and higher educational institutes are developing technological innovations that are required to make different farming sub systems economically viable and environment friendly. However, the gap between the availability of innovations and the adoption by the farming communities seems to be widening.

*EAS are faced with several challenges that constrain its performance-* EAS are seen as agencies that can make new knowledge available to farmers and assist the farmers in developing their farming and management skills. Agricultural extension service is still conceptualized as a diffusion support process, starting from publicly-funded technology generation and dissemination. Consequently, the extension service suffers from being treated as a linear process that is supply-driven or top down by design. Debated relating to the agricultural extension system in Sri Lanka have revealed the following drawbacks:

- Large performance gap between research system and the farmer with respect to technological achievements.
- Client dissatisfaction – The system fails to meet the information demands of the farmers and rural communities.
- Bureaucratic approaches – The system is primarily geared up to promote state-sponsored programs irrespective of farmers’ interests.
- Declining investments in the extension owing to increased reluctance among policy makers to invest in extension leading to reduced budgets.
- Slow adjustment to reform process – failing to realize the need for extension to engage with a wide range of issues beyond disseminating technologies.

### **3. Extension and advisory services in Sri Lanka: Current status**

#### **Food crop sector**

##### **Department of Agriculture**

The extension service of the Department of Agriculture (DoA) has undergone a great deal of change, since its inception in the 1920s. Until 1980s, the village-level Agricultural Extension Officers (*Krushi Viapthi Sevaka* or KVS) performed a remarkable technology transfer program. Each KVS covered about 200 farmers under the supervision of the District Agricultural Extension Officers (DAEOs) and a Deputy Director (Extension), using individual and group communication. By early 1990s, there were over 2,400 grass-roots level extension workers who maintained close contact with the farming communities. The introduction of Training and Visit (T & V) system with its scheme of streamlined field visits and farmer meetings provided a basis for the following:

- Monitoring activities of the field extension personnel
- Measuring progress of extension for which a methodology was previously unavailable.

At the end of 1980s, two major transformations took place in the agricultural extension system. While one focussed on devolution of food sector EAS, the other was aimed at establishment of an integrated extension approach.

In 1989, under the 13th Amendment of the Constitution, central governance power was devolved to the newly created eight provincial councils. Hence, agricultural extension became a duty of provincial councils, and agricultural extension function of the DoA and Department of Animal Production and Health (DAPH) was largely devolved to the provinces. In 1990, the total

cadre of 2,400 grass-roots level extension workers (KVSs) of the DoA were reassigned to the Ministry of Public Administration as village officers (*Grama Niladhari*) handling administrative tasks. A consequence of this decision was a virtual breakdown of the extension service at the village level. Since then, an Agricultural Instructor (AI), a community level technically qualified extension officer, is responsible for food crop extension of a division comprising of several villages and covers over 1,700 farmers.

The Integrated Agricultural Extension Approach (IAEA) was introduced in 1993, involving four government institutions, viz. the DoA, DAPH, Department of Export Agriculture (DEA) and the Coconut Cultivation Board (CCB). The IAEA was based on the formation of an Integrated Agricultural Extension Service (IAES) with the participation of four institutions to function under a uniform procedure. The major reasons to introduce this approach were cost effectiveness, disruption in the technical line of command, insufficiency of grass-roots level extension workers and the need to practice the farming systems approach (Sivayoganathan, 1999). The Second Agricultural Extension Project (SAEP) launched in 1999 followed the IAEA and more funds were made available for extension.

The individual and group extension methods were intensified in a special program called *Yaya* (block), implemented since 2000, to increase the national rice production. The AIs selected paddy tracts having 20-25 ha of land area with 15-25 farmers, with higher productivity potential, better irrigation, and free of soil and land ownership problems. The farmer groups were provided with a package of integrated crop management practices. The DoA acted as the mediator between relevant organizations such as fertilizer company, banks and other private organizations to supply all the inputs needed for the cultivation and signing forward contract agreements to assure better market

facility.

The *Yaya* program was further intensified as the Granary Area Program (GAP) in some locations with the involvement of other major stakeholders. Some of the innovative extension tools such as cyber extension service, rice knowledge bank web site to technically support extension staff, media campaign, interactive multimedia CDs, crop clinics, picketing campaigns, and cultivation and yield competitions were also introduced and implemented to educate farmers. The outcome of these intensified extension efforts after three years was the increase of national rice yield up to 4.3 t/ha (Emitiyagoda, 2009).

Encouraged by the success of the *Yaya* program, the second phase was launched under the title *Yaya 2* with the aim of increasing the national productivity up to 5.3 t/ha by 2025 (Rohan Wijekoon, personal communication, January 2015). The main interventions include, environment friendly Good Agricultural Practices (GAP) such as judicious use of agrochemicals, use of Integrated Plant Nutrition System (IPNS), Integrated Pest Management (IPM), use of mechanized farming techniques preferred by the young farmers, and increasing cropping intensity with the introduction of crop diversification to increase the overall farm profitability. Appropriate technology packages for the main rice growing agro-ecological regions have been proposed. The extension approach is designed to increase the frequency of contacts, use of ICT and frequent monitoring of the seasonal activities with the help of relevant stakeholders. The development of ICT use in extension services is further discussed in section 4.

### **Gender and agricultural extension**

It is a common practice to give priority to men, while appointing field extension cadres. For example, even now out of the 38 Agricultural Instructors who are currently in

service in the North-Central Province, only 8 (21%) are females (Visit [www.agridept.nc.gov.lk](http://www.agridept.nc.gov.lk)). This has created imbalances in service delivery to the female members of the farming community making them economically vulnerable. The farm women agricultural extension service was initiated in 1970 and further developed in late 1980s. Female extension workers were mobilized to assist farm women in establishing home gardens and other farming activities to improve the income and nutrition of farming families. This service was also subsequently made gender neutral by including male extension workers with special training. In 2006, the farm women organizations were registered under the DoA and the women were assisted to start small enterprises by providing technical training and part funding to buy equipment. In 2011, a program on women entrepreneurship promotion was initiated by training farm women in various income generating activities e.g., food processing, planting material production, and equipment necessary were supplied at subsidized rates. Special mobile demonstration vehicles were also used (Rose Rupasinghe, personal communication, June 2015).

### **Agro-enterprise development and information service**

The central DoA has recently launched an Agro-Enterprise Development and Information Service (AgEDIS) in addition to the field extension programs of the Inter-provincial areas. Multidisciplinary teams of agriculturists visit to inspect the farmland of those who are interested in establishing entrepreneurial farming business and a set of technical recommendations as a formal report is provided to the owner.

### **Promotion of quality agro food for export through DOAgbiz**

A FAO funded project on strengthening agriculture extension system through agro

enterprise development was launched from 2010-2013. Under this program the farmer business school approach was adopted and some farmer co-operative societies developed. As a further refinement, a new intervention was recently developed to provide specific type of extension to achieve specific targets given by authorities. The certification of agro-food from land/seed to export gate was identified as a responsibility of the extension and training center of DoA. Therefore, this new extension system was initiated by the incumbent director extension and training, Mr. R.S. Wijesekera, (Personal Communication). The objective of establishing this system is to certify agro-food exported under GAP or organic procedures overcoming the prevailing technical barriers to global / local trade. This would enable the supply of quality assured fresh and processed food products to the end user and also the smooth functioning of the value chain with traceability and paperless marketing. The officers appointed for this program are named as Counsellor for Agribusiness (CAB). They facilitate the certification of farms under GAP or organic. The certified farms will be given GAP certificate and a QR code.

Good Agricultural Practices (GAP) and organic certification procedures are being introduced on a crop basis, such as rice, mango, pineapple, guava, passion fruit, banana, avocado, sour-sop, bitter gourd, pumpkin, luffa, green chili, green house tomato, bell pepper, zucchini etc. Producers (individuals and farmer groups or Farmer Co-op) are registered and certified at DOAgbiz as quality assured suppliers while DOAgbiz acts as a data hub to provide necessary information to the parties concerned. The website named Farmer Empowering Information System (FEIS) has been developed. A database of 200,000 growers, collectors and exporters would be developed and shared with national plant quarantine service. To implement the

program a new division named division of agribusiness counselling was established at DoA headquarters with 25 officers placed centrally and 100 agribusiness counsellors at field level.

### **Research-extension-farmer linkages of DoA**

The research-extension linkage of the DoA is formalized into an effective dialogue through the following mechanisms (Rupasinghe, 2014):

- i) Provincial Technical Working Groups (PTWG): The group provides a regular forum for research and extension staff engaged in different disciplines to interact with each other. The forum can be used to come to an agreement on sharing responsibilities for production programs to be implemented during the upcoming seasons. The provincial director of agriculture and deputy director (Research) of the regional research institute act as "Co-chair". The head of the regional in-service training institute performs as the Secretary. The PTWGs meet before the commencement of each cultivation season and priorities for the on-coming seasons are agreed upon.
- ii) Annual Symposium of Department of Agriculture (ASDA): All senior scientists, technical officers and extension officers of DoA are invited to the symposium and are given opportunities to present their findings of research outcomes, experience gained in extension activities and socio-economic studies. The event has helped develop a better understanding among officers of different disciplines throughout the country.
- iii) Researchers as trainers: Researchers as resource persons get involved in various farmer training and training-of-trainer programs. This creates an opportunity for the extension officers to discuss their field experience and give a feedback on the technical recommendation, enabling the farmers, extension workers and

- researchers, to understand issues of one another.
- iv) Disciplinary-wise working group meetings: Research officers of a specific discipline get together before the commencement of each season. Scientists from both the central and provincial research institutes contribute towards deciding research priorities. Representatives from the extension service are also invited to comment.

### **Mahaweli authority of Sri Lanka**

Mahaweli development program is the largest multipurpose development program ever undertaken in Sri Lanka. It was based on the development of land and water resources of Mahaweli river basins. The project started in 1970 settled 130,000 farmer families in 90,000 ha of land developed for irrigated agriculture under the downstream development. New projects have begun expanding the farmer base even further. Most of the settlers were allocated 1 ha of irrigable land lot and 0.2 ha of highland lot to be utilized as a homestead. Six major Mahaweli systems cover over 92,000 ha of paddy land cultivated with nearly 190 per cent cropping intensity, and over 23,000 ha of other field crops. This is a substantial share of the national agricultural production (Visit [www.mahaweli.gov.lk](http://www.mahaweli.gov.lk)).

The Mahaweli projects are divided into "systems". Each system is considered as an agri-socio-economic entity and managed by an administrative system comprising a resident project manager, block managers and unit managers. Unit managers who are functioning at the grass-roots level are multifunctional officers and they are responsible for dealing with all types of farmer needs including agricultural extension. The current extension services to the farmers are handled by 62 professional agriculturalists and 302 field officers.

Farmer organizations are formed at

the distributary channel level covering an average area of about 100 ha. The organizations engage in participatory management of distribution of irrigation water and play an important role in organizing farmer training classes, field days, field visits, demonstrations, field trials and *Yaya* rice cultivation program discussed in Section 3.1 above. They also facilitate agricultural credit and other inputs, and marketing of the produce of the members (Dayaratne, 2009). The research-extension linkage in the Mahaweli systems is maintained by the research and extension officers of the DoA and Mahaweli staff in the same manner as Provincial Technical Working Group (PTWG).

