Focus Area 2 : Food, Nutrition and Agriculture

Introduction

The agriculture sector plays a vital role in Sri Lanka's economy. With more than 70% of the population living in rural areas depending on agriculture for their livelihoods, this sector contributes approximately 11% to the Gross Domestic Product (GDP) and generates 30% of the employment. Sri Lanka became self-sufficient in rice production in 2011 and maize in 2012.

However, the growth of this sector has been rather slow. Fragmented land use, changing weather patterns, insufficient availability of water, credit, seed, technology, marketing, storage and transportation, high cost of inputs, labor shortages and poor farming practices continue to weaken productivity in agriculture. The farming community is moving away from agriculture due to low profit margins caused by many reasons.

Approximately 90% of the poor live on rural agricultural economy. Therefore, rapid agricultural productivity growth is fundamental for reducing poverty in Sri Lanka. Food production while protecting the environment, natural resources, and bio-diversity needs to be given high priority in Sri Lanka's development strategies. High dependence on external inputs, which causes high cost of production as well as environmental pollution, is a major issue. Food security should be achieved through environment friendly management systems.

Proper regulations are also required to protect farmers in terms of marketing of their products, and providing necessary inputs. Postharvest measures also should be given due consideration in order to prevent losses and obtain maximum benefits to the farmer.

Proper nutrition is a basic requirement of human beings. However, with the ever changing food consumption patterns the attention paid on quality and nutrition received from food are very poor. Issues observed in this sector are lack of awareness on food varieties and nutritional levels, unethical and misleading advertisements, lack of simple methods to identify quality food, etc.

Attention paid on food safety and risk assessment in Sri Lanka is also not sufficient to assure healthy and quality food to the population. Food poisoning, food-borne disease outbreaks are regular incidents in the country. There are high possibilities of food/agricultural products being contaminated with agrochemicals, and unfavorable additives and toxins.

There are needs to implement proper surveillance systems, create awareness on nutrition and quality of food, control of food borne diseases, risk management and assurance of food safety in order to have a healthy population.

Sub Areas, Issues and Relevant Interventions

Table 1 : Sub Areas and Justifications

Sub Areas	Justifications
1) Crop- based Production & Productivity	Although Sri Lanka has achieved self-sufficiency level in Rice and Maize, other serials, vegetables and fruits are not produced to meet the national requirement. It is necessary to increase production and maximize productivity providing agricultural inputs (high quality Seed & planting material, agricultural credit, better land and water management practices and labor). At the same time planned cultivation /market oriented production and better production technologies and climate change issues should be addressed.
2) Food and Nutrition	Food and proper nutrition is essential to improve quality of life, and enhance socio-economic development of the country. It can be achieved by providing optimum nutrient levels, which leads to maintaining good health and nutritional well-being at all stages of life.
3) Food Safety risk Assessment	Food Safety risk assessment is necessary to improve the food and food control systems to achieve food safety, reducing the numbers of food-borne diseases. Areas such as food contamination, agro- chemical residuals and natural toxins should also be given proper attention.
4) Eco Friendly Agriculture	Healthy eco systems provide humans with many requirements to sustain the life, including clean air and water, fertile soil, food, medicines, materials and diversity of genes and species. Eco-friendly agriculture focuses on food production while preserving the biological diversity, wildlife, natural eco systems and places which are critically important for the survival of mankind , plants and animals.
5) Postharvest handling and processing	Postharvest handling and processing is vital to enhance the national agricultural growth by; reducing postharvest losses and assuring food security through innovative technology development, increasing value addition, improving processing, packaging, quality control and value addition. On the other hand designing of processing machineries and utilizing by-products, can develop sustainable agro-industries, create new employment opportunities in the sector and increase the income level of the rural farming community.
6) Commercial and Small Farmer profits	Sri Lankan farmers earn low profit margins compared to other Asian countries. This is one of the major reasons to move farmers away from agriculture. Therefore it is necessary to attract youth and women to develop this area by providing inputs (such as small-scale machinery) and creating a good marketing system using ICT for agriculture and aqua culture.
7) Livestock production and Fisheries	The livestock sector which consists mainly of the dairy and poultry sub-sectors, are considered as priority areas for growth, employment generation and increasing income of rural farmers. However, local production, especially milk and milk products is sufficient only to meet 33% percent of the requirement at current consumption rate. Although Sri Lanka has a considerable potential in offshore/deep sea, inland fisheries and aquaculture, the fisheries sector contributed only around 1.3% to GDP in 2012. The sector also employs over 650,000 people directly and indirectly through related activities.

