Sri Lanka Organization of Agriculture Proffecionals (SLAOP)

Proceedings of the Annual Seminar on

"Food Security and Agriculture Professionals in Sri Lanka"

Held at

Sri Lanka Foundation, Colombo

03rd October 2017

SLOAP is a member of the Organization of Professional Associations (OPA) of Sri Lanka

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SLOAP is a non profit organization devoted and dedicated to up lift and enhance Agricultural professionalism in Sri Lanka

Edited by
K.L. Jayatissa

Note from the Editor

The Contents in the proceedings are based on the recordings and note taken down at the seminar seccions

Executive Committee 2016/2017
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Seminar Programme

Registration of participants

Inauguration of the Seminar

Lighting the traditional oil lamp

Welcome address – by Hon. Chairman Prof. K.Samarasinghe

Lecture by Chief Guest – Dr WMM Weerakoon/ Adl Secretary, Ministry of Agriculture,

Presentation by Dr. MP Dhanapala - Food security, Comparative advantage and the Farmer

Presentation by Prof.Buddhi Marambe – Saving Agriculture from being a Looming Crisis in Sri Lanka

Presentation by Prof. Pradeepa De Silva - Agricultural sustainability with Livestock on board

Panel discussion with Prof. S Sivayoganathan as the Chairman of the Panel

Vote of Thanks by General Secretary / SLOAP 2016/'17 Mrs SBAMAM Gunawardhana

Lunch

Attended by Chief Guest – Dr WMM Weerakoon/ Adl Secretary, Ministry of Agriculture, and .....invitees representing the Government sector organizations as well as private sector.

Acknowledgement

For the generous support rendered by

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PART - I

SLOAP Seminar - 2017

Contents

Proceedings of the Annual Seminar held at Sri Lanka Foundation, Colombo, Sri Lanka

on 03rd October 2017, by Sri Lanka Organization of Agricultural Professionals (SLOAP)

Sri Lanka Organization of Agricultural Professionals (SLOAP)

Proceedings of the Annual Seminar on "Food Security and sustainability of Agriculture in Sri Lanka"

Held at the Sri Lanka Foundation, Colombo, Si Lanka

on 03rd October 2017

SLOAP is a member of the Organization of Professional Associations (OPA) of Sri Lanka

Biography of Dr. M.P. Dhanapala

Dr. M.P. Dhanapala obtained the B.Sc. degree in Agriculture from the University of Ceylon at Peradeniya in 1968. He received the M.Sc. degree in Plant breeding from Saga National University, Japan and the doctoral degree in genetics & plant breeding from the North Dakota State University, USA. After graduation he joined the Department of Agriculture as a research officer and served there until his retirement as the Director of the Rice Research and Development Institute at Batalagoda.

Dr. Dhanapala has contributed to the development of over 25 improved rice varieties (especially BG varieties) grown in Sri Lanka. He was a member of the Board of Management of the Postgraduate Institute of Agriculture, Visiting Lecturer in many Universities in Sri Lanka, a Senior Scientist at the Council for Agricultural Research Policy, and a consultant Plant Breeder for Sugarcane Research Institute, Sri Lanka. He has supervised many postgraduate research students locally and internationally. He has published more than 30 scientific articles in recognized journals, and over 20 feature articles in popular newspapers.

He was also an internationally recognized scientists and served at the International Rice Research Institute in Philippines; Tsukuba International Center in Japan, and JICA. He was awarded with the Glenn Smith Fellowship in 1987/88 and 1988/89 by North Dakota State University, USA in recognition of academic excellence, Sri Lanka Presidential Awards in 1982 and 2014, FAO CERES Medal in 1982, Council for Agricultural Research Policy Award 1996, the 1st Prize from the Ministry of Agriculture in Sri Lanka for sphere heading the development of rice varieties and the technological package leading to Green Revolution in Rice.

1. Presentation by Dr MP Dhanapala

Food Security, Comparative Advantage and the Farmer

Mr. Chairman, distinguished guests, colleagues, ladies and gentlemen.

I am delighted to be in front of this highly respected audience and let me thank at the outset Mr. Chairman and the committee for giving me this opportunity to address you.

I am an old-fashioned conventional plant breeder, more precisely a rice breeder. Nowadays people do not like to listen to me; probably my views and ideas are obsolete. However, I always go by facts. Facts are neither exaggerated nor distorted by scientists; if anybody does that, he/she is no more a scientist.

Three terms in my jargon I used in the title are Food Security, Comparative Advantage and the Farmer. We talk of Food Security, yet nearly 25 % of our daily energy requirement is met by wheat flour based products. We have to consume more rice, yams/tuber or other cereals if we are to do away with wheat flour, which is not going to be attractive any way.

The second term, Comparative Advantage emerged in early 1990s when we were to sign General Agreement on Trade and Tariff. It simply means that you have comparative advantage in producing a commodity only if you can produce cheaper than any other nation in an unsubsidized agricultural environment. If

you look at this concept seriously, we do not have comparative advantage for many crop, even for our major export crop, Tea. That is all that I want to say about Comparative Advantage.

The third term, the Farmer, is the key player in this whole episode. Without farmer we cannot have food security. We have to keep him happy and enthusiastic at any cost.

Food Security

The three main requirements for human survival are Food, Shelter and Clothing. Food is of utmost importance. "Subbe Saththa Aaharathtithika", for everyone in animal kingdom food is essential.

To my mind, Food Security should fulfill the following requirements: availability throughout the year, distribution all over the country, affordability to everyone and hygienically acceptable.

As affordability is concerned, a few days ago I bought a kilogram of red rice in a printed pack with a label Wasa Visa free, Kuruluthuda. I had to pay Rs. 220/= for the pack, which is a price I cannot afford to pay regularly with my pension.

The most important issue is that Prof. M.F. Chandraratne had worked with Kuruluthudu wee and published in his book on Rice Breeding in 1950s that Kuruluthuda is a photosensitive variety that can be grown only in Maha season. The botanical descriptors of Kuruluthuda rice variety by K. J. Gunawardena in 1947 (Trop. Agr. CIII (2): 105 – 112) indicate that it is a white rice. There were two white rice varieties in the 21 recommended pure-lines by the Agriculture Department in 1940s; one is Kuruluthuda, the other is Podi wee A8. Therefore, the authenticity of labelling is questionable.

A couple of weeks ago there was a news item that a medical professional reporting Cadmium (Cd) in rice and Lead (Pb) in vegetables. Author did not specifically say, whether the rice variety was locally produced or imported. If locally produced rice, then one has to find out how it has happened, because rice

plant does not accumulate Cd, nor do the vegetables harbor Pb.

Rice Production at the Inception of Breeding

Right here, I want to mention the status of rice when rice breeding begun in the country. We were far behind national production targets. The yield 15 bushels per acre was apparently the target we had. India was much ahead of us. Great bulk of the national requirement was imported.

Rice Production in 1940s

I940s was apparently the last era of traditional varieties without inorganic manure. You can find these figures in the last page of Trop. Agric. Journals issues in late 1940s. Yields were always less than 15 bu/ac.

Replacement of Traditional and H Varieties by NIVs

We may see how the traditional varieties were replaced gradually from 1958, with the emergence of H4 and subsequently by the new improved varieties from 1970s.

Progress in Rice Production

The rice production gradually increased and met the demand; there had been a surplus in the year 2013 and 2015.

I recapitulated these issues because rice is our major staple.

Accepting the government's campaign to popularize traditional rice varieties as a measure towards Field Crop Imports

We can see a deficit in the production in some important field crops. This will demand land, labour and capital to meet the required quantities.

Status of Vegetable Sector

The status of vegetable sector, though not alarming, need some more tonnage to meet the 200 g daily per capita target requirement.

Some importation of exotic vegetables like Asparagus, Cauliflower, Peas etc. and exportation of Cucumber, Leak, Mushroom etc. are evident in this sector.

The major requirement is to even-out production to prevent gluts and scarcities in the market for which a computer software package was developed in collaboration of DOA and the University of Peradeniya with National Science Foundation (NSF) funding.