### **HADABIMA Authority (*Haritha Danaw Bim Sanwardena Madyama Adikariya*)**

HADABIMA, under the Ministry of Agriculture, initially started as "National Agriculture Diversification and Settlement Authority" (NADSA) in 1978 to address the issues stemmed due to soil erosion owing to plantation industry in the hill country. The activities were initially confined to Kandy and Kegalle districts and now operate in 40 divisional secretariat divisions in 10 districts. Initially, it targeted soil conservation works in 2,000 ha. and currently targets 16,000 ha., using the treasury funds. The aim is to re-convert the unproductive land to productive units while minimizing the soil erosion and soil degradation with the participation of the poor farming communities. The extension and development functions are performed under an assistant director (development) and there are 10 zonal managers and 30 unit managers. The field program is implemented with active participation of nearly 100 farmer organizations. The development planning is undertaken using participatory rural appraisal approach and the extension officers assist farmers to implement the conservation and livelihood improvement

program by providing incentives, technical training, planting material and market promotion. In addition to mechanical and biological soil conservation measures, production and use of organic manure is undertaken on a compulsory basis. This program is frequently faced with problems of funding, lack of human resources and inadequate incentives for the existing staff. Although this authority is coming under the same ministry and located in close proximity to DoA, there seems to be very little coordination between the two organizations.

### **Use of communication media in agricultural extension**

#### **Use of Electronic Media**

The Audio Visual Centre (AVC) of the DoA is well-established agricultural media centre in the country. The design and preparation of print media extension material (posters, banners, hoardings etc.), audio visual aids (CDs, DVDs, Multimedia CD ROMs etc.), TV documentaries and weekly TV programs (*Mihikatha Dinuwo* and *Govi Bimata Arunalu*) are executed by the center, while the farm broadcasting service of DoA broadcasts several radio programs. AVC also assists the other extension services to prepare their audio-visual material. Most of these media programs are well received by the farming community and students.

#### **Cyber extension: An ICT initiative**

With the beginning of the millennium, the Ministry of Agriculture, and the DoA in Sri Lanka realized the need for an alternative mechanism to cope up with the demand for information from different stakeholders. Steps were initiated to capitalize on the innovations and developments in the cyber world, which were already getting closer to the farming community. Therefore, as an ICT initiative, for the first time in Sri Lanka a “Cyber Extension” mechanism was implemented by the AVC of the DoA in 2004

as an appropriate information exchange mechanism, which seemed affordable and convenient to rural farmers in satisfying their information needs (Wijekoon and Rizwan, 2009).

The project established 45 Cyber Extension Units (CEU) at 45 *Govijana Kendra* offices (Agrarian Service Centres) during the period 2004-2006 (Wijekoon, 2014). Interactive multimedia based digital extension strategies were used in phase one. Continuous monitoring and an evaluation process of digital extension mechanism were done and improvements made. After considering the rapid development of e-governance status in Sri Lanka, Internet connections were provided to CEUs to enhance national agriculture research and extension system by improving the generation and collaborative use of agriculture knowledge and information system.

Under the ICT Initiative, a toll free agricultural advisory service with a dedicated hot line (number 1920) was established. This service has become popular among the farming community and general public in Sri Lanka. Another ICT initiative of Cyber Extension, is Wikipedia ([www.govia.lk](http://www.govia.lk)), which is a participatory and interactive web tool for agricultural development in Sri Lanka operated with the participation of agricultural community. According to Malsha, Jayasinghe and Wijeratne (2011), farmers in a remote location in Kurunegala district preferred to get information through ICT tools such as television, CDs and DVDs, print media and mobile phones. Most of the farmers studied used ICT tools to obtain information on pests and diseases control, agro chemicals, and new cultivation methods. Further, results indicate that there is a significant effect on improvement of farmers' knowledge to reduce pests and diseases.

In the recent years, there have been some

attempts to bridge the information gap between agriculture stakeholders and the end users using mobile-based methods. Most of these initiatives were limited to SMS-based methods: Mobitel agri-price information index dairy project by the Dambadeniya development foundation; SMS-enabled commodity trade-matching portal by the Sarvodaya Fusion; *Govi Gnana Seva* (GGS) Project and, Dialog TradeNet (Dissanayake and Wanigasundera, 2014). De Silva and Ratnadiwakara (2008) showed that if farmers used the phone at the agricultural value chain, their information search costs could have been reduced significantly creating greater incentives for commercialization of their agriculture. Some agro companies have initiated IT-based transactions with the farmers. The Hayleys Company has introduced ICT-based recording of issuing agricultural inputs to farmer out-growers. Data pertaining to selling of farmer produce to the company are compiled daily at the village level collecting centres. In order to reduce the time gap of providing quick solutions for pest and disease problems, the e-Crop advisory service of CIC introduced microscopes with built-in digital cameras, which are capable of taking clear and magnified pictures of pest and disease problems. These pictures are then transmitted to the experts in distant locations who could quickly identify and recommend remedial measures (Wijekoon, 2014). Another innovative approach to help fishermen to find useful fishing zones in the sea was successfully launched by Weligama *Nenasala* (Visit [www.fishinglanka.com](http://www.fishinglanka.com)).

A study conducted in 2009, on the use of Computer-Based Learning Materials (CBLM), revealed that both the farmers and officers used cyber extension systems in obtaining agricultural information. Use of CBLMs by the officers was positively influenced by their computer experience and education level (Dissanayake, Wickramasooya and

Wijekoon, 2009).

According to Information and Communication Technology Agency of Sri Lanka (ICTA), action is being taken to develop smart and sustainable online government services (Visit [www.icta.lk](http://www.icta.lk)). Widespread e-literacy and connectivity, increased affordable access to ICT in rural areas, and development of local language digital content should soon be able to uplift the living conditions of the rural and urban poor and disadvantaged groups. A unique ICT initiative is underway, where Google has teamed up with the Sri Lankan government to deliver broadband internet to every region of the island nation, making Sri Lanka the first country in the world to have universal Internet coverage with free Wi-Fi to people via a fleet of huge helium-filled balloons floating way up in the stratosphere (Visit [www.sciencealert.com](http://www.sciencealert.com)).

### **Plantations sector**

The Ministry of Plantation Industries (MPI) is the main governing body of the institutions responsible for the development and promotion of main plantation crops such as tea, rubber and coconut (Box 2).

## Box 2: Plantation sector in Sri Lanka

**Tea:** Tea continues to be a principle source of foreign exchange representing 14 per cent of the total export. Earnings from tea exports reached an all time high of USD 1600 million in 2014 (Sri Lanka Tea Board, 2014). Sri Lanka is the third largest tea exporter in the world contributing 16.6 per cent of the global tea exports.(Ministry of Plantation Industries, 2013) As per the Census of Tea Small Holdings in 2005, total tea area in Sri Lanka is approximately 221,968 ha. The extent of tea smallholdings is 132,329 ha, amounting to 59 per cent of the total tea area in Sri Lanka, which contributes to 71 per cent of the national production (Tea Small Holdings Development Authority, 2013). The large scale tea estates are managed by 20 Regional Plantation Companies (36 per cent of total extent), and government institutions (5 % of total extent) (Ministry of Plantation Industries, 2014). Sri Lanka Tea Board, Tea Research Institute and Tea Small Holdings Development Authority (TSHDA) are the main institutes involved in the management of the tea industry.

The dominant tea smallholdings sector continued to make progress and recently exceeded the productivity of 2,000 kg per hectare. This success is mainly attributed to the increase of inputs, higher green leaf prices and favourable weather conditions that prevailed in the recent years. Despite stiff competition from other beverages, the use of high-yielding cultivars, eco-friendly agronomic practices and health products such as organic tea, contributed to increase in the economic stability of the tea industry. However, the productivity of tea compared to that of the main competitors, in terms of land and labour, remains stagnant, while the cost of production continues to rise. The made tea prices of all producing countries declined significantly since the last quarter of 2014. According to Sri Lanka Tea Board (2015), the average prices in the first quarter 2015 (Rs. 420.21/kg) was below the cost of production level of Rs. 422/kg reported in 2013. Hence, most of the plantation companies faced severe financial crisis while the smallholder sector received reduced prices for their green leaf supply. The government has recently introduced a guaranteed price scheme to pay a higher price for the good quality green leaf supplied by the smallholders.

**Rubber:** Rubber plantations occupy 130,780 ha, of which 81,345 ha (62%) are owned by the rubber smallholders. Further, 37 per cent consists of large plantations which are owned by regional plantation companies and the balance 1 per cent by the government institutions (Ministry of Plantation Industries, 2014). The extent of rubber in the late 1970s, which was above 200,000 ha, reduced drastically, mainly due to changes in land use pattern in the traditional rubber growing areas in the Western districts (Dissanayake and Wijesuriya, 2014). The current emphasis is on the expansion of rubber cultivation in non-traditional rubber growing areas in Uva and Eastern provinces, where land and labour are assumed to be non-limiting factors, while the weather too is suitable for this crop.

Being the second most important plantation crop, the production and processing of natural rubber and the product manufacturing industry together provide employment to over 300,000 persons making this industry very important for the economy. It is also considered as an environment friendly industry. Rubber growers enjoyed high prices in the recent years making the industry highly viable (Rs. 535 per kg in 2011 to Rs 389 per kg in 2013). However, since 2014 the prices are steadily coming down and the current auction prices are around Rs. 200 per kg. (Ministry of Plantation Industries, 2014)

**Coconut:** Coconut is the most widespread plantation crop found in all the districts in Sri Lanka. It accounts for approximately 12 per cent of all agricultural produce in Sri Lanka. Total land area under cultivation is 395,000 ha and about 2,500 to 3,000 million coconuts are produced per year. Sri Lanka has the highest per capita consumption of coconut in the world with an average of 110 coconuts/person/annum. Coconut is probably the most important perennial food crop of the Sri Lankans providing about 22 per cent of the caloric and protein intake. Coconut is also the most important source of edible fat in the daily diet. Nearly 70-75 per cent of the annual total coconut production is used for domestic consumption, and the balance 25-30 per cent is used in processing industries. (Coconut Research Institute, 2013).

## **Tea sector**

TSHDA (Tea Small Holdings Development Authority) delivers extension services to 350,982 smallholders in the country with the help of 157 field level tea inspector/extension officers. The officers are operating under 26 sub office OICs, coming under eight assistant regional managers (extension) and supervised by six regional managers. Altogether, a total of about 200 technical officers (both executives and non-executives) engage primarily in extension related functions (Tea Small Holdings Development Authority, 2013). The field extension officer to farmer ratio is nearly 1:2700 when it is believed that it should be 1:1000. According to Obeysekera (2009), the extension coverage is extremely poor as the area under cultivation per extension worker is 814.85 ha. This shows the need for expansion of the TSHDA staff strength as well as the need for more collaborative and partnership approaches to better serve the tea smallholders.

The extension services of the TSHDA follow the commodity based production oriented approach dealing with only the tea cultivation. Group extension methods are extensively used with limited individual contacts and mass communication (Obeysekera, 2009). The setting of result-oriented statutory objectives along with the implementation of a detailed action plan were introduced for smooth functioning of service provision. Under this, the long- and medium-term objectives are set taking into account the problems of smallholders. The medium-term results expected are as follows:

- Increasing the yield
- Improving the harvested green leaf quality
- Strengthening the community-based organizations
- Facilitating additional income from tea smallholdings

Major emphasis is laid on the following activities (Tea Small Holdings Development Authority, 2013):

- 1) Promote or undertake development of tea smallholdings using incentive schemes to promote tea replanting, new planting, rehabilitation and cultivation of tea mixed with rubber or coconut.
- 2) Acquire or develop facilities required for the manufacture of produce. "Tea Shakthi Fund" was established initially by the TSHDA and subsequently a separate institution was set up under Ministry of Plantation Industries.
- 3) Promote marketing of the produce by conducting price supervision activities of factories processing smallholder leaf, directing Tea Smallholder Societies to market green leaf produced in tea smallholdings.
- 4) Take all such steps to facilitate the provision of services as may be necessary for the development of such tea lands:
  - a) Distributing tea fertilizer
  - b) Provisioning planting material, equipment and transport facilities
  - c) Implementing extension and advisory services
  - d) Establishing society leaf collecting centres
  - e) Strengthening tea smallholder societies and directing smallholders to additional income earning activities.