Table 2: Issues/Problems, R&D Needs and Relevant Interventions

Sub Areas	Issues/Problems	Research and Development Needs	Relevant Interventions
1) Crop based Production & Productivity	I) Lack of high quality varieties/ planting material	i) Development of new varieties	**Pure and Applied Research** a) Research on high-yielding varieties tolerant to biotic and abiotic stresses b) Research on normal multiplication method
	II) Absence of accurate assessment programmes on national seed requirement	i) Develop accurate assessment system	**Pure and Applied research** Survey on accurate assessment of national seed requirement
			Capacity development Train AOs on assessment
	III) Poor nutrient and soil erosion management	i) Development of sustainable community based erosion control methods ii) Measures to minimize use of chemical inputs	**Policy studies** Policy for upgrading soil nutrient and erosion management
			Pure and Applied research Research on sustainable erosion control methods
			Innovations Community based erosion control methods
			Capacity Building Train AOs on new methods
	IV) Lack of demand driven production system and Unplanned cultivation	i) Optimize the cultivation pattern and varieties according to the market needs/climate/nutritional requirements.	**Pure and Applied Research** Market research on demand and supply
			ICT Database on market information

Sub Areas	Issues/Problems	Research and Development Needs	Relevant Interventions
			Popularization Create awareness among farmers on market needs, climate changes etc.
	V) Lack of labor and mechanization	i) Develop appropriate machineries and train people	**Pure and applied Research** Research on development of machinery suitable to local conditions
			Capacity building Train farmers on use of machinery
	VI) Poor water use efficiency	i) Develop water conserve farming systems	**Pure and applied Research** Research on water-conservation farming systems
			Innovations Cultivation systems with minimum water use
			Popularization Create awareness among farmers
2) Food and Nutrition	I) Lack of awareness on nutritional quality and needs of food	i) Assessment of nutrient contents of food ii) Establish food composition tables	**Pure and Applied Research** Research on functionality of foods
			Popularization Create awareness among the general public
	II) Lack of simple method to identify quality food	i) Develop simple methods to identify quality food	**Pure and Applied Research** Research food contamination and toxicities
	III) Unethical and misleading advertisements	i) Development of proper regulations on advertising	**Policy Studies** Development of policies/ regulations for food advertisements
			Popularization Create awareness among the general public on proper nutrition

Sub Areas	Issues/Problems	Research and Development Needs	Relevant Interventions
3) Food Safety risk Assessment	I) Absence of scientific investigation and data on chemical residuals	i) Risk assessment of agrochemicals / food additives	**Pure and Applied Research** a) Research on agrochemicals and their impact on human health
	II) Lack of proper surveillance programme	i) Survey on occurrence of toxicity in food crops ii) Assessment of risk factors	**Pure and Applied Research** a) Research on methods to reduce toxicity in food b) Research on suitability/unsuitability of food as in the Ayurvedic systems
	III) Food born -disease outbreaks	i) Minimize food-born diseases ii) Minimizing food poisoning outbreaks	**Pure and Applied Research** Research on food borne diseases and control measures
			Popularization Create awareness among general public on food poisoning
4) Eco Friendly Agriculture	I) Low priority to indigenous species	i) Improve the indigenous varieties to compete with exotic species	**Pure and Applied Research** Research to Improve the indigenous varieties to compete with exotic species
			Popularization Promote use of indigenous species
	II) High- dependence on external inputs	i) Promote use of low cost and environmentally friendly inputs	**Pure and Applied Research** Research on cost effective farming systems
	III) Lack of knowledge on bio pesticides & biologically active compounds	i) Promote biological control of diseases	**Pure and Applied Research** Research on bio pesticides
			Indigenous Knowledge and IPR Produce bio-pesticides using IK
			Popularization Create awareness among farmers and AOs

Sub Areas	Issues/Problems	Research and Development Needs	Relevant Interventions
	IV) Competitive species	i) Control of competitive species	**Pure and Applied Research** Identification of exotic species and research on control measures
			Popularization Create awareness among farmers
5) Postharvest handling and processing	I) Poor supply chain management/marketing and un-planned harvesting	i) Establish a proper marketing system for agriculture products	**Pure and Applied research** Market research
			Capacity Building Train farmers on post-harvest handling and processing
			ICT Develop databases to supply market information
	II) Higher energy cost	i) Develop low cost post-harvest handling methods	**Pure and Applied research** Research on low cost postharvest processing methods
			Innovations Energy efficient post-harvest processing methods
	III) Poor postharvest quality of traditional products	i) Develop novel techniques for postharvest handling of traditional products	**Pure and Applied research** Research on traditional packaging materials and postharvest technologies
6) Commercial and Small Farmer profits	I) Absence of proper communication in armers' clusters	i) Develop proper communication channels to increase farmers' profits	**ICT** Develop information channels/databases etc.
			Popularization Create awareness among farmers