Postharvest losses, especially during transport, are too high in this sector and prevention of those would help to meet food security easily. Jayawardenapura University, funded by NSF is working on this aspect, especially losses during transport.

Status of Fruit Crop Sector

Status of fruit crop sector is seen here. Some fruits like rambutan, Durian Mangusteen are not listed here. We import some exotic fruits especially the ones we do not have comparative advantage. The main issue in fruit crops is the seasonality in production. A few fruit species like Banana, Papaw are available throughout the year. Pineapple is produced year-round by application of Carbide.

Storage facilities and further research effort to improve productivity and year-round (off-season) production of tropical fruits are needed here.

Land Use in Sri Lanka

All the food crops, plantation crops including export agricultural crops are confined to 3.54 million hectares, which is about 54 % of the total area of the country.

Rice is the largest single crop occupying the area 0.92 million hectares. Nearly 39 % of the rice extent is in the wet-zone. Though double cropping is practiced, the annual cultivated extent had never gone beyond 1.12 million hectares.

Home gardens, though occupy 1.45 million hectares, consist of mixed cropping systems.

Extent of other field crops is small making it compulsory to improve productivity while expanding cultivated extent.

Among the plantation crops, Tea occupies 0.23 million hectares while Rubber and Coconut 0.21 and 0.30 million hectares respectively. Apparently, these extents, especially rubber and coconut, are shrinking gradually.

We have to confine to this land extent in future too to attain food security. We are left with only two options: improve the productivity of the Potential of cultivars is the backbone of productivity and undoubtedly, we have to go for hybrid technology wherever possible. Also, it is essential to develop suitable agronomic packages to optimize yields of new cultivars.

We are in tropics and our soils are poor partially due to low organic matter accumulation. Also, high cropping intensity would bring down soil fertility drastically as fallow period is limited for resuming nutritional status in the soil. The soil fertility is therefore to be maintained and sustained by liberal application of organic manure with required quantities of inorganic manure.

We cannot ignore farmer's potential in the productivity improvement. We have to give credits, subsidies and a fair farm-gate price for his product to improve his potential.

If any one of the three areas is week, the productivity is affected.

Expansion of Cultivated Extent

Since we are confined to 3.54 million hectares of agricultural lands, we have to use all the idling agricultural lands in the country. There are many uncultivated idling paddy lands particularly in the wet-zone. We have to give due emphasis to paddy production in the wet zone, at least cultivation of one crop a year, and release more paddy lands in the dry-zone irrigated schemes for other field crop (OFC) cultivation during Yala season. Walagambahuwa concept would be helpful to save water for Yala season supplementary irrigation of OFCs. This strategy is not suitable for intermediate zone as there can be standing water in the fields during peak rainfall period. Standing water destroys field crops other than paddy.

Walagambahuwa concept originated from Maha Illuppallama Dry-zone Agricultural Research Station to save water for a Yala season crop in small tanks. It simply insists the initiation of Maha cultivation (land preparation) with the onset of rainfall and use of water in the reservoir (tank) for supplementary irrigation. However, this concept was not seriously adopted in irrigation schemes. This may be applicable to major irrigation schemes too.

Furthermore, we can adopt a 3rd crop (legume) between paddy crops of Maha and Yala seasons with residual moisture in the soil. This was successfully demonstrated by DOA in Hambantota District a couple of years ago.

We have 0.3 million hectares of coconut lands and most of them are not inter-cropped. Also, the senile and unproductive coconut lands can be avenue planted in east-west direction with suitable spacing adjustments to practice inter-cropping.

Home gardens is an important component contributing to food security. Prof. Mikuntan's home gardens project by the Faculty of Agriculture, Jaffna University with NSF funding is an eye opener. He cultivates crops where crops cannot be grown in resettlement schemes in few districts in Northern Province. Revitalization of old home gardens with better adapted crop species and livestock combinations would help to attain food security.

Though not shown in this slide, poly-tunnels with drip irrigation and fertigation would be another area to be expanded. NSF funded research is ongoing at Open University, Nawala to improve quality of poly tunnel vegetables adjusting potting mixture.

Farmer, the Key Player

We cannot attain food security without this key player, the farmer. We have to keep him happy and enthusiastic.

Prof. Reiner Shickely, an Extension Specialist who did a survey in Colonization

Schemes in Sri Lanka, in 1966, while introducing a booklet "Getting Agriculture Moving", emphasized the term "EMPATHY" to understand the heartbeat of the farmer. He simply said, "put yourself in the position of the farmer and think".

Right now, I will ask this simple question from the audience. Would you like to continue your life by farming from tomorrow onwards? "Dena welandam, Nodena Govithan". Your answer in simply "No". why? Because of no social acceptance, the drudgery of hard work and low income.

A.W. Bevan (1914)

It simply says low income which is true today too. This "goiya" in the past is still a "goiya" and that is the reason that young generation moving away from agriculture. My father was a "goiya" during the British era. Two things he told me echoes in my mind. The first thing was not to disclose that you are a son of a farmer. That shows the attitude he had about the social acceptance of farming. The second thing was more disturbing. He said "I do farming because of the independence it has. I do not want myself to be dictated by anybody". So, that is farmer.

Appeal of Farmer

I have attended many farmer fora in my career as a rice breeder. I was never encountered with any technical question pertaining to rice cultivation. The questions asked were listed here. Real farmers are trying to make their ends meet. They survive hand to mouth as they earn their living only by farming. We have to be compassionate and generous towards farmers as they are part of our society.

Final Statement - Ultimate success of these lie with one thing, and that is the contentment of the farmer, by and large.

2. Presentation by Prof. Buddhi Marambe

Saving agriculture from being a looming crisis in Sri Lanka - by Prof. Buddhi Marambe.

Brief biography of Professor Buddhi Marambe

Professor Buddhi Marambe is a graduate of from University of Peradeniya, who obtained the B.Sc. Agriculture degree in 1985 with Second Class Upper Division Honours. He obtained the Masters degree in 1991 and Doctoral degree in 1993 from the Hiroshima University, Japan in the field of Plant Environmental Sciences. His research interests include weed science, climate change and food security. He has 30 years of service as an academic attached to the Department of Crop Science of the Faculty of Agriculture, University of Peradeniya. He was the Head of the Department of Crop Science (2001-2003), Dean of the Faculty of Agriculture (2003-2009) and Director of the Agriculture Education Unit (AEU; 2009-2015) of the University of Peradeniya.

Currently he is the Chairman of the Board of Study in Crop Science of the Postgraduate Institute of Agriculture (PGIA) and Chairman of the National Experts Committee on Climate Change Adaptation (NECCCA) of the Ministry of Mahaweli Development and Environment, and a member of the Governing Council of the Rajarata University of Sri Lanka appointed by the University Grants Commission (UGC). He also serves as an independent member of the Board of Directors of several private sector organizations.

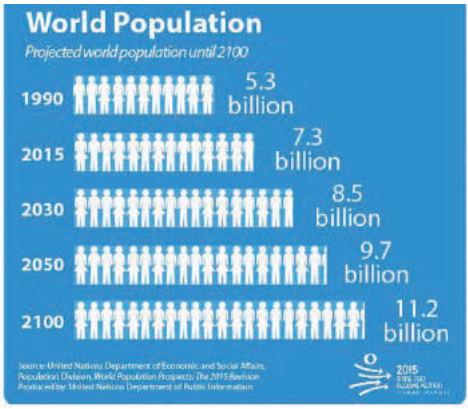
Professor Marambe is also a member of the Government Delegation in climate negotiations at the United Nations Framework Convention on Climate Change (UNFCCC) during the past years.

Professor Marambe has published more than 100 research publications and 10 popular articles in his fields of study, and the principal investigator or project coordinator of six multi-country projects supported by international donor

agencies. He has provided his services as a National Consultant to the World Bank, UNDP, FAO and CIAT in nationally and internationally important issues related to agriculture.