Ministry of Plantation Industries (2014) has identified the following as major issues and challenges of the tea industry:

- Low productivity in tea lands
- High cost of production
- Labour shortage in some areas
- Low adoption of modern technology
- Low capital investment
- Inadequate value addition
- Poor quality of green leaf
- Inadequate replanting
- Prevailing tariff constraints in the world market for 'Ceylon Tea'.

The situation that prevailed in 2012 with regard to the investment for the implementation of the work plan of the TSHDA is unsatisfactory as indicated by Tea Small Holdings Development Authority (2013: 27):

“...only Rs. 199 million was received for capital expenditure from the consolidated fund during the year. Expected extra allocation of Rs. 150 million was not received. But the total development capital expenditure was Rs. 276.32 million Thus, the institution was compelled to carry forward a sum of Rs. 86.96 million of subsidy payments to the ensuing year as accrued expenditure. In the above background, using estimated receipts of funds, annual expenditure, estimated development targets and achievement for operational review of the organization is not realistic.”

Although, the present situation shows a marginal improvement as shown below, it seems inadequate to improve towards achieving expected results (Personal communication with TSHDA management):

1. The investment situation has gradually improved in the last two years and hence not likely to be a serious bottleneck to achieve medium-term objectives.
2. Despite a sound basis for planning in the result-oriented management approach, the implementation of activities is severely affected by inadequate participation of the community-based organizations to prioritize the extension activities; the diminishing motivation of the field extension workers to commit to remain in their respective ranges to complete tasks; and the lack of enthusiasm of the smallholders to replant their existing tea plots.

The extension staff emoluments have not increased in line with other state sector parallel services. Hence, some of the experienced staff left to join other sectors.

Recruitment of new extension staff is also becoming difficult due to the lack of attractive incentive packages. Of those recently appointed, a good number has already left and joined other sectors.

The Tea Research Institute of Sri Lanka (TRI), which started in 1925, continues to be the main organization dealing with developing and disseminating technologies of tea cultivation and processing to the industry. Until late 1950s, the scientists provided advisory services to the managers of the tea plantations by way of visiting them when they faced problems. A separate advisory established in 1959 in the TRI. It was transformed into an ‘Advisory and Extension service’. The services that were limited to on-call estate visits to solve field problems were expanded to facilitate wider dissemination of technical information. Thus the plantation managers and their staff were empowered to make their own decisions regarding handling of field problems based on the technical information received beforehand.

In early 1960s, the TRI realized the need for decentralizing the advisory services as the demand for advice increased beyond manageable limits of the head office at Talawakelle. This led to the opening of Advisory and Extension units at the TRI regional stations in Passara (1963) for Uva, Ratnapura (1964) for low country and Hantana (1966) for the mid country tea growing regions. With the expansion of tea smallholder sector in low country, the institute realized the need for more regional stations in low country areas and opened regional stations in Kottawa in Galle district (1980), Deniyaya in Matara district (1984) and recently at Matugama in Kalutara district (2008). The advisory officers attached to the advisory and extension division and its regional units maintain close contacts with personnel in the tea industry and disseminate tea production technologies except tea processing, which is handled by

the research staff of technology division of the institute. The TRI has evolved different mechanisms to disseminate information to large plantations coming under Regional Plantation Companies (RPCs) and to the smallholders. The TRI liaise with the TSHDA in disseminating technological information to tea smallholders (Rajasinghe and Samansiri, 2014).

The extension communication strategies used by the TRI also expanded to include individual, group (e.g. extension training) and mass methods (e.g. use of print and electronic media). However, the on-call service to plantations continues to the present with the involvement of scientists as subject-matter specialists in selected cases where their expertise and in-depth knowledge are required to solve field problems. With the changes that have taken place in the tea plantation sector and to meet their diverse demands, TRI also had to change its strategies from time to time to suit the situation. It is encouraging to note that some research and development studies are recently undertaken to address the needs of extension services of the tea industry. In addition to the individual extension methods, i.e. estate visits, telephone calls and advisory correspondence, group extension methods such as demonstrations, field days, workshops and crop clinics are conducted on the request of plantation companies and other stakeholders. Mass media methods are also used to create awareness on the recent developments of research and especially to inform the growers about the specific recommendations on crop cultivation and leaf manufacture. Print media are heavily used and several types of publications from highly technical journals such as Sri Lanka Journal of Tea Science to simpler reading material such as Tea Bulletin, Tea Handbook, Monographs,

advisory booklets and leaflets, and Tea News updates are regularly published and distributed. A series of video documentaries have also been produced on important field operations. Radio and television programs are broadcasted in national and regional channels, though not regularly.

The TRI has developed mechanisms to maintain effective linkages with the major stakeholders of the industry. The Experiments and Extension (E&E) forums are held twice a year with the members appointed from all sectors at the national level of the tea industry i.e. senior management of corporate sector plantations, TSHDA and, input and output marketing firms, scientists from other organizations etc. Apart from presentations made by senior TRI scientists and extensionists on new technologies, findings and research studies that are nearing completion are discussed. The forum provides an opportunity for the industry representatives to present their problems and to suggest new areas and ideas for research. The concept of the E & E Forum was extended from the estate sector to the smallholder sector by conducting additional two forums in the Sinhala language every year. In order to improve the dialogue at sub-national level and to improve the wider participation of tea growers in identifying emerging local problems and to feedback on technologies recommended, six regional scientific committees were formed with the participation of all plantation managers in the respective regions. Regional technical and extension forum is the similar mechanism set up for the smallholdings sector where the representatives of Tea Small holder Societies and TSHDA officials meet with TRI scientists to exchange timely information. A number of different officers in the advisory and extension service of the TRI is listed in Table 1.

**Table 1: Extension personnel of advisory and extension service**

Cadre Positions	No. of Cadre Positions	Vacancies
Deputy Director (Extension)	01	01
Head of the Division	01	00
Principal Advisory Officer	05	03
Senior Advisory Officer	05	05
Advisory Officer	07	0
Extension Officer	24	14
<b>Total</b>	<b>44</b>	<b>23</b>

Source: Tea Research Institute of Sri Lanka

Although the productivity of the tea smallholdings sector is higher than that of the corporate sector, findings of a survey conducted by the TSHDA in 2008 revealed that only about 34.5 per cent total holdings had obtained advisory services from the government sources (Amarathunga and Wanigasundera, 2010). Therefore, formal communication channels presently available between the TRI and tea smallholders are inadequate for the timely dissemination of tea technologies to reach all tea smallholdings in the island. Inadequate linkages among key partners viz. researchers, extensionists in public and private sector and tea growers result in systematic “bottlenecks” in technology dissemination systems and limit their effectiveness to contribute to development of tea industry. Hence, extension scientists have made some attempts to study and introduce different extension models and approaches for strengthening the existing extension system.

New models of extension proposed are characterized by participatory involvement of many stakeholders in program planning, development and implementation. It is encouraging to note that some advanced research and development studies have been recently undertaken to address the needs of extension services of the tea industry. The areas of study include development of para-extension approaches and private-public partnerships to facilitate

wider dissemination of technology, setting up of IT-based information and service delivery mechanism (Sidhakaran *et al*, 2014; Samansiri, Wanigasundera and Wijekoon 2014; Amaratunga, 2015).

There are some private extension channels, which are basically market-oriented and operate through bought leaf factories, agro-input and service-oriented agencies (Amarathunga, Wanigasundera and Premadasa, 2008). However, there is no proper organizational mechanism for monitoring and evaluation of the private sector extension channels to ensure that the recommended technologies are effectively disseminated and used by smallholders. Hence, a comprehensive empirical R & D study was conducted to explore the existing collaborations among the key stakeholders, the factors affecting such linking mechanism of extension, and to appraise the partners' readiness for a public and private partnership (PPP) extension model (Amarathunga, 2015). Based on the factors affecting existing collaborations a Public-Private Partnership (PPP) extension model (partners: TSHDA, tea factory, input supplier, TRI) was formulated as a model, and incorporated into six existing factory-based models and implemented, for a period of 12 months.

These six models with different stakeholder combinations showed varying levels of partnership during the observation period.

The preliminary evaluation results showed that the knowledge level and adoption rate of standard field operations increased significantly in proportion to the degree of partnership among the stakeholders. The results provide sufficient evidence to prove that the level of adoption of proven technologies strongly depends on the degree of interaction between smallholders and other extension agents. As a result of this initiative, such models are now being initiated by some stakeholders.

The advisory officers of the TRI highlighted the following as the most crucial issues needing immediate attention (personal communication):

- Fill the 52 per cent vacant extension officer cadres.
- Set up proper mechanism to monitor activities of para-extension and PPP services.
- Allocate adequate funds and human resources for conducting extension research required for the tea sector.
- Use appropriate development communication strategies to address the real needs of stakeholders and to undertake participatory development programs.
- Monitor the various technologies coming from various countries to highlight their relevance to the sustainable management of the tea industry.
- Introduce skills development initiatives on specific field and factory operations, which are affected due to lack of skilled workers.

### **3.5.2 Rubber sector**

The productivity of most smallholder rubber lands remains far below their potential, creating a good deal of challenge for the extension services. According to Wijesuriya *et al.* (2010), the awareness and technical knowledge on crucial operations of the

rubber growers were less than 50 per cent, which shows the inadequacies of the extension services.

The Rubber Development Department (RDD) was established in 1994, by amalgamating the Rubber Control Department (established back in 1930s for the regulatory functions of the rubber industry) with the Advisory Services Department (ASD) of the Rubber Research Institute. During the amalgamation process, the regional level executive positions were allocated to Sri Lanka Administrative Service (SLAS) officers limiting the promotional prospects of technically qualified extension officers who were agriculture graduates or diploma holders. Unlike most other agricultural research and extension establishments, where the senior management consists of agriculture or scientific service officers who serve a long-term tenure, these SLAS and other state service officers cannot provide a continued service over long periods, as they are routinely transferred to other state sector institutions.

Rubber lands in traditional rubber growing districts located mainly in south-western Sri Lanka are increasingly faced with competition for alternative land uses such as tea plantations and housing. As an alternative, the popularization of rubber cultivation was initiated in the non-traditional areas such as the semi-dry regions of Moneragala and Ampara districts. The general EAS for the rubber growers are mandated to the Rubber Development Department (RDD), while the Rubber Research Institute also provides technical advisory services through its research divisions and ASD. The RDD and *Thurusaviya* Fund (TF) are responsible for the development of the rubber sector, while the Rubber Research Institute of Sri Lanka (RRISL) is solely responsible for research and development activities. The ASD is its extension arm. In addition to performing extension activities, RDD is also responsible

for issuing permits for rubber planting, subsidy disbursement and, providing planting material to the smallholders. *Thurusaviya* Fund is responsible for establishment, registration and organizing *Thurusaviya* societies (smallholder rubber societies). The fund also provides processing facilities and enhances rubber sales and marketing.