Sub Areas	Issues/Problems	Research and Development Needs	Relevant Interventions
8) Livestock production and Fisheries	I) Use of illegal and unregulated fishing methods	i) Develop sustainable fish catching methods	**Innovations** a) Designing of efficient , low cost fishing gear and crafts b) New techniques/sustainable fishing methods
			Capacity building Develop capacity for marine fishing
			Popularization Popularize sustainable fishing
	II) Lack of efficient captive breeding methods for fish	i) Development of breeding methods for high demand and endangered species	**Pure and Applied Research** Research on suitable captive breeding methods
			Capacity Building Development of infrastructure with facilities for culturing marine fish in captivity
	III) Underutilized and unutilized fish stocks	i) Identification and use of underutilized and unutilized fish stocks with economic value	**Pure and Applied Research** Research on natural diversity and density of fish

Sub Areas	Issues/Problems	Research and Development Needs	Relevant Interventions
	IV) Issues relevant to Aquaculture (including mari culture)	i) Establish most suitable culture systems ii) Development of disease resistant varieties and to improve immune systems for important diseases of fish iii) Study the impact of climate change on fisheries	**Policy studies** Development of relevant policies/regulations for aquaculture
			Pure and Applied Research a) Research on suitable freshwater, brackish water and marine food fish varieties b) development of high quality low cost feed using locally available material c) Research on algae species suitable for cultivation d) Development of temperature and salinity tolerant food fish species e) Identify impact of climate change on food fish (freshwater brackish water and marine) and coastal aquaculture f) Study the impact of temperature and salinity on coastal aquaculture systems
			Innovations Development of value-added products

Sub Areas	Issues/Problems	Research and Development Needs	Relevant Interventions
			Biotechnology a) Identify suitable fish species for local conditions b) Development of disease resistant varieties
			Capacity Building Development of infrastructure and training
	V) Poor postharvest handling and processing	i) Reduce postharvest losses at all levels ii) Development of value-added products	**Pure and Applied Research** Research for development of value added products, safe and attractive packaging techniques to improve shelf life and consumer attraction and demand
			Indigenous Knowledge Use of traditional knowledge in postharvest handling
			Standardization, testing and accreditation Introduce testing services to maintain the quality of products
			Capacity building a) Development of accredited laboratories for testing of products and toxicity studies b) Development of mechanized systems for loading, unloading, transporting, postharvest handling, processing,

Sub Areas	Issues/Problems	Research and Development Needs	Relevant Interventions
	VI) Issues relevant to dairy industry(Insufficient milk production and poor quality of milk)	i) Improve milk production (Quality and quantity) ii) Develop value-added products	**Pure and Applied Research** a) Improve/upgrade local species b) Research on increasing milk production c) Development of value-added products
	VII) Disease outbreaks	i) Control of livestock diseases	**Policy studies** Adopt strict quarantine procedures
			Pure and Applied research a) Develop resistance breeds b) Develop new vaccines c) Identify disease causing factors
	VIII) Lack of breeding animals	i) Develop improved breeds and breeding techniques	**Pure and Applied Research** a) Develop improved breeds b) Research on appropriate husbandry methods
	IX) Insufficient feed supply and Poor quality	i) Production of feed raw materials	**Pure and Applied Research** a) Research on new feed varieties b) Research on efficient pasture conservation and utilization methods
	X) Lack of value added products	i) Value addition to animal products	**Pure and Applied Research** a) Research on value-added products b) Research on utilization of byproducts

***Table 3: Interventions and Key Performance Indicators**

Sub Areas and Issues/Problems	Interventions/Activities									
	Policy Studies	Pure and Applied Research	Innovation	Information and Communication Technologies	Nanotechnology	Biotechnology	Indigenous knowledge & Intellectual Property Rights(IPR)	Testing, Standardization & Accreditation	Capacity Building	Popularization
1) Crop based production and productivity										
i) Lack of high quality varieties/ planting materials		√	√						√	
Time Frame(TF)		Medium								
KPIs		No. of new varieties								
Lead Institute (LI)		Agriculture research institutes								

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