World population increases by almost about two billions every 15 years. Required increase in food calories to feed 9.7 billion people by 2050 Food Security





Food Security and sustainable Agriculture in era of modern science and technology

The brighter side –Of the total Land area-6.271 m. ha, Agricultural 3.54 m. ha, Forest - 2.07 m. ha. Labour force in Agriculture 28.4%. Excess production in rice, vegetables, tropical fruits through healthy Commitment of the Dept. Agric. and supporting entities, Private sector - primary production and value addition, Donor attraction.

Unwelcoming picture - Growth rate of agriculture (2016)-4.2%, Total agriculture, food and beverage imports USD 1.9 billion (2016), Imported approx. 948,000 tons of wheat (2016), One of the major importers of red lentils (USD 140 million per annum), Spends approximately USD 68 million annually to import animal

feed, Imports approximately USD 208 million of cotton (raw cotton, yarn, and fabric) annually. Over 500,000 mt of rice to be imported in 2017.

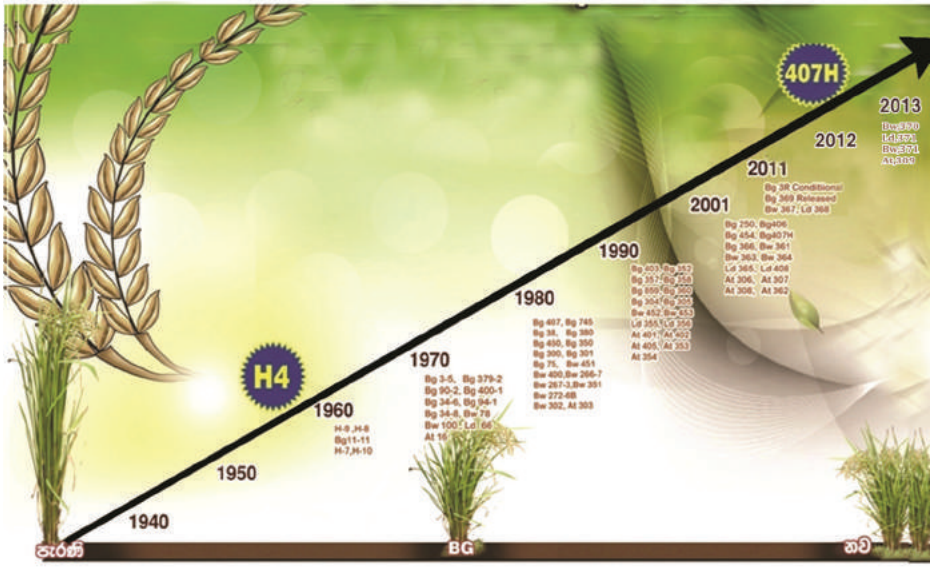
In meeting the challenge of ensuring food security to people, present Government seems to rely excessively on traditional rice varieties, abandoning use of major agrochemicals including chemical fertilizers. Is it practicable?

A study(2014) representing 268 m. acres of cropland in USA reveals that, of the 9% higher yielding organically grown crops, only <1.5% with fruit and vegetable crops.



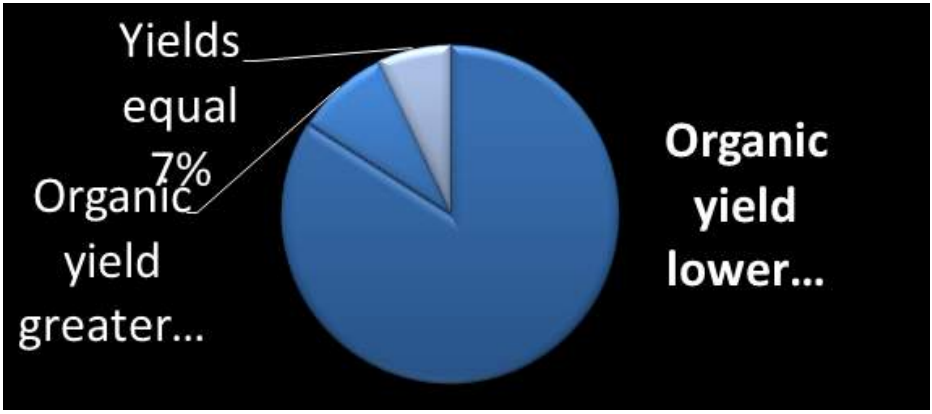
Yield Gaps observed in Sri Lanka with traditional rice varieties and new improved varieties are so wide that it is almost impossible to secure food security by replacing current 20% of the total extent under new improved rice varieties capable of yielding >4.5 mt per ha with traditional varieties capable of yielding only <1.5 mt per ha which is grown in less than 1% of the total extent at the moment. Yield Gaps observed in Sri Lanka with traditional rice varieties and

new improved varieties are so wide that it is almost impossible to secure food security by replacing current 20% of the total extent under new improved rice varieties capable of yielding >4.5 mt per ha with traditional varieties capable of yielding only <1.5 mt per ha which is grown in less than 1% of the total extent at the moment.



Use of Glyphosate for Crops in Sri Lanka (2013/2104)

FAO-WFP Report 2017 - 2016 – In the absence of glyphosate, paddy fields often have a high weed population. In a year of reduced rainfall this is especially harmful as the weeds, which are often more adapted than the crop to dry conditions, use a large proportion of the available soil moisture



Glyphosate ban set to brew up trouble for Lankan tea exports

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Pedagogy

Are our methodologies diverse enough? Are our techniques diverse enough? Are we bias in information dissemination? Challenge = Myth (Scientists + Academia), Challenge = Policy + Politics + Pedagogy







Private – public partnership leads to innovations that benefits Agriculture, Need more investments, Technology: attract youth, improve efficiency, Farmer – cornerstone in food security and sustainable agriculture,



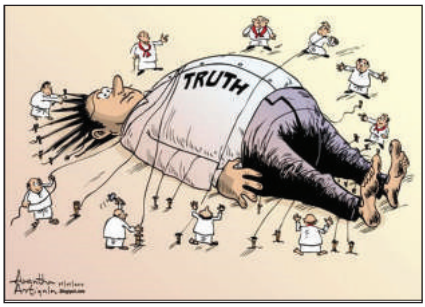
Sri Lanka's agriculture sector suffers from low productivity and leads to food insecurity and poverty

The Government will promote private sector participation and PPPs where feasible

The Government will undertake agricultural reforms to minimize food insecurity, and create inclusive growth by developing underserved districts. Recognizing the dangers of climate change, we will prioritize environmental protection and disaster management, and energy security.

Vision 2025: To enable these, we will undertake fundamental reforms in governance