According to the cadre positions given by the RDD, there should be 12 supra grade Rubber Development Officers (RDOs). 182 RDOs are expected to serve as field extension officers dealing with the rubber smallholders. However, the actual number of officers at present is far below the approved cadre and only about 98 RDOs remain in service as little attention has been paid to recruit more RDOs. This situation together with reduced emphasis for extension functions has created serious limitations (Visit <http://www.rubberdev.gov.lk/web/>).

The RDD has identified the following as their major functions:

- 1) Implementation of the powers vested under principal statutes and legal sources.
- 2) Registration of rubber lands and their owners through the regional offices, issuance of licenses, and the provision of planting material, fertilizer and subsidies.
- 3) Administration of the system of subsidies for new planting and re-planting, and the distribution of subsidies through the district offices.
- 4) Production of high quality rubber plants in government and private rubber plant nurseries, and provision of subsidies and instructions to the private sector for the production of plants.
- 5) Issuance of licenses for sale of rubber, manufacture of rubber based products and export of rubber.
- 6) Provision of subsidies for the modernization of factories for the manufacture of rubber.

- 7) Collection of important data and information in respect of the rubber cultivated lands, production, local consumption and export
- 8) Provision of advisory services for the cultivators and transportation of their agricultural inputs to augment progress of the rubber cultivation.
- 9) Make rubber smallholders aware of the available markets.
- 10) Interaction with international organizations in the spheres of production, consumption and trade in natural rubber.
- 11) Collection and administration of cess funds.
- 12) Motivating the smallholders in respect of the phases of rubber cultivation and production.
- 13) Organization and implementation of activities for the economic upliftment of the smallholders.
- 14) Implementation of state policy aimed at the expansion of productivity and production in the sphere of rubber and act as the leading institution for that purpose.
- 15) Collection of important data and information in respect of the rubber cultivated lands, production, local consumption and export.

From the above list, it could be seen that emphasis laid on the advisory and extension functions is low, even though the extension services are clearly identified in the mission statement of the RDD. This situation is reflected in the Action Plan of RDD for 2015. The funds estimated for direct extension functions amount to only 0.34 per cent of the total capital budget allocations, which includes Rs. 2985 million for the guaranteed rubber prices. In addition to the colossal sum allocated for guaranteed prices, the major capital items budgeted for were production of nursery plants, replanting, intercropping and rain guard subsidies. The funds allocated for extension related

work included only training of tappers and bud grafters, in-service training of officers, extension publications and publicity. These allocations amount to only 1.12 per cent of the capital budget, even without the guaranteed price payments. No allocations seem to have been made for any advisory visits and farmer training related to crop cultivation and processing.

According to Riyaldeen (2009: 210):

“When the structural setup of the extension services in the rubber sector is reviewed it is mainly a top down approach and there is less upstream flow in the decision making process. Although the approach of the RDD tries to encourage a two-way flow, due to the lack of participation from farmers it does not seem to be successful”. “....By forming an effective linkage for three-way information flow between farmers, extension agents and research institute staff, extension services will be demand-led, and farmers' problems will set the extension agenda.”

The ASD of the RRI, which was amalgamated to form the RDD in 1994, was again reformed with 35 extension officers reallocated from RDD. The head of ASD with five executive level regional advisory officers and about 25 extension officers lead the advisory and training functions of the ASD. In addition, the respective research departments of RRI also provide technical services and expert advice to the rubber plantations, plant nurseries and processors. It appears that there is a lack of coordination among the actors who serve the rubber smallholders. This has led to inefficiencies and wastage of resources (Dissanayake and Wijesuriya, 2009). In a field study conducted on the services of the field extension officers of RDD and ASD, it was revealed that the RDD extension officer had to serve an average of 815 farmers cultivating 802 ha of rubber lands (Munasighe, Wanigasundera and Kularatne, 2009). However, the extension officers of ASD had to serve 2980

growers and therefore only about 16 per cent growers knew the ASD services. The extension training conducted by ASD officers was identified as more efficient compared to those done by RDD. Only about 14 per cent of extension officers had positive attitudes about the extension services, but 55 per cent of growers had positive attitudes towards extension staff.

### **Coconut sector**

The Coconut production and processing technologies were developed and disseminated primarily by the Coconut Research Institute (CRI), which was set up in late 1920s. The Coconut Cultivation Board (CCB) was formed in 1971 to provide subsidies to island-wide coconut growers and assist them to get the best benefits from it. All the functions and the staff of the advisory division of the CRI were absorbed by the CCB. The extension services of the CCB are implemented through 18 regional offices established in major coconut growing areas. Coconut Development Officers (CDO) are the field level extension officers operating from agrarian service centres, who not only administer the subsidy scheme, but also provide technical guidance and inputs to small and medium scale coconut growers. The CRI is solely responsible to provide extension and other technical support services to the large coconut estates. The coconut development authority handles the industrial development and marketing services of the coconut sector.

There are 17 regional managers and 162 CDOs covering the coconut growing districts. A study carried out by the CRI regarding the extent of service area covered by each CDO of CCB showed that it varies from 1017 ha in the Ampara region to 5121 ha in the Marawila region. The national average of land area to be covered by each CDO is about 3000 ha. The number of coconut holdings to be served by a CDO

varied from 5012 (in Gampaha) to 19,490 (in Anuradhapura) with a mean of 10362 holdings (Coconut Cultivation Board, 2012). This clearly shows that the CDO in the region is unable to attend to the needs of coconut growers on an individual basis. The CCB promotes technology transfer and provides the required services for growers with the objectives of: enhancing knowledge and skills on coconut land development generated by CRI, and address the real field level problems of coconut growers.

The main extension methodologies implemented by CCB include individual field visit by the CDO, field days, seminars, crop clinics, group discussions, field demonstrations, mass media programs and exhibitions, printed materials (leaflets, brochures etc.) and farmer field schools. The extension training for farmers and in-service training for officers of various agencies are given by two coconut development training centres at Lunuwila and Medamulana.

A special community based development program called *Kapruka Purawara* has been launched in 2011 covering identified Divisional Secretary (DS) divisions. The program deals with upgrading plantations, enhancing productivity of coconut lands, developing coconut-based products, provisioning financial services, and expanding market and employment opportunities. It is proposed to cover 180 DS divisions. Village level *Kapruka* societies are being formed and integrated into regional and national levels (Coconut Cultivation Board, 2012).

The main strategies of the technology transfer activities of CRI are as follows (Appuhamy, 2009):

- i. Acquire information about technology needs, production problems and adoption of technologies.

- ii. Evaluate the relevance, effectiveness, impact, and affordability of technologies.
- iii. Disseminate coconut cultivation and processing technologies and information to extension personnel, growers, commercial entrepreneurs and the general public.

In addition to the technology transfer to the coconut plantations, the CRI conducts technical training programs to field extension officers of CCB and many other extension personnel from the government as well as from NGO and private sector. The CRI has produced a series of technical and extension literature on production and processing technology targeting different categories of end users. These include technology updates, advisory bulletins, advisory circulars, research journal, coconut bulletins, flash cards, leaflets, posters, booklets on special issues, stickers, banners and display boards. The mass media are also being used for creating awareness and updating the stakeholders, especially the growers. Magazine type weekly radio programs; occasional television advertisements; and newspaper weekly supplements are used to achieve a wide coverage. In addition, video documentaries and multimedia CD ROMs are produced in collaboration with the DoA.

Despite various extension services performed by the CRI and CCB, a diagnostic survey conducted in 2006 (Appuhamy, 2009) has revealed that the actual adoption of the technology among most growers is very low.

According to the technology transfer division staff of the CRI (personal communication), there are some major limitations with the extension services in coconut sector:

- i. Low attitude and lack of interest among the farming community towards extension services due to low emphasis laid on identifying their specific needs.
- ii. Inadequate use of mass media for the exchange of views and sharing of information.
- iii. Farmers face difficulties in utilizing knowledge disseminated through training programs due to lack of repetition or follow-up activities.
- iv. Lack of coordination between the two groups of extension officials.
- v. Lack of proper mechanism to monitor and evaluate the progress of already implemented extension programs.

### **Sugarcane sector**

Sugar is a basic food commodity, next in importance to rice and wheat. With the current per capita consumption of 31.6 kg, about 622,000 tons are required for Sri Lankans per year. The domestic production is sufficient to meet only 6.1 per cent of the requirement. (Ministry of Plantation Industries, 2013) The sugar imports constituted 33 per cent of the expenditure on basic food commodities (rice, flour, wheat and sugar) imported to the country and in addition, over Rs. 5 billion is spent annually on importation of spirit, which can be produced from by-products of the sugar manufacture. Hence, the import substitution of sugar and its by-products would make a significant contribution to the foreign exchange in Sri Lanka (Perera, 2009).

At present, nearly 15,000 farm families are directly involved in sugarcane production in sugar mills, while many others produce jaggery and syrup as a cottage industry. In addition to direct employment, sugar production provides indirect employment opportunities in the supply of necessary services for sugarcane farming and sugar processing (Keerthipala, 2007).

There are about 125,000 ha of undeveloped land suited for sugarcane development in the dry and intermediate zones of Sri Lanka. Thus, expansion and diversification of the sugarcane industry in Sri Lanka, as an agro-industrial sector, would greatly benefit the economy in many ways. It can also serve as a nucleus for rural development in the under-developed areas and help uplift the rural economy and improve the standards of living of the rural people (Keerthipala, 2007).

The total area under sugarcane cultivation is estimated to be 18,300 ha, as both rain-fed and/or irrigated cultivations. The two main sugar projects at Sevenagala, and Pelwatte manage the majority of sugarcane land. There are also cane lands outside the area demarcated for these sugar projects, particularly in the Moneragala, Badulla and Ampara districts, cultivated by private farmers. In 2012, the government re-acquired the Sevanagala and Pelwatte sugar companies and since then there is steady progress in local sugar production. In 2013, these two companies have produced 42,500 tons of sugar. The former Hingurana sugar project was also developed as a public-private partnership and now runs as Gal Oya Plantations Limited. They produced nearly 20,000 tons of sugar from about 3,600 ha of sugarcane cultivation.

The extension activities of the sugar industry are primarily under the private ownership on the basis of commodity development approach. The field extension officers (Agricultural assistants and Field assistants) monitor the crop in his/her assigned zone, and provide both the technical advice and the inputs at the same time.

The extension service is provided by the sugar companies and the farmers have to bear the cost for extension service indirectly, because the present cane payment system by the company include the cost for the

extension service also. Unlike in other sectors such as the tea smallholdings sector, no regulatory body is moderating the sugarcane price.

The current extension approach could also be viewed as a pluralistic approach (public-private) because part of the extension service and research component of the sugar industry are catered by Sugarcane Research Institute (SRI), a semi government body, apart from the extension activities that are handled by the private companies. There is a public-private joint mechanism in the conduct of research catering to the sugar industry, while SRI is conducting most of the technology transfer activities in collaboration with the companies.

According to a recent study conducted by Peiris, Abeynayake and Perera (2012), the average technology adoption level of farmers in Sevenagala was relatively higher due to effective extension services

and providing incentives to the farmers by Sevenagala sugar industry. The average yield of the study area was 71.5 t/ha -- lower than the potential yield of the area (over 100 t/ha).

However, the relationship between farmer and extension service has improved after 2012. This is due to measures including the following taken by the government:

- Reacquisition of Pelwatte and Sevanagala Sugar industries,
- Increase in sugarcane price
- Extension of fertilizer subsidy for sugarcane farmers
- Incentives for farmers based on profits.

These developments have created a conducive environment for the extension activities organized by SRI in collaboration with sugar industries. The numbers of extension staff involved in the three major sugar projects are shown in Table 2 (Perera, 2015).