Challenge: Blue Green Economic Policies

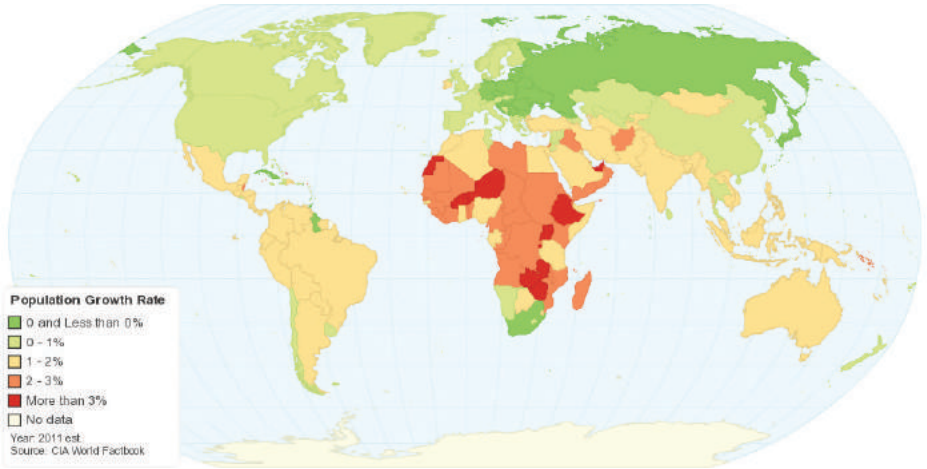


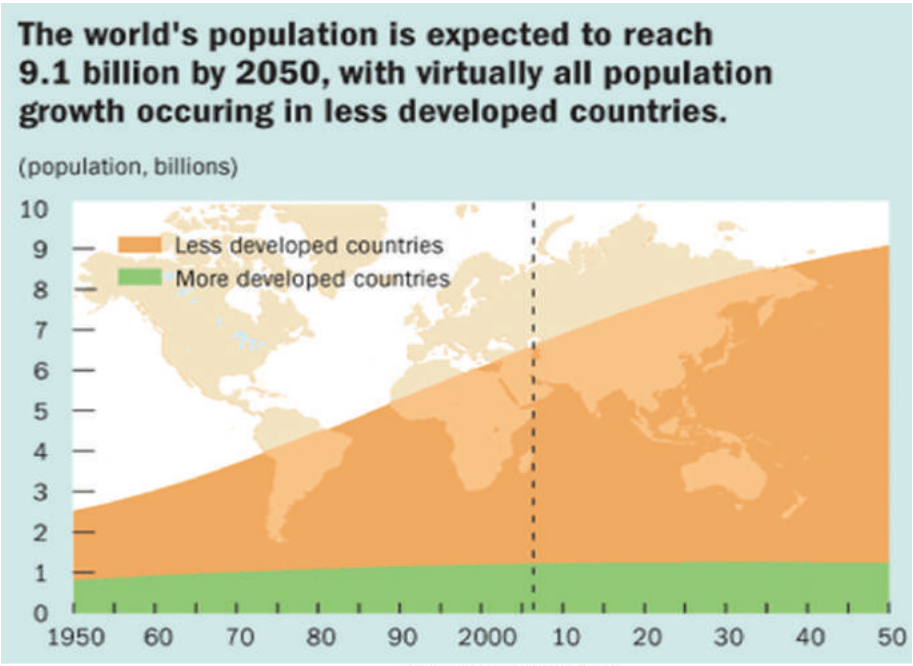
3. Presentation by Prof. Pradeepa Silva

Brief Biography – G.L.L.P. Silva

Pradeepa Silva is a Professor attached to the Department of Animal Science, Faculty of Agriculture, University of Peradeniya. Her field of specialization is Animal Genetics and she is involved in undergraduate and postgraduate teaching in the area of animal genetics and breeding, particularly on the aspects population genetics, molecular genetics, and breeding systems of indigenous animals. Her research areas include characterization of farm animal genetic resources, particularly indigenous farm animals including their diversity, adaptability and conservation through utilization in system approach. She has written four books and fifteen book chapters, and currently serving as an editor in several local journals. She has more than 100 scientific communications to her credits.

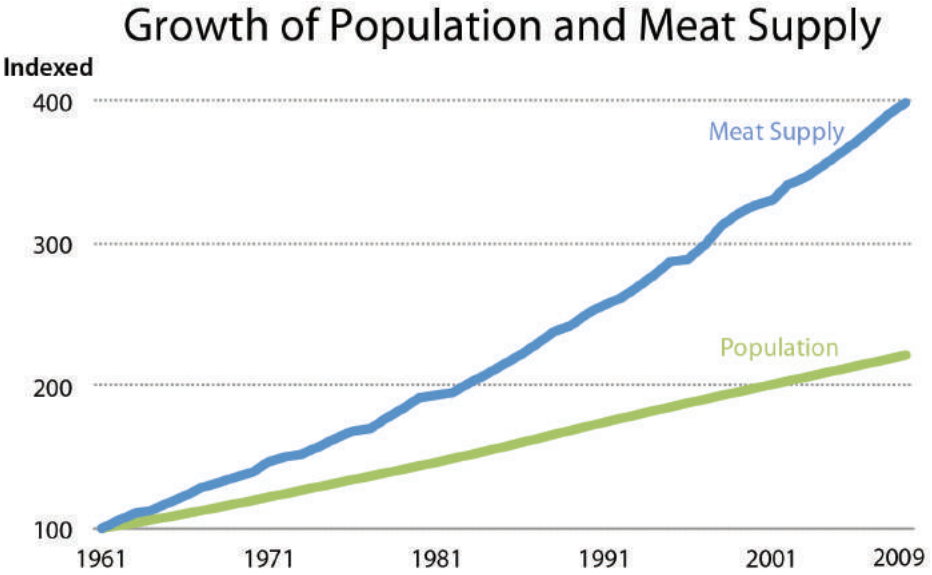
Pradeepa Silva holds a Bachelors' degree in Agriculture from the University of Peradeniya, Sri Lanka, and a Ph.D. degree in Genetics and Animal Breeding from the University of Sydney, Australia. She was a recipient of the Fulbright Senior Research Fellowship in 2007. She has won President's awards for scientific publication in the years 2008, 2009 and 2010. She is the current president of the Sri Lanka Association of Animal Production, and serves as a member of the National Animal Breeding Committee appointed by the Ministry of Rural Economic Development, National Committee on Agricultural Biotechnology appointed by the Sri Lanka Council for Agriculture and Invasive Species Specialist Group appointed by the Biodiversity Secretariat of Ministry of Mahaweli Development & Environment.

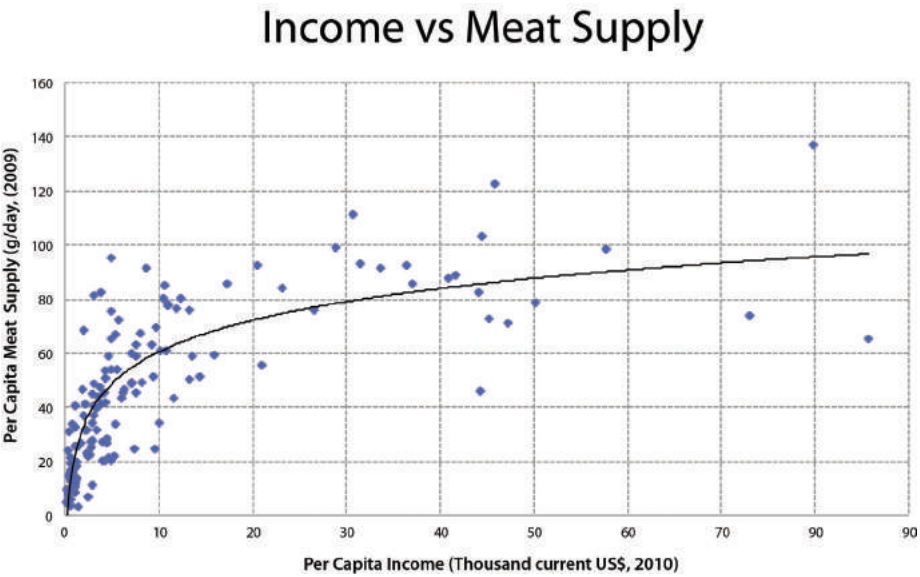




IMF, 2006, UNDP 2009

Global demand for meat and milk products shows an increasing trend especially in emerging economies. To cope up with this trend, production environment has been fostered by the technological innovations working hand-in-hand with other supportive services. Increased demand for animal sourced food from low and middle income countries arising from factors such as increasing income levels of individuals, enhanced nutrition based knowledge, desirable policies etc. Growth of meat industry shows a direct relationship with the population growth as well as growth of individual income levels. They carry 15% food energy, 25% dietary protein (high biological value) and Essential micro-nutrition. In developed economies, 60% of dietary energy requirement, 3130 kcal/ day is met through animal based products.





The production situation of Sri Lanka too shows a similar pattern, as witnessed by indicators such as per capita availability, rate of increase in production in relation to few major animal based products like milk, chicken meat and eggs. Currently only 39% of milk and dairy requirement is fulfilled by local production. The gap is filled by imports.

Basing on current trends in demand and supply of the main animal based products, the future demand too will increase and all efforts should be taken to increase the supply as well.

The challenge the country faces in this endeavor is multi-faceted; Limitation of resources (Land, water, feed), Expanding populations with increase per capita animal protein intake, Shifting economies, Population migration (urbanization), Climate change, Technology transfer/ Research output, Livestock as a contributor for Climate change, Sustainable Agriculture, Land degradation, Competitor for resource utilization.