**Table 2: Number of farmers and extension officers in major sugar projects - 2015**

Number	Pelwatte Sugar Industries PLC			Sevanagala Sugar Company			Gal Oya Plantations Ltd
	Out-growers	Settlers	Farmer Organization	Settlers Rain-fed	Irrigated	Out-growers	
Farmers	7600	1500	300	1640	2280	40	3966
FAs/AAs/FOs*	36	20	02	6	10	-	25
AOs/ASDs*	06	08	-	03	07	1	08
SDs*/Managers	10	05	1	01	03	-	05
Farmers per AA/FA/FO	100-200	75-100	150	200-300	200-300	40	200-250

\* AA- Agricultural Assistant, FA – Field Assistant, FO – Field Officers AO – Agriculture Officer, ASD- Assistant Superintendent, SD – Superintendent

The SRI is providing the technical back-up with train-the-trainer approach for the extension staff of the main sugarcane companies. The five Development Officers attached to SRI under the guidance of senior scientists conducted group extension activities such as demonstration and training classes etc. in collaboration with industry extension staff who coordinates input, credit and marketing services. Around 3000 farmers participated in those group activities --200 training programs on promoting adoption of recommended farming practices during 2013 and 2014 (Perera, 2015).

### **Minor Export Agricultural Crops (EAC) sector**

The Department of Export Agriculture (DEA) is the main government institution that promotes EAC sector in Sri Lanka. The DEA was formed in 1972, and since then different extension methods and approaches have been followed from time to time, for the betterment of this sector. The DEA has two arms: the research division and the extension division. Technology development is the function of research division whereas technology transfer is the responsibility of extension division. Since its inception in 1972, the DEA was principally involved in the development of technology and dissemination among farmers engaged in spice and other allied crop cultivation. Expansion of the area under cultivation was the main target for the extension services.

The extension service is operating in 14 districts where suitable climatic conditions exist for minor export crops and implemented by 14 district-level assistant directors, under which about 150 field extension officers provide services to growers. Another 195 graduates, who were appointed to the Department, also are called upon to undertake some development services for the farmers.

A separate ministry for improving the EAC sector was created in 2010 and is called as the ministry of minor export crops promotion. This ministry manages Department of Export Agriculture and the Cashew Corporation. The Cashew Corporation also provides extension services to cashew farmers through 25 extension officers attached to divisional secretary divisions in 15 cashew-growing districts. Conducting awareness and training programs, supplying planting material and providing planting subsidies are major functions of these extension officers.

Development functions of the minor export crops farmers were recently combined with the programs of other ministries promoting economic development of communities. The extension efforts of the DEA in recent years include the following (Seneviratne and Dissanayake, 2014):

1. Crop Zoning – a concept of ‘best crop for best region’. By considering agro-ecological suitability of different crop species and different varieties of the same species crop zoning has been initiated. Better crop growth, yield and quality are the factors considered in implementing crop zoning (Seneviratne and Gunasinghe, 2009).
2. Plant certification program – in order to prevent starting a cultivation using inferior seedling/plant stock.
3. Integrated Nutrient Management – Good agricultural practices, especially avoiding agro chemical usage and depending on more of the organic manure were emphasized.
4. Market oriented extension – Establishing organic villages and organizing forward contracts with buyers were implemented.

In addition to the above, establishing large scale processing centres for the spices and a post-harvest advisory service have been initiated. The ‘Export Agricultural

Promotional Societies' were also created for better coordination with farmers (Seneviratne and Dissanayake, 2014). Through these farmer organizations, equipment for processing centres are given free of charge in addition to distribution of nursery plants. Lack of skilled labour for some important field operations and post-harvest operations of spice crops is a pressing problem, especially for large-scale growers. In order to ease this problem, the youth who are willing to undertake the above-mentioned jobs are trained and a set of tools are supplied to the successful trainees.

According to Seneviratne and Gunasinghe (2009), a strong research-extension linkage exists in the DEA. Quarterly research-extension dialogues are held. In these sessions, district level assistant directors present problems of EAC growers and the research officers present suitable solution or, researchable problems are identified for future research.

### Livestock sector

There are about 1.5 million cattle, 0.3 million buffalos, 13 million poultry 0.08 million pigs in the country with a negligible number of sheep, ducks other species. Livestock are spread throughout all regions of Sri Lanka with concentrations of certain farming systems in particular areas due to cultural, market and agro-climatic reasons (Visit [www.livestock.gov.lk/site/en/profile-of-the-livestock-sector](http://www.livestock.gov.lk/site/en/profile-of-the-livestock-sector)). Dairy sector, though the most important of all livestock sub sectors, is operating far below its potential. Despite the slow increase in recent years, the domestic milk production only constitutes about 30 per cent of the requirement and the rest (around 69,000 metric tons ) is imported annually by spending approximately USD 13 million.

The estimated annual milk production in the country is 350 million litres and is produced

in larger or smaller scale in all the districts. The successive governments since national independence have made efforts to develop the milk industry through the interventions such as introducing high yielding cows, introducing milk production genetic characters into the local low yielding herds, improving animal health provision, providing subsidies and extension services, milk marketing etc. The dairy sector in most of the agro-ecological regions is predominantly based on smallholders keeping 2-5 cows and their followers, except in the south-eastern region, where the herds tend to be large, but mostly comprising of the indigenous types with poor milk yields. The dry zone areas of Sri Lanka have the highest proportion of the livestock (approximately 74 per cent) supplying about 64 per cent of the milk, but the efforts to improve the productivity of the small scale livestock farms in the dry zone is highly inadequate. Compared to the livestock raised in the wet and intermediate zones, the cattle in the dry zone are reared in extensive systems and fed with very little concentrate feed and depend mostly on the poor quality grass and crop residue (Sunil Gamage, Personal communication, June 2015). The productivity of the cattle farms can be substantially improved by increasing the adoption of low cost locally produced improved feed and other animal husbandry practices.

According to the Livestock Development Policy and Strategies approved in 2006 by the government, it was expected to "achieve increased self-reliance, of at least 50 per cent, in domestic milk by 2015" (Ministry of Livestock and Infrastructure Development, 2006). The strategies designed for the livestock sector were:

1. Modernization of the industry through mechanization, the dissemination of knowledge and technology, and encouragement of the private sector by fiscal and tariff policies

2. Strengthening of disease surveillance
3. Joint venture programmes between the public and private sector
4. Making available breeding animals, where state farms are responsible for supply of quality breeding stock
5. The Ministry of Livestock and Rural Community Development (MLRCD) and its departments to be the focal point for government operations in livestock development.

The public livestock extension is a decentralized service, similar to DoA and mainly implemented by the government veterinary offices established in all parts of the country under the nine Provincial Departments of Animal Production and Health (PDAPH). Each veterinary office is manned by one veterinary surgeon and about two livestock development instructors.

By assessing the activities conducted to achieve the set goals, the Sri Lanka and New Zealand team that designed the Sri Lanka dairy excellence training initiative has made the following comment (FCG ANZDEC, 2014):

“...there is little attention being paid to increasing on-farm productivity by improving extension service delivery: as a matter of course; on-going and iterative; and, while facilitated by an extensionist, developing a culture of adult learning and knowledge exchange.” The progress made in promoting some technologies essential for the improvement of productivity, especially the cattle feed is poor. Ranaweera (2009) has identified the lack of human resources as the main reason for this situation. According to him;

“The number of veterinary surgeons employed by the DAPH has risen markedly in recent years, but the cadre of livestock officers and Livestock Development Instructors (LDI) has stagnated. It is the LDIs

who are primarily responsible for providing extension and artificial insemination services to farmers. While these two roles are somewhat synergistic, it is apparent that the lack of inspectors dictates that the breeding service is prioritized and extension services are provided on an ad hoc basis. This lack of an extensive extension programme affects the development of the industry”.

Wickramasooriya, Kendaragama and Wijetilake (2009), indicated that there are several positions designated as Livestock Officer (LO), Research Officers (RO) and Livestock Development Officers (LDO), which are directly involved in livestock production and development extension. However, in the recent years most of these positions have not been filled thus creating a serious human resource gap in the department (available: 34 LOs out of 77 cadres, 627 LDI out of 1078) (Wickramasooriya, Ratnayake and Sivasothy, 2014). It is unlikely that increasing the cadres of veterinary surgeons (544 nos. at present) alone would enable the DAPH to handle the growing demand for livestock extension services. The veterinary surgeons are highly trained professionals to handle the medicinal aspects of the livestock and pet animals. They have to deal with escalating health problems, which alone take the bulk of the working time of field veterinarians. Therefore, it is extremely important that the services of adequate number of suitably qualified extension professionals are made available to deal with the animal husbandry issues of small scale farmers, most of whom farm both crops and livestock in an integrated manner. It is encouraging to note that some animal health campaigns are implemented successfully in collaboration with partners of One Health initiative.

Compared to the other sectors of Sri Lankan agriculture, the livestock extension service shows slow progress in adopting modern ICT for technology dissemination

to farming communities. Except for some communication through the web radio of DoA and occasional TV programs, there is no regular use of electronic or new media. The poultry industry of Sri Lanka, which was more of a backyard type of industry has developed into a commercial industry over the past three decades. With the active participation of the private sector, the industry today is producing chicken meat and eggs to meet the current requirements. Due to the relatively low price compared to other animal products, the poultry products are the most consumed animal protein sources in the average Sri Lankan diets. The per capita consumption of chicken meat and eggs in 2012 was estimated to be 5.98 kg and 102 eggs respectively. The poultry production, especially of the small-scale broiler producers, operates on forward contracts with large-scale companies for input supplying and marketing. However, All Island Poultry Farmers Association is of the view that a cartel of large scale poultry producers controls the industry. The smallholders who account over 40 per cent of the poultry industry are struggling to survive due to the sharp increase in cost of production (Visit [www.thepoultrysite.com/poultrynews/](http://www.thepoultrysite.com/poultrynews/)).

Sri Lanka has a goat population of around 785,000 of which majority are found in Jaffna, Puttalam, Kurunegala, Batticaloa and Anuradhapura districts in the dry zone. In Sri Lanka, mutton is one of the choicest meats retailing at around 200 per cent over the price of beef. In addition to local production, Sri Lanka imports around 360 metric tons of mutton annually (Department of Animal Production and Health, 2013).

### **Extension services by the universities**

Agriculture universities in India and elsewhere are engaged significantly in extension and advisory services for farming communities. In Sri Lanka, there are no such agricultural universities or

services, but the faculties of agriculture conduct some outreach programs targeting farming communities. The agriculture and allied faculties of the state universities are conducting some farmer training and school children awareness programs for the surrounding farming communities on ad-hoc basis.

The Agricultural Education Unit (AEU) of the Faculty of Agriculture, University of Peradeniya is helping the development of the secondary and tertiary education in agriculture and allied sciences in the country. research and development work in the field of agricultural education is carried out in collaboration with other stakeholders with the intention of supporting the rural and regional development. Another noteworthy extension initiative could be found in Ruhuna University. In this program called 'Grow more mushroom to enhance food security', different agricultural extension efforts have been implemented to uplift the living standards of the mushroom farmers, while increasing the productivity. The overall development of the mushroom units were attempted by the following agricultural extension activities: pooling human resources, development of extension materials, conducting farmer trainings, development of value added products, web page development, market interventions, directing credit facilities, establishment of links to rural technology centre, enhancement of social capital, seed production, and voice mail system. About 400 mushroom farmers from Matara district are the direct beneficiaries, while over 5000 persons accessed information delivered through mobile phones (Mahinda Wijeratne, Personal Communication, June 2015).

With the guidance of experts for a selected community as a part of their training, the students following the Advanced Module of the Department of Agricultural Extension of the University of Peradeniya conduct a series of comprehensive productivity enhancement training annually for selected

farming community in collaboration with the relevant line agencies. The Institute for Agro Technology and Rural Sciences of Colombo University located in a remote location of Hambantota district conducts diploma courses for farmers, provides tissue cultured banana plants and conducts farmer trainings.

The Department of Agricultural and Plantation Engineering of the Open University offers courses to individuals who intend to choose Agriculture as their career and the courses also enhance working capacity of those in the field by targeting high levels of productivity and sustainability. The department offers courses under two distinct streams of studies -- Industrial studies in Agriculture and Engineering Technology. The field extension workers looking for bachelors level educational qualifications are offered a course covering subjects such as: Crop Production, Plant and Soil Science, Biotechnology, Fisheries and Aquaculture, Food Processing, Agricultural Extension, Economics and Management, Agricultural Farm Machinery, Post-harvest Technology, Watershed Management and Irrigation. In addition, the Open University offers a Diploma in Agriculture with the objective of upgrading the agricultural knowledge and skills of Agricultural Research and Production Assistants (ARPAs) who are involved in agriculture and agrarian services at grass-roots level (Visit [www.ou.ac.lk](http://www.ou.ac.lk)).

## **The Non-state sector extension services**

### **Involvement of private sector**

Mahaliyanaarachchi and Bandara (2006) have argued that the structural change in agricultural extension could take two approaches: commercialization and privatization. Privatization is mainly changing the ownership of the extension service to private sector from public sector, which

has been mainly funded and delivered by government agencies free of charge for decades. People in most of the developing countries have unpleasant experiences of privatization. Commercialization is not merely privatization. It does not need a change of ownership under commercialization. Ownership can be kept with the government or semi government organization, but the service is provided on a commercial basis. The strategies of commercialization include decentralization, public cost recovery, contracting of services etc.

The private sector involvement in the food crop sector extension formally began in 1998, when the Asian Development Bank supported launching of a pilot study to promote private-sector participation in agricultural extension. The pilot study of initiating private advisory service was undertaken under the Second Perennial Crops Development Project and financed by the ADB. The study was implemented from 1998 to 2007. In 2001, three agri-business firms were selected covering specialized lines of business, i.e., input supplies, output procurement and crop advisory and farmer services. The fee-based services focused on loan processing for the establishment of spice, fruit and floricultural crops supported by the Perennial Crop Development Project and Farm Advisory Services. The fees charged from farmers were set below the actual cost with the remainder covered by the government through project funds.

The experience of the pilot activity showed that potential exists in Sri Lanka for a gradual introduction of a fee-levying private extension services among commercial farmers with a better ability to pay, leaving scarce government resources to serve the poor and subsistence-level groups of farmers more effectively. However, to be profitable, private sector extension services must be integrated into other commercial operations, such as the sale of farm inputs.

Since 2000, there has been a rapid growth in non-state actors providing extension alongside other farm services. For these organizations, agricultural extension remains a function that contributes to realizing a larger goal of agri-business development or overall rural development. Three types of such entities could be identified viz. i) those that deal in supply of agricultural inputs and/ or engaged in procuring agricultural commodities, ii) development agencies and iii) farmer associations, co-operatives and companies.

Input linked commercial extension services are in operation from early days with the introduction of plantation agriculture related to tea, rubber and coconut, by the British. Several firms, which supplied agro inputs and processing machinery, and those engaged in produce marketing, provide advisory services and recover the cost of the service by including a marginal proportion of income or a commission from their selling or buying (De Zoysa, 2014). The main agricultural firms are expanding their services as means to gain market share. The firms are increasing sales through demonstrations and other promotional activities. The practice has been duplicated successfully to popularize hybrid seed varieties of high-value vegetables and fruit crops, chillies, papaya and several cold-climate vegetables.

CIC Agri Businesses (Private) Limited is a leading private sector organization providing agricultural advisory services. It comprises of several subsidiaries such as CIC Seeds (Private) Ltd., CIC Agri Biotech (Private) Ltd., CIC Agro Produce Export, CIC Dairies etc. and manages over 5,600 ha. of its own farms in Sri Lanka. It is a leading supplier of certified quality paddy seed in the country through its own farms and a network of contract growers. In 2009, CIC Agri Business had 110 extension staff members who worked directly with over 20,000 farmers producing a variety of agricultural and

livestock products such as seed paddy, rice, fruits, vegetables, eggs, yoghurt, etc. (De Zoysa, 2014). A. Baur and Company Pvt (Ltd) (Visit [www.baurs.com/baurs.com/](http://www.baurs.com/baurs.com/)), Hayleys Agriculture Holdings Ltd (Visit [www.hayleys.com](http://www.hayleys.com)) Browns and Company Plc (Visit [www.brownsgroup.com](http://www.brownsgroup.com)), Lankem Agro Plc (Visit [www.lankemagro.com](http://www.lankemagro.com)), Unipower (Pvt) Ltd (Visit [www.unipowersl.com](http://www.unipowersl.com)) are other private firms providing EAS to farmers.

Another category of private sector involvement categorized as Market-Oriented Advisory services (MOAs) are operated by leading retail chains, organic food exporters and niche product buyers such as of Cargills (Ceylon) PLC, Keells Food Products PLC (Visit [www.keels.com](http://www.keels.com)), Ceylon Cold Stores (Visit [www.elephanthouse.lk](http://www.elephanthouse.lk)), Ceylon Agro Industries (Visit [www.prima.com.lk/](http://www.prima.com.lk/)), Bio-Foods (Pvt.) Ltd (Visit [www.bioboodslk.com](http://www.bioboodslk.com)) and Nuwara Eliya Agriculture Co-op Society Ltd (AGCO)(Visit [www.agco.lk](http://www.agco.lk)). These MOAs use different approaches and methods in order to improve the effectiveness and strengthen the competitiveness along the value chain (Perera and De Silva, 2014).

The retailers of agro-input companies are an important informal technical information source for the rural farmers who have little contacts with the formal sources. According to World Bank: “The development of rural stockists (agro dealers) is critical for accelerating the access of the rural poor to quality agricultural inputs in Africa. Their development significantly reduces search costs faced by farmers; making much needed production inputs available in rural areas at the right time and in appropriate volumes, sizes, and affordable prices. A new form of private sector driven extension system is emerging in these countries as the major agricultural input supply companies are increasingly conducting commercial demonstrations of new technologies in rural areas with rural stockists” (Visit [www.worldbank.org/html/extdr/fertilizeruse/documents](http://www.worldbank.org/html/extdr/fertilizeruse/documents)). There is neither an effort to

train the dealers to improve their technical knowledge nor to monitor their services to make sure they do a proper service.

## Agricultural cooperatives and farmer organizations in EAS

Agricultural cooperatives make a significant contribution for the small farmers enabling them to face the risks and uncertainty involved in agricultural production process. The members also gain a bargaining power and reduce marketing, processing, and transaction costs by pooling their produce. In addition, they can engage in value-addition by pooling their capital and centralising management. The enactment of Co-operative Credit Societies Ordinance in 1911, has laid the foundation for co-operative movement of Sri Lanka. The

Department of Cooperative Development established in 1930 paved the way to formalize the registration and monitoring of various types of COOPs. In 1957, the village level cooperatives were strengthened as Multipurpose Cooperatives.

A study undertaken by Wanigasundera (2012) revealed that 1184 cooperative societies related to various sub sectors of agriculture were registered under the Department of Cooperative Development. The total membership of all agricultural cooperatives registered is around 250,000. The distribution of agricultural cooperatives according to sub sectors is shown in Figure 1.

These village level co-operatives were integrated into regional and national level apex bodies as shown in Figure 2.

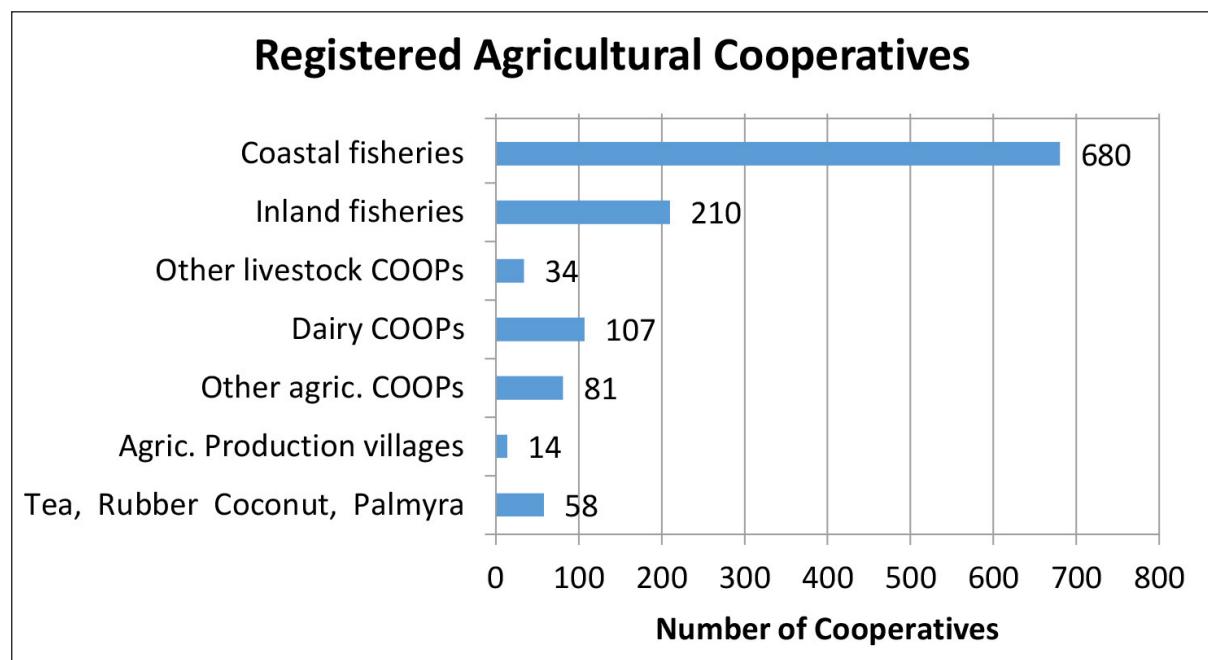


Figure 1. Sector-wise Distribution of Agriculture Cooperatives.

Source: Department of Cooperative Development, 2012.

## National Level Cooperatives

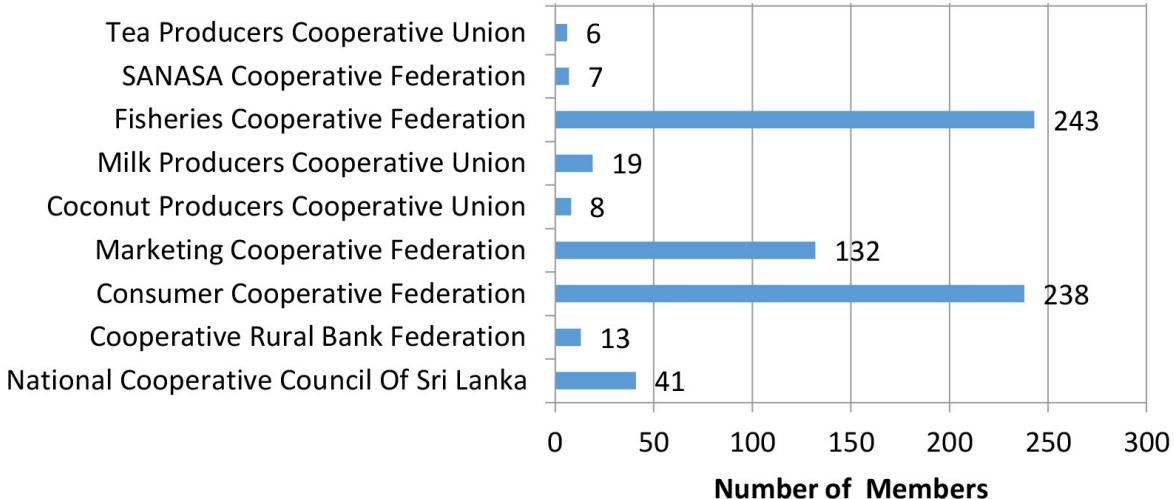


Figure 2: Distribution of National Level Agricultural Cooperatives.