Some facts about Livestock production

According to UN's FAO, in a global scenario, animal husbandry has its merits as well as demerits. Despite its ability to keep human race feeding with high quality nutritious material, it contributes to a significant extent to the greenhouse effect as well, directly by adding anthropogenic gases to the environment and indirectly by effecting diminution of woodland by and large. Industry is tarnished with excessive use of chemical pesticides. Animal husbandry in the modern world competes with agriculture for cropping land too.

The management and conservation of the natural resource base, and the orientation of technological change in such a manner as to ensure the attainment of continued satisfaction of human needs for present and future generations – Building a common vision for sustainable food and agriculture, Principles and approaches, FAO 2014.

Why livestock in the farming system?

Crop and livestock farming complements each other; Replenishing land, water and air; Conservation of biodiversity; Human and animal welfare; Economic viability.

Thus, combat the environmentally unfriendly effects, overcome risks. It demands on the 3 Is in any sustainable system to hold them together;

Interconnectivity

Interdependency

Interactions

80.2% farming land extent is small holdings in Sri Lanka, around 35% of which includes livestock

Main interactions in Farming systems with livestock

Around 23% of nitrogen for crop production comes from animal manure

Considerations



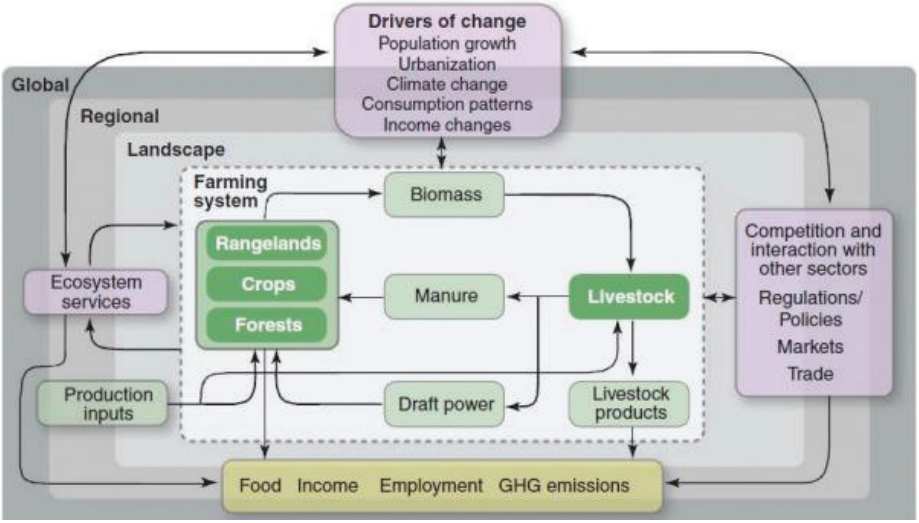
Reduce GHG emission

Recycling

Increase soil health

Crop residue generates 70% of ruminant diet in the tropics

Main interactions in Farming systems with livestock



Appropriate animals can cope up with harsh environment and low input system

Understanding synergies



Tradeoffs between crop and livestock; Secure the buffering action; Securing environmental health; Multiple benefits by livestock on board;

Non-food uses

Draught/ Transport; Supply of fiber, fuel, fertilizer; Wealth; Financial Security; Conservation of biodiversity; Traditional agriculture systems in Sri Lanka ; 2,355 crops species and 654 animal species ; Carbon sequestration – grassland; 260 MT C/ha.

Conclusion:

Agriculture systems with livestock cater to the environmental, social and economic needs in sustainable Agriculture Production systems

Tradeoff between livestock drivers acting for and against environment, societies and economies is imperative in achieving the sustainability in agriculture.

Frequent assessment on present status and projections on future scenarios are important

Policies with futuristic approach and their proper implementation today is vital for future of the industry

ROSHAN RAJADURAI

MANAGING DIRECTOR

KELANI VALLEY , TALAWAKELLE & HORANA PLANTATIONS

PRESENT STATUS OF THE PLANTATION SECTOR & THE WAY FORWARD

Roshan Rajadurai has 33 years experience in the Plantation Sector, having joined the JEDB as an Asst. Manager in 1984 and with the privatization of the Plantations in 1992, he joined Kelani Valley Plantations of the Hayleys Group as Estate Manager. In 2002, he joined Kahawatte Plantations of the Dilmah Group as General Manager and was the CEO of Kahawatte from 2008 to 2012. In 2013, he rejoined Hayleys Group as the Group Management Committee Member for the Plantation Sector, which consists of Kelani Valley, Talawakelle and Horana Plantations.

IN the recent past Hayleys Plantations Sector has won Gold Awards in the National Business Excellence for Agriculture and Plantation Sector, JASTECA CSR Awards, Excellence in Environmental Sustainability, National Green Award for Food and Beverage category, National Occupational Health and Safety Excellence in Agriculture Sector and won Silver awards at the National Business Excellence overall for Environmental Sustainability, Corporate Social Responsibility and Performance Management. Hayleys Plantation Sector also won Gold in the IPM National HR Excellence Awards and was the winner at the Asia Pacific HRM Congress Awards for leading HR practices in Quality of Work Life. They also won the Gold Medal in Global HR Excellence Awards 2017.

ROSHAN RAJADURAI

MANAGING DIRECTOR

KELANI VALLEY , TALAWAKELLE & HORANA PLANTATIONS

PRESENT STATUS OF THE PLANTATION SECTOR & THE WAY FORWARD



AGRICULTURE SECTOR OF SRI LANKA – 2.4 Mn Employed

Food crop sector - 1.2 Million Ha. of Paddy (1.8 mn hhs), 86, 000 Ha of Vegetables, 85,000 Ha of Fruit, 130, 000 Ha of Other Crops

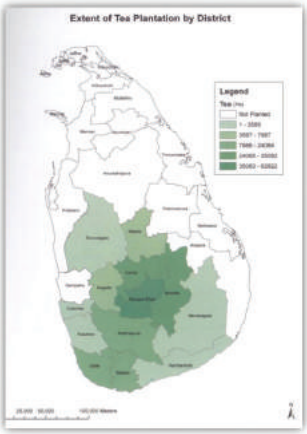
14 DISTRICTS IN 3 ELEVATIONS

- Low Grown : 0 – 600M AMSL
- Mid Grown : 600M and 1,200M AMSL.
- High Grown: Above 1,200M AMSL.

7 GEOGRAPHICAL INDICATORS

- Nuwara-Eliya
- Uda Pussellawa
- Dimbula
- Uva
- Kandy
- Sabaragamuwa
- Ruhuna





Plantation sector - 395,00 Ha of Coconut (700,000 + 100,000 mn), 220,000 Ha. of Tea, 135,000 Ha of Rubber, 120,000 Ha. T&R small holdings – 70,000+47,000 ha.(426,000+200,000 mn) RPC - 47,000 Ha Rubber(150,000 mn),

EA sector - 120,000 Ha of Export Agriculture Crops

1 Million people looked after by Regional Plantation Companies.

One twentieth (5%) of the national population is cared for by SRI LANKA Tea industry, within 14 districts in 3 elevations;

Low Grown : 0 – 600M AMSL , Mid Grown : 600M and 1,200M AMSL., High Grown: Above 1,200M AMSL.