Source: Department of Cooperative Development, 2012

The growth of farmer organizations in the food crop sector began in 1980s with the establishment of farmer organizations in Gal Oya and Minipe irrigation settlement schemes. The Department of Agrarian Services was mandated to expand the farmer organization movement. There are nearly 14,950 farmer organizations dealing mainly with food production with a total membership of nearly 1.3 million.

In 1995, Tea Small Holder Societies were established to promote the production and marketing of green leaf. There are 1377 societies with 27,600 smallholders. In 2002, *Thurusaviya* Societies were established to improve the production and processing of the rubber small holdings sector. There are 335 registered societies with more than 20,000 members. Export Crops Promotion Societies were set up in 2004 with the initiative of Department of Export Agriculture. There are 254 functioning societies having over 19,000 members. The coconut sector has been served by a few strong cooperatives with 3970 members. In addition, 2440 *Kapruka* societies were recently established to support the small growers.

The overall performance of selected sample of organizations, representing all major agricultural sub sectors, showed that co-operatives in the plantation sector, except one coconut producers cooperative, showed the lowest achievement of about 44 per cent of the potential, while the highest (68 per cent) level was achieved by the Agriculture Cooperative (AGCO) Nuwara Eliya. The most noteworthy weaknesses of the agricultural co-operatives and farmer organization were as follows: (i) inadequate participation of females and the youth in leadership positions; (ii) lack of human resource development; (iii) inadequate integration; and (iv) poor use of Information and Communication Technology.

In addition to cooperatives and farmer organizations, the private sector agricultural companies have also developed community-based farmer organizations or companies. The companies such as CIC, MILCO, and Hayleys have started setting up farmer groups to produce seeds, milk etc. They often work on a buy-back system and facilitate input supply and credit. Two examples for this model are given below:

- i) The private sector agricultural companies such as MILCO and CIC have promoted farmer groups in the areas they operate. MILCO has set up nearly 2000 farmer-managed societies in the dairy sector. They have also set up a social security fund with shared contribution. Over 40,000 farmer members have contributed to this fund, which provide financial assistance to members when needed.
- ii) The CIC has started a seed production program with farmer groups from major irrigation areas. More than 200 such groups with a farmer base of nearly 10,000 farmers engage in the production of seed paddy, vegetable seeds and maize on a buy-back system.

## **4. Generic issues in agricultural extension**

Extension and advisory services in general are losing their effectiveness, as they have to deal with new challenges. Downsizing and decentralizing public extension in order to save money has become an inevitable option for many state sector organizations. Entrepreneurial farmers and modern agribusiness firms cannot achieve their targets by solely depending on the conventional technology transfer, which is mainly related to crop production processing. The agro inputs, financial services and marketing, which are dominated by the private sector companies, have become more critical to face the changing technologies and fluctuating market dynamics. Since these new requirements are handled effectively by the private sector, the EAS needs to change the strict state controlled top-down approach to a collaborative service, where the state, the private sector and the farmer achieve their goals in a mutually beneficial manner, bringing more benefits to the rural poor. Some of the specific challenges in Sri Lankan EAS are as follows:

### **Human resource for EAS: Availability and deployment**

From the discussion on the current status of EAS (as discussed in Section 3), it is clear that the existing state sector organizations have failed to provide the whole spectrum of extension services to meet the expectations of the farming community. Even though there is a general complaint about the non-availability of adequate field level extension workers, one has to seriously assess whether the available field staff distributed among various agencies could work together to provide EAS in a cost effective manner to the stakeholders. For example, there are about 2,400 AIs working in provincial and inter-provincial ranges of DoA and other field service units. Nearly 9,600 Agriculture

Research and Production Assistants (ARPA) work almost at every village level, but attached to the Agrarian Development Department, which comes under the same Ministry (Visit [www.agrarianddept.gov.lk](http://www.agrarianddept.gov.lk)). A good deal of service rendered by these two departments overlap at the farm level and the farmers actually need the service of both officers in a package and not in isolation. The ARPAs, though not all have had agriculture education to the same diploma level as AIs, could fill in for the formerly lost KVS positions and would do even better if appropriate training in agriculture were given.

Some of the attempts made in the past to integrate the extension services targeted to farming communities (IEAS, AMA programs) failed due to misunderstanding of priorities of different groups of professionals, especially their leaders, who could not realize how and why they provide services to farmers and get paid from taxpayers' money. Therefore, policy measures are urgently required to enable integration of extension services even if they remain decentralized. Furthermore, senior extension experts are not adequately represented in most regional and national policy-making bodies of government or agricultural research and extension organisations. The administrative service personnel or the research scientists who do not have experience in practical extension often occupy senior positions of such bodies.

These types of issues exist even in the other extension services. As discussed in section 3.6, the livestock extension services suffer due to lack of understanding between veterinarians and livestock officers. In the case of rubber extension services, due to domination of administrative service personnel, technical extension cadres are frustrated. In all such situations, the final effect is that the productivity remains far below its potential, and the farmers continue to remain poor.

## **Capacity development of extension personnel**

According to Prasad, Sulaiman and Mittal (2015:18): “Capacity building within the context of extension is often understood as enhancing technical capacity of extension personnel to deal with current and emerging technological bottlenecks in the field”. There is an increasing need to develop the capacity of the extension personnel not only in translation of technology, but also in other functions becoming critical for the application of new knowledge. The conventional system of capacity development of state sector extension personnel in Sri Lanka is through ‘In-service Training Institutes’. There are several such institutes operating in Sri Lanka. The central and provincial DoAs manage a few ISTIs with the primary objective of keeping the field extension staff updated on new developments in agricultural technologies. This should help raise the professional competence of the staff and to continue educating them to cope with changing conditions and needs in agricultural production and development. Induction training, refresher training and, pre-seasonal training are common types of trainings usually conducted at these institutes (Visit <http://www.agidept.gov.lk/index.php/>).

The Annual Symposium of Department of Agriculture (ASDA) is a platform for public discussion, debate and criticism of research output of technical officers and extension personnel of DoA. ASDA, through its annual publication and technical presentations made to a wide cross section of stakeholders, promotes speedy transfer of new technologies among potential end-users. In addition to DoA, DEA, DAPH, and CCB maintain similar ISTIs. However, the other plantation crop sectors rely on National Institute of Plantation Management for training their extension personnel.

The private sector agriculture companies have started agricultural education programs. The

CIC Institute of Agribusiness is one such foremost initiative set up in 2009 to provide opportunities for farmer groups, agribusiness sector staff and government agricultural officers to share knowledge and experience of modern agriculture techniques through exposure visits and tailor-made short training programmes. More than 3800 persons have attended such training programmes and exposure visits (De Soysa, 2014). Rangiri Ranketha Biodynamic Training and Research Center was initiated by Biofoods (Pvt Ltd). This training center was established in 2010, with the objective of promoting organic and biodynamic agricultural concepts by educating farmers, students and other interested persons through training programs. Over 3500 participants have been trained in organic and biodynamic farming practices by conducting more than 200 training sessions. It is envisaged that this training institute would be developed into an international institute providing advanced education in organic and biodynamic farming (Sarah Ranaweera, personal communication, July 2015).

## **Limited recognition of extension provision**

The mind-set that “anybody can do extension” should be changed. One way of doing that is by showing the real social and economic impacts of extension using scientific method. The conventional excuse that ‘cost-benefit analysis and the impacts of agricultural extension services are difficult to measure’ has allowed decision makers to pay little initiation to make necessary changes at the policymaking and implementation levels. Swanson and Rajalahti (2010) have proposed a comprehensive set of indicators that could be used in the M & E of extension projects. Considering the availability of diploma, bachelors and master/PhD level agriculture education programs in Sri Lanka, it could be assumed that there is adequate manpower with the right qualifications available for recruitment for the EAS systems (Box 3).

### **Box 3: Status of agricultural education in Sri Lanka**

The annual enrolment in the bachelors degree programs in agriculture and allied sciences offered by Sri Lankan Universities exceed 1200 (Annexure 2). The curricula of the agriculture and related degrees in Sri Lankan university system have increased in diversity and content during the last few years. This is a strategy implemented to cater to the needs of the industry and improve the employability.

The National Vocational Qualification Framework (NVQ) is implemented in Sri Lanka to ensure that all current and newly emerging Technical and Vocational Education and Training (TVET) activities are well coordinated. The competency based training curricula and appropriate teaching, learning and assessment material help in ensuring the quality of skill development of technical and vocational education in Sri Lanka. The intermediate level courses in agriculture and allied fields which have gained appropriate NVQ are shown in Table 3.

Postgraduate Institute of Agriculture (PGIA) in University of Peradeniya is the main institute offering postgraduate programs. Nearly five hundred bachelors degree holders enrol at the PGIA annually for MSc, MBA, MPhil, and PhD degrees. In addition, four other universities are also offering a small number of postgraduate degrees in their faculties of agriculture. Most of the bachelors degree level extension officers attached to Department of Agriculture and other extension services obtain their postgraduate qualifications from the PGIA as their promotions are granted considering enhanced qualifications. Unlike undergraduate level education, which is provided free of charge from state universities, postgraduate courses are fee-levying and this imposes a restriction on certain deserving students with financial difficulties since there are very limited opportunities for scholarships and sponsorships.

A limited number of agricultural extension research projects are undertaken by the university faculty, senior extension professionals and university students specializing in agricultural extension, especially those engaged in masters and doctoral level research programs. The board of study in agricultural extension of the PGIA offers two masters programs targeted mostly to the extension and development professionals and students. MSc in development communication and extension is popular among the extension staff of the state, private and non-government sectors, while the MSc in organizational management is popular among the management staff in public, private and non-government sectors. The major research themes related to the field of extension in recent years include development of interactive inter-personal and mass methods of extension communication, private-public partnerships and use of ICT in agricultural communication.

One of the most important, but neglected organizations with a mandate of developing human resources for the plantations sector is the National Institute of Plantation Management (NIPM). As per the act, the NIPM is the only national institute, which has the authority to award certificates and confer memberships to eligible plantation executives. In achieving these objectives the NIPM is mandated to conduct seminars, workshops, examinations, and to provide research and consultancy services to private and public sector organizations.

**Table 3: Intermediate agricultural vocational education courses and their details**

Discipline	Level	Capacity
Agriculture	DL (2-3 yrs) Certificate course (1 yr)	500/Yr, 250/Yr
Floriculture	HDL (2 yrs), DL (1 yr)	40/Yr
Animal Husbandry	DL (2yrs)	100 / 2 yrs
Forestry	DL (2yrs)	50 / yr
Farm machinery technology	DL (1 yr, NVQ 5) HDL (2yrs, NVQ 6)	25/Yr
Food technology	DL (1yr, NVQ 5) HDL (2yrs, NVQ 6)	25/yr

DL = Diploma HDL = Higher Diploma Medium- S = Sinhala T = Tamil E =English

Source: Gurung and Azad, 2013

Taking the case of NIPM one could see the status of neglect of the human resource development in the agriculture sector. Having realized the deterioration of the standing of the institute, the Ministry of Plantation Industries initiated a study in 2011 with the objective of designing a program to restructure NIPM (Wanigasundera, 2011). Although NIPM has been generally perceived by many as a training institute, the NIPM act mandates for the NIPM to engage in other services, such as promoting investments, collecting and sharing data and carrying out research. Based on a comprehensive data collection and dialogue with key stakeholders in the plantation sectors, this study recommended to amend the act to enable the appointment of nationally/internationally recognized professionals into the management board similar to that of the national institute of business management and to change the organizational arrangements to include an enhanced cadre of technical expertise. Among the other important changes proposed were as follows:

- (1) assess the quality and the content of training programs with a proper cost/benefit analyses of the existing programs
  - (2) undertake frequent needs and gap analyses, and design tailor-made training and development programs
  - (3) develop NIPM as the apex body of the plantation industries to provide broad spectrum of services to the industry
  - (4) initiate mutually beneficial linkages with universities and other recognized training institutes, both locally and abroad to offer plantation management degrees/diplomas/ technical training.
- It is sad to note that none of the above recommendations have been considered by the policy makers.

The lack of recognition for some field extension positions, limitations for career advancement, and the tendency not to recruit females for such positions may not attract the young diploma and degree holders towards the extension services. In general, the field level extension officers in most extension services are poorly motivated.

A study on job satisfaction of agricultural instructors of anuradhapura revealed that they had only a moderate level of satisfaction towards most aspects of their job. They also had low level of satisfaction towards salary and benefits (Bandara and Wanigasundera, 2009). Therefore, an innovative approach to recruit, train and motivate field extension workers is urgently needed.

### **Inability to build on the pluralism in EAS delivery**

The continuation of spending public money to provide all the extension support for all farmers is due to the assumption that farmers are poor and hence unable to afford paying for services. This may be true with the majority of poor farmers, but the entrepreneurial farmers are willing to pay for commercialized extension services specifically designed and delivered for them. A recent study conducted on the perceived value of agricultural extension services by the farmers in the dry zone major vegetable growing areas, revealed that mean willingness to pay for extension service was Rs. 2250 +/-1248 per year per farmer and for both extension and other supportive services it was Rs. 6347 +/- 325 (Fernando, 2014). It was also shown that the farmers with higher income and educational level were willing to pay more for tailor-made services.

The farmer organizations and agricultural cooperatives, though present in many farming systems, have shown varying degrees of success in mobilizing extension services. There is a tendency to establish several CBOs artificially created for different farming subsectors for the convenience of field interventions by different donors and development agencies. These societies often tend to work in isolation imposing extra burden on village leaders and lack sustainability. It is important to develop integrated mechanisms for one main CBO to have different sub-committees dealing with different farming sectors at village level.

## 5. Conclusions and way forward

There is no doubt that agriculture sector is still the mainstay of Sri Lanka's economy, but it operates below the potential, even though technology and some essential resources are available. This is mainly due to poorly focussed supporting mechanisms such as EAS and policy environment failing to handle the unprecedented challenges such as global climate change. The farming communities and other stakeholders need to be supported substantially to adapt to these challenges before it is too late.

The state sector extension services have been established many decades ago covering all sub sectors of farming by one or more EAS. These EAS are undergoing change both in terms of approaches used and service coverage, but remain largely as top-down and supply driven. Most EAS are operating without adequate integration and far below the needed level of services, owing to lack of policy directions and dwindling financial investments and other resources. Both vertical and horizontal integration of services and stakeholders have not been successfully achieved, leaving many unhappy human resources. Commercialization, privatization or de-centralization of EAS are being attempted with the intention of giving a challenge and a solution for the field extension staff. The involvement of the private sector in EAS is developing, but some scrutiny is necessary, especially at the grass-roots level to make sure they are integrated effectively to serve the farming communities.

ICT-based interventions are likely to provide a quantum leap in effectively linking the farming communities with other stakeholders in the value chain, but ICT usage in extension is not yet popular among all actors although innovative applications are being developed on a limited scale. The methodologies for planning, monitoring and evaluation of extension are not

developed due to inadequate research and development and slow pace of sharing the potential applications. The recent developments in making Sri Lanka a complete Wi-Fi zone makes matters even more challenging for those who are expected to develop strategies to make EAS truly ICT-based.

Despite having a high potential to accelerate extension delivery, private-public partnerships and collaborative extension programs have not been adequately developed. There is lack of genuine interest among those operating in different stages of the agricultural knowledge system to work together to make farming truly profitable and environment friendly.

Training and development of human resources in most sectors are inadequate. There is no central body, such as MANAGE in India, to develop regulatory framework, management systems and personnel to integrate national and provincial level extension strategies.

It is encouraging to note that services to clients of both genders have developed appreciably. However, program planning and implementation of extension services lack participation of the beneficiaries and professionals. The conventional view point that extension services to all farmers should be provided free of charge by the government has led to a situation where the extension is assumed by some as a welfare function that could be handled by anyone even without a professional training.

Although some research and development related to EAS is undertaken, the published research show lack of scientific method compared to most other disciplines of agriculture. The main reason for this is the fact that in most local agricultural research institutes there are no full-time extension researchers. The limited research and development studies are undertaken by

senior extension workers while attending to their main job responsibilities. According to Sivayoganathan (1999), the Council for Agricultural Research (CARP) had attempted to develop a national agricultural extension policy in mid 1990s through its national agricultural extension committee, but had fallen on deaf ears. It is therefore essential that mechanism is developed for the experts to work together within the country, in the region and globally striving to provide a platform for EAS providers to discuss issues cutting across public, private, NGO sectors and to engage in advocacy and policy engagement (Sulaiman and Davis (2012).

Sri Lanka Agricultural Extension Association (SLAEA) is a voluntary association of agricultural extension workers, academics and managers of extension services. Some attempts have been initiated by SLAEA to develop professionalism among the extension workers and scientists and to develop networks. It would be necessary for these volunteer bodies to take the leading role in setting up more recognized national or regional organization with a wide participation of the EAS professionals.

As an immediate measure, it is proposed that a national level policy dialogue with wide participation of all stakeholders is carried out, and policy guidelines are developed for integrating EAS as an effective partnership model operating among all stakeholders on cost sharing basis. The responsibility of planning and implementation of EAS interventions should be handled by those who have the required competencies. The state and other funding sources should be persuaded to enhance their allocations for subsidizing the cost of EAS to poor farmers, human resource development and research in EAS. Special attention of EAS should also be paid to backward farming communities such as those who were severely affected by the armed struggle experienced in the North and East of Sri Lanka.

It is also important to explore the need to set up a national institute of agricultural extension to undertake research and development together with human resource development enabling the extension professionals to eventually belong to a recognized service similar to Sri Lanka Scientific Service.

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## Annexures

### Annexure 1 (a) Extents and production of major agricultural sectors in Sri Lanka

Crop	Total Extent (ha)	Total holdings	Total production	GDP %
Tea	222,000		340.2 Mn. Kgs	1.038
Rubber	239,000		130.4 Mn. Kgs	0.957
Coconut			2513 Mn. Nuts	1.107
Minor Export crops (Spices)	97,333		93.5 Mn. Kgs	0.276
Paddy	780,000 <i>Maha</i> season 448,000 <i>Yala</i> season		4,621 Mn.Kgs	1.464
Other field crops	200,755		886.1 Mn.Kgs	3.565
Livestock		Cattle 1,265,039	258 Mn. Litres	0.879
		Buffalo 473,911	62 Mn. Litres	
		Goat 408,787		
		Sheep 9,000		
		Pigs 89,334		
		Poultry 17,801,000	Eggs 2272780Mn. Meat 127740 MT	
Forestry				0.550
Other				0.396
Fishery			512,840 MT	1.67
Other				0.20
Agriculture Overall				12.10

Source: Central Bank of Sri Lanka, 2014, <http://www.livestock.gov.lk/site/en/statistics>, Dept. of Animal Production and Health, 2014

### Annexure 1 (b) Productivity of selected crops in Asian countries

Item	Sri Lanka	India	Pakistan	Nepal	Ban'desh	Indonesia	Japan	China
Vegetables (kg/Ha)	10221.4	12895.5	14462.7	13190.9	7237.6	9412.9	8287.2	16504.2
Cabagge other brassicas (kg/Ha)	20047.8	22570.8	17148.0	25574.4	12851.5	21489.3	70903.1	33652.0
Maize (kg/Ha)	3009.5	1948.8	4002.2	2313.5	6299.1	4686.0	2579.5	5794.9
Paddy (kg/Ha)	3849.9	3573.4	2572.5	3045.0	4382.5	5070.9	6660.7	6671.3
Tea (kg/Ha)	1497.0	1889.3	*	1020.6	1087.6	1203.6	1833.1	1034.9
Coconut (kg/Ha)	5487.7	5287.3	6735.9	1924.8	1884.9	6119.9	*	8566.5
Rubber (kg/Ha)	1149.9	1924.4	*	*	100.4	849.4	*	1236.7
Cow Milk (Whole fresh) (kg/An)	756.5	1329.0	1230.0	464.5	205.2	1645.5	7522.0	2985.0

Source: Statistical yearbook of FAO (2013)

**Annexure 2** Graduate level degree programs in Sri Lankan universities (Internal / External)

University	Faculty	Degree	Course duration (years)	Student enrolment 2010/11
Ruhuna	Agriculture	B.Sc in Agriculture Resource Management	4	147
		B.Sc. in Green Technology	4	-
	Fisheries & Marine Science	B.Sc. in Agri Business Management	4	-
		B.Sc. in Fisheries & marine seed	4	45
Eastern	Agriculture	B.Sc. in Agriculture	4	73
Rajarata	Agriculture	B.Sc. in Agriculture	4	70
Jaffna	Agriculture	B.Sc. in Agriculture	4	56
Peradeniya	Agriculture	B.Sc. in Ag.Technology and Mgt.	4	175
		B.Sc. in Food Science & Technology	4	22
		B.Sc. in Animal Science & Fisheries	4	44
	Veterinary Medicine and Animal Science	B.Sc. Veterinary Medicine and Animal Science	4	83
University of Sabaragamuwa	Agricultural Science	B.Sc. in Agriculture Science and Management	4	83
Wayambe University	Agriculture and Plantation	B.Sc. in Agriculture	4	112
		B.Sc. in Plantation Management	4	
		External Degree Programme for practicing planters and executives from plantation sector	3	113
	Livestock Fisheries and Nutrition	B.Sc. in Food Science and Nutrition	4	20
		B.Sc. in Food Production and Technology Management	4	40
Uwa-Wellassa University	Animal Science and Export Agriculture	B.Sc. Animal Science	4	47
		B.Sc. in Export Agriculture	4	44
		B.Sc. in Tea Technology and Value Addition	4	44
		B.Sc. in Palm and Latex Technology and value addition	4	51
	Applied Science	B.Sc. in Food, Seed & Technology	4	43
University of Jayawardenapura		B.Sc. Forestry and Environment	4	NA
		B.Sc. Special (Plant Bio- technology)	4	NA
University of Kelaniya	Faculty of Science	B.Sc. Environment Conservation and Management	4	32
Open University of Sri Lanka		Bachelor of Industrial Studies (Agriculture) (External Degree)		370

**Source:** Gurung and Azad (2013)