7 GEOGRAPHICAL INDICATORS - Nuwara-Eliya, Uda Pussellawa, Dimbula, Uva, Kandy, Sabaragamuwa and Ruhuna.

3 PRODUCER SECTORS: RPCs (20 Co. – 35%), Govt. owned estates (27estates -5%)and SHs(400,000operators - 60%)

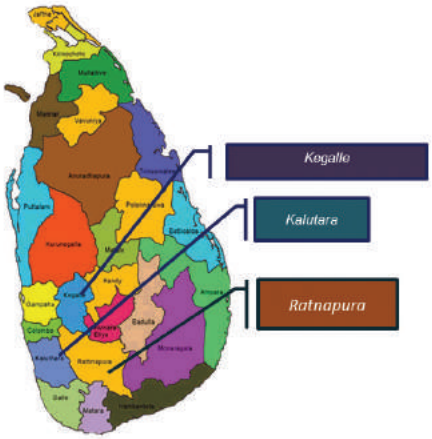
1975 Estates nationalized – 1992 Privatized,

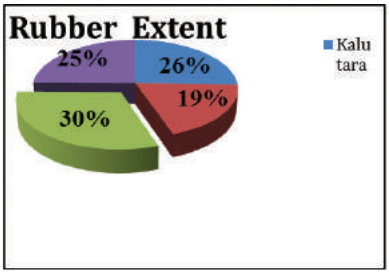
Tea small holdings:

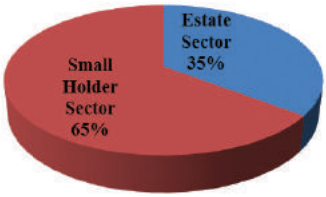
Lands less than 10Acres (4 Ha), Number of small holdings-397,223, Hectares under cultivation-132,329 Ha(59%)

82% Single ownership-own 76% of the land, 12% less than 20 perches, 75% less than 1 acre, 95% less than 2 acres, 1% above 10 acres.

RUBBER GROWING AREAS IN SRI LANKA – Kegalla (30%), Kalutara(26%), Ratnapura (19%) and other (25%)







Ownership – Estates 50,360 ha in 2008 – 46,991 ha in 2015

Small holdings – 71,736ha in 2008 – 85,908 ha in 2015

RUBBER PRODUCTION –

National – 947 mn Kg (2004) – 886 mn kg 92015)

RPC – 326 mn kg (2004) – 261 mn kg (2015)

RUBBER PRICES – RSS 1Rs/Kg Rs 127.00 (2004) – Rs 240.00 /kg (2016)

REGIONAL PLANTATION COMPANIES

RPCs : Only Stakeholder in Producing, Processing & Marketing of Tea and other crops. 453 Estates & 300 Factories, Cares for a resident population of 1 Mn (5% of Sri Lanka), Cultivates : 35% of Land , Produces : 25% of Green Leaf Processes : 41% of Made Tea

REGIONAL PLANTATION COMPANIES







- **RPCs : Only Stakeholder in Producing, Processing & Marketing of Tea and other crops.**

Cares for a resident population of 1 Mn (5% of Sri Lanka), Cultivates : 35% of Land, Produces : 25% of Green Leaf, Processes : 41% of Made Tea, 502 Estates – 272,902 Ha with 389,549 workers. Of all the tea, rubber and coconut land, 51% of Tea land, 35% of Rubber land and 2% of Coconut land under state institutions.(JEDB & SLSPC).

The Government Treasury had to subsidize Rs. 5 Billion per year. (@ Current Rate Rs 40 Billion/Year). Annual loss Rs. 1.5 Bn per year by 1992. (@ Current Rate Rs. 13 Billion/Year). By 1990s, Rs. 4 Billion in debt converted to equity (Plantation Restructuring Unit 1991).

In spite of above, final debt JEDB/SLSPC was Rs.3.3 Billion (Plantation Restructuring Unit 1991).

Total debt of Rs 7.3 Billion by 1992.

Key causes to this - Monolithic size, Centralization, Government bureaucracy, political agendas and interference.

Act No. 17 of 1992 established 23 RPCs.

STATE VS PRIVATE MANAGEMENT – PRE & POST 1992

No taxes, Lease Rentals during State Management but Treasury subsidy of Rs 5 Billion per annum.

SOCIO-ECONOMIC & INDUSTRY CONTRIBUTION

Total revenue RPCs add to the local economy around Rs. 70 billion only from Tea at estate level.

A resident plantation community of 1 million is dependent on the RPCs for their sustenance. Across the High, Mid and Low elevations, hundreds of villages, local bazaars, small enterprises and ancillary services are totally dependent on the local plantation economy for their survival.

Significant contributor to the tourism sector in the Up Country.

The "Ceylon Tea" Brand – The Ethical Tea, Food Factory , Chemical Free Tea, Cleanest Tea in the World, Ethical Management, Zero Child Employment, Ozone Friendly Tea, Sustainable Agriculture, Environmental Management, Product Traceability to Source, Single Origin Estate Marks, Global Certifications as GAP, RA,FSC, ETP, Global Conformances, Management systems, Services and Facilities provided to employees are mainly associated with the Company sector.

300 Factories- more than 700 Global & International Certifications.

Zero use of chemicals - no Paraquat, no Glyphosate used for weed control, conform to Global MRLs.

ENVIRONMENTAL CONTRIBUTION

ECOSYSTEM CONSERVATION, RESTORATION & SUSTAINABLE FORESTRY

Conservation areas over 5000 feet, tree species that support biodiversity, bird and animal life

Contribute towards CO2 sequestration significantly

Commercial Forestry - Timber and Fuel Wood

Social Forestry – Firewood for community usage

Shade / Wind belt planting- conserve soil moisture, recycle nutrients, addition of OM,

Afforestation and Reforestation with native/ indigenous species

BIODIVERSITY CONSERVATION

Conform to Good Agricultural Practices (GAP) and International Standards & Certification on Flora & Fauna. (RA, FSC,GAP,ETP, IUCN, SLBDF)

Protect the natural & virgin jungle, wild life, flora & fauna

Facilitate research & studies, training & awareness to stakeholder communities

Biodiversity assessments with IUCN

Active member of the BIODIVERSITY Forum SRI LANKA (SLBDF), SOIL AND WATER CONSERVATION , BIOLOGICAL SOIL CONSERVATION

Encouraging soil microorganisms as driving force in nutrient cycles.

Sloping Agricultural Land Technology (SALT), Mix cropping, Agro Forestry.

Planting of Vetiver in bank edges and upper banks of drains, ground cover and creeping cover, planting grass in vacant patches.

Planting of shade trees to give protection and enrich the soil.

Establishing wind belts to increase wind resistance, slow down and filter wind velocity.

PHYSICAL SOIL CONSERVATION SYSTEM

Terraces, Bunds, Channels, Contour and Leader drains.

Periodic testing of soil for Carbon, pH and nutrient levels.

WATER CONSERVATION

Protecting all water bodies in the estates – rivers, water falls, streams, ponds etc.

Water Retention Systems – Rain Water Harvesting.

Establish Chemical Free Buffer Zones, Periodic Water Testing.

Protecting drinking water sources, riverine forestry.

CARBON FOOTPRINT REDUCTION AND ENERGY CONSERVATION

Estates strongly committed to reduce GHG emissions, Carbon footprint and slow the pace of global warming and air pollution : Tea - strong sink of Carbon - 43 tons of CO2 annually.

Trees planted to reduce Carbon dioxide sequestration and contribute positively to mitigating the adverse impact of greenhouse gas (GHG) emissions and climate change.

Plantations compute and monitor direct and indirect GHG emissions.

Operating all Tea Dryers on renewable energy – firewood/briquettes.

Invest in energy efficient machinery and equipment.

Hydro power generation significantly support energy sustainability and achieving carbon neutrality.

Installation of energy efficient Capacitor banks, lighting and VSDs.

PLANTATION POPULATION

AREA OF RESIDENCE- PLANTATION POPULATION

RPC POPULATION Vs WORKFORCE

EMPLOYMENT DISTRIBUTION

REGIONAL PLANTATION COMPANY (RPC) EMPLOYMENT

RPC plantation workers get fully secured, guaranteed, life time family employment with mandatory minimum 300 days work per year from 18 years to 60 years.

Workers are completely free agents and there is no compulsion of any sort for them to report for work although they reside in the estates and enjoy all the benefits and facilities.

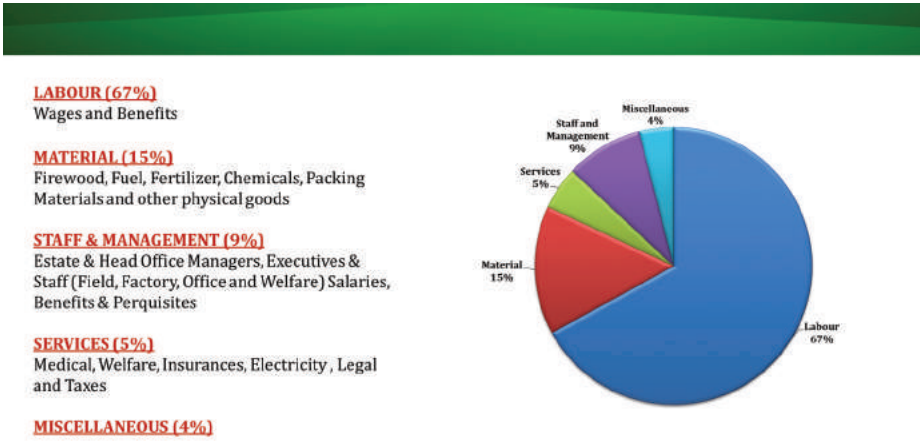
EPF/ETF, Gratuity, 20 days Paid Holidays

14 days Paid Sick Leave, Attendance Bonus, Profit Bonus, Profit Share, Maternity Benefits, 3 Months Paid Maternity Leave, Free Maternal & Child Care on estate itself, Allowances of Milk powder, Flour & Rice, Free issue of Medicines, Drugs, Vaccinations and Vitamins, Total Custodial Child Care on estate account from 0 – 5 years, All vaccinations from birth up to 5 years for children on estate itself with paid leave for mothers and Funeral aid, Maintenance of places of Worship , Elders Home for retirees etc.

Health, Sanitation, Housing, Water, Social Services, Welfare, Community & Support Services, Facilities and Amenities free of charge on estate account from birth to death,

61 Hospitals, 323 Dispensaries, 1474 Child Development Centres caring for 250,000 families with a total population of 1Mn in 453 estates in 14 districts.

BREAKDOWN OF COP - Rs./kg. MADE TEA – (2016)



LABOUR (67%)

Wages and Benefits

MATERIAL (15%) - Firewood, Fuel, Fertilizer, Chemicals, Packing Materials and other physical goods

STAFF & MANAGEMENT (9%) -Estate & Head Office Managers, Executives & Staff (Field, Factory, Office and Welfare) Salaries, Benefits & Perquisites

SERVICES (5%) -Medical, Welfare, Insurances, Electricity , Legal and Taxes

MISCELLANEOUS (4%) - RPC LABOUR WAGE INCREASE, WAGE INCREASE % – BASE YEAR 1990, SUB SECTOR DAILY WAGE (Rs/Day) – 2016, ESTATE (5%) Vs RURAL (77%) SECTOR WAGES (Rs/Month), RPC WAGES vs. COMPETING COUNTRIES (SL/Rs) – 2016, LABOUR COST- % OF REVENUE -2016

Revenue @ Kg of MT = Rs. 450/-

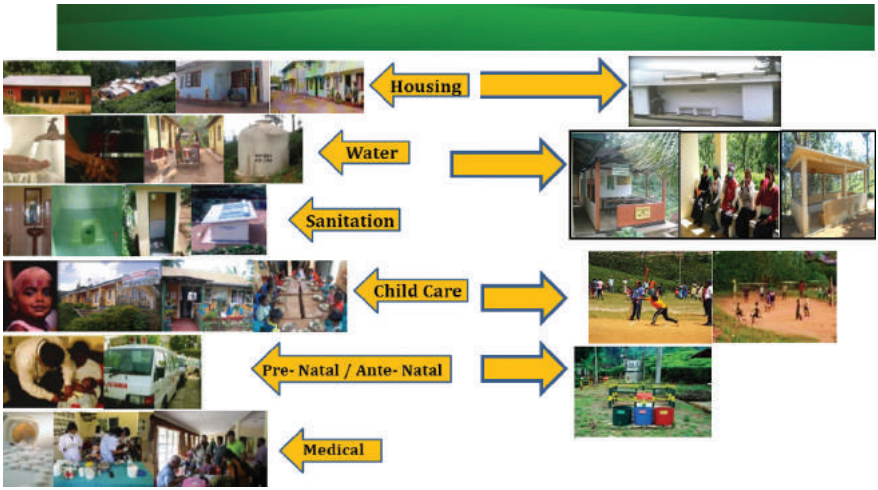
Labour Cost = 80% of Revenue

Labour Cost = 67% of COP

Labour Cost = Rs.355/- @Kg of MT

LABOUR WAGE Vs. HIGH GROWN GSA

CARES FOR A RESIDENT POPULATION OF 1 MILLION, BENEFITS TO RPC PLANTATION COMMUNITY



MATERNAL CARE

2.5 Kg. Healthy baby at birth, Mother to gain 750g – 01 Kg weight for every month in the last 5-6 months of her pregnancy.

Antenatal Registration, Paid leave for Antenatal Clinics, Worming, Vitamins, Triposha, Folic Acid , Iron Tablets, Tetanus Toxide Vaccine on estate account during working hours.

MOH & Government Midwife on Estate for Pre-Natal Clinics and paid leave given to workers to attend these clinics.

Mid-Wife visits homes. Transport to hospital for safe delivery.

Pre-pregnancy nutritional status (BMI), Maternal Anemia (Serum Hb), Gestational age estimation monitoring.

From BCG to D&T and Polio at 5 years- all vaccinations given on Estate itself.

CUSTODIAL CHILD CARE

Health care for children by qualified Child Development Officers in 1,544 Child Development Centres.

Nutrition, growth monitoring, age appropriate stimulation.

Pre-school education and psycho -social development.

Parental awareness, free feeding, free mid day meal, milk, school books and bags.

BENEFITS TO RPC PLANTATION COMMUNITY

NATIONAL HEALTH PROGRAMMES

Cancer Programmes, Eye and Dental Camps, TB Control, Rabies Control, Anemia, Mental & Child Health Programmes, Family Planning, National Nutrition Month, National Health Week, Mobile films shows on health.

ADOLESCENT GIRLS HEALTH & NUTRITION

Training and Awareness on Food Consumption, Habits, Safety, Malnutrition,

Personal Hygiene, Reproductive Health, Anemia, Infectious Diseases, Environmental Hygiene, Awareness of early marriage, Improvement of Self-esteem, Establishment of Youth Clubs, Empowerment of Women.

TRAINING AND SKILL DEVELOPMENT OF ESTATE HEALTH STAFF

Child Development Centre Staff, Family Welfare Officers, Midwives, Estate Medical Assistants and Registered Medical Practitioners.

AWARENESS PROGRAMMES ON SOCIAL CONCERNS

Combat Alcoholism, Tobacco and Drug Abuse, Community Participation, Awareness on Child abuse, Domestic Violence and Sexual Harassment.

OTHERS

Libraries , Barber Salons, Sewing Centres, Hot water bathing facilities, "E" KIOSKS, Mahila Shakthi Programmes, Maintain Base Hospital Wards, Insurance Policies for Housing Projects, Water Schemes & Water Committees, National Identity Card and Birth Certificate Documentation Facilitation.

1991- PRE VS POST PRIVATIZATION HEALTH INDICATORS

INFANT MORTALITY RATE-RPC'S

(PER 1,000 LIVE BIRTHS -1 ST YEAR OF LIFE) – (13) - 1987 – 53, 2015 – 5.82

NEO NATAL MORTALITY RATE- RPC'S

(PER 1,000 LIVE BIRTHS-1 ST 28 DAYS) – (na) – 1986 – 38, 2008- 3.2

STILL BIRTH RATE- RPC'S

(PER 1,000 LIVE BIRTHS-28 WEEKS) – (na) – 1986 – 65.2, 2015 – 8.9

PRENATAL MORTALITY-RPC'S

(PER 1,000 BIRTH- STILL BIRTH & 7 DAYS AFTER BIRTH) – (na) – 1987 -90.7, 2008 – 16.9

Available information also show that there is an overall improvement on other Key Health Indicators like CRUDE BIRTH RATE-RPC'S, INSTITUTIONAL DELIVERIES- RPC'S ('000), MATERNAL DEATH -RPC'S

(1 Mn. POPULATION-42 DAYS AFTER DELIVERY), MATERNAL MORTALITY RATE (MMR)-RPC'S

(PER 10,000 LIVE BIRTHS), LOW BIRTH WEIGHT-RPC'S

(2.1/2 kgs AT BIRTH)

WORKER HOUSING

At the privatization 1992 itself as a precondition, the RPCs absolved of any responsibility related to Worker Housing.

7 perches of land for core house given absolutely free by the RPCs.

Free Housing Grant up to Rs. 125,000/- (1997) + Technical, Material, Logistical and Managerial input and assistance from PHDT, RPCs, State and Non State Organizations, NGOs & INGOs.

Community Centers, roads, water supply and other social amenities provided free to Housing Schemes.

By 2014,- 28,000 New Houses & 110,000 Upgraded housing- 60% of workers live in upgraded houses.

VP TEA REPLANTING 1992-2014

Bearing Extent (Ha) as at 2014	69,739
VP Extent (Ha) as at 2014 - (53% VP)	36,766
Replanted Extent (Ha) during 1992 -2014	22,137
Immature Extent (Ha) as at 2014	2,438
Total Replanted Extent (Ha) from 1992-2014	24,575
% Replanted of the Existing VP Hectares	67%
Annual Rate of Replanting from 1992 of VP Extent	2.64

INVESTMENTS BY RPCs (1993-2012)

In 1990s State subsidy of Rs. 5 Bn per annum + debt of Rs. 7.7 Bn + loss of Rs. 1.5 Bn – NOW ZERO

Pre Privatization- US$ 275 Mn investment in Plantations (Rs.35 Bn in current terms)

NUWARA ELIYA DISTRICT – QUALITY OF LIFE

Income receivers per House Hold	1.9
Poverty Head Count (PHC)	6.6
Own account/family workers	28.1%
Employed persons below Poverty Line	4.6%
Dietary Energy Consumption – Kilo Calories	2,358
Maternal Mortality Ratio (per 10,000 live births)	1.9
Under weight children	25.5%
Housing units with 2 rooms	33.6%
Drinking water within premises	78.2%
Bathing water sufficiency	90.3%
Exclusive toilets for households	83.1%
No toilet facilities	0.3%
Telephones	83.1%
Radio	73.4%
TV	82.7%
Refrigerators	23.3%
Gas cookers	40.1%

MARKET AND VIABILTY

From 1992-1995 loss, 1996-2002 profit, 2003 to 2015 except for (2004,2007, 2012) 9 years, loss on account of low world prices, high internal costs related to unaffordable labour wages with very low productivity.

Tea price in 2016 (HG) @ Rs. 450/- per Kilo below COP of Rs. 530/- .

Labour wages was 71% of the High Grown GSA prior to privatization - 162% by 2016.

1991 Auction price USD 1.41 per Kilo, by 2016 USD 3.2 - 2.3 fold increase.

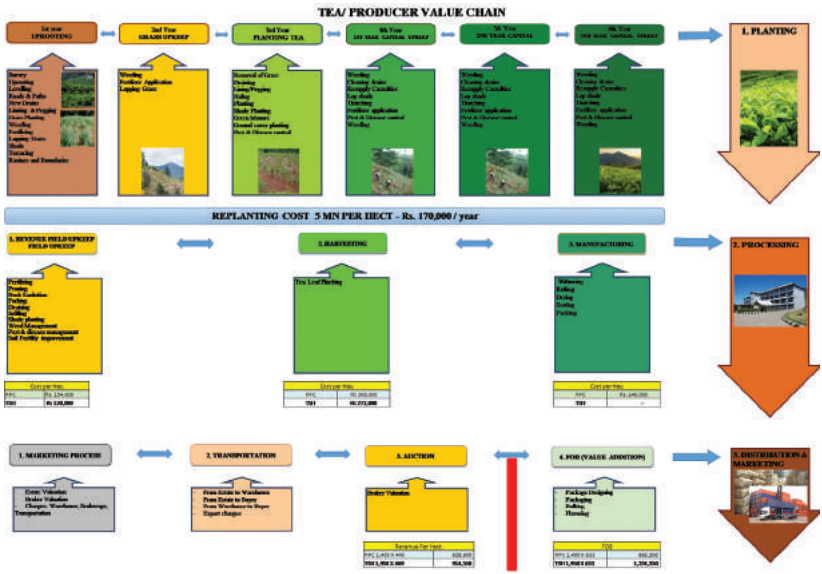
Labour wage from Rs. 48/-to Rs. 730/- by 2016 – 15 fold increase

Protect the "Producer Sustainability" by giving a higher share of the value .

Strengthen the marketing of the product and leverage on the advantages of Ceylon Tea.

Who makes the money? (Source: War on Want - UK)

Revenue Cost Viability



CHALLENGES

Climate change and the erratic/ extreme weather conditions

Political interference and impositions

Policy inconsistency – Fuel wood, Oil palm

Acquisition of productive agricultural land

Illogical decisions based on sentiment – weedicides

Short 'Lease Hold Tenure" and uncertainties/ambiguities related to it

Outmigration of skilled workers

Unsustainable Tea prices below Cost of Production

Loss of brand value and identity in global markets

Very high social cost borne by the companies for services & amenities

WAY FORWARD FOR THE INDUSTRY

Change the employment model – daily wage based to 'Revenue Share' model

Adaptation to mechanization – people, plant and processes

High yielding cultivars

Finalize Lease Hold Tenure

Capital infusion to strengthen the advisory, extension and research services

Low cost capital for developmental capital expenditure

Improve skills, knowledge and attitude of workers and household cash management

Improve housing stock in plantations

Diversification to optimize economic returns from the land

Improve field productivity and labour productivity, value addition

HOW DO WE GET THERE?

Mechanization of Field Operations and reduce the labour intensive nature of plantation operations.

Ability and the freedom to maximize economic value of the assets in a sustainable manner through diversification.

Separate politics from the economics of the industry.

Differentiate fact from fiction; based on empirical evidence and not on emotion and sentiment.

THE WAY FORWARD - REVENUE SHARING

Revenue Sharing" Model for the plantation workers to move away from employer dependent to self managed model.

150 year old traditional model - resident, daily wage based, employer dependent workers who still look up to the estate management to determine their income earning capacity and potential.

Change the management dependent, entitlement minded, welfare oriented, low factor productivity, daily wage based system for the sustainability of the plantation community.

Workers to be empowered with entrepreneurial skills in an environment where they will have a proprietary interest and an opportunity to maximize earnings to the limit of their effort and initiative.

Current thinking is to empower the growers and make them directly responsible for their capacity to earn while the management provides the suitable environment, technical and managerial inputs.

The willingness on the part of the workers to increase their productivity where they see an apparent direct gain to themselves have also contributed to the success.

The flexibility of their times of work has contributed to the increase in

productivity & ability to be an entrepreneur.

Revenue Sharing" Model has contributed to Increased earnings and giving dignity to the operators ,enhancing their job security and improving the overall Quality of Life

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A SUSTAINABLE FUTURE FOR OUR WORKERS

Productivity based rather than Attendance based wages.

Productivity/Revenue Share based earning model.

Gain sharing entrepreneurs instead of "Daily Wage" based worker.

Archaic daily wage based worker to commercial worker.

Autonomous "Social Business Enterprise" instead of paternalistic & management dependent culture

Empowered workers instead of dependent workers with an entitlement mindset.

SOME REGARD PLANTATIONS AS A PREDATORY TIGER TO BE SHOT, OTHERS LOOK ON IT AS A COW THEY CAN MILK TO EXHAUSTION, BUT THE REAL TRAGEDY IS THAT NOT ENOUGH PEOPLE SEE IT AS A HEALTHY AND A STURDY HORSE, PULLING A STRONG WAGON STEADILY ON.

PART - II

Annual Scientific Session Seminar

SLOAP AGM - 2016

LIVESTOCK PRODUCTION IN SRI LANKA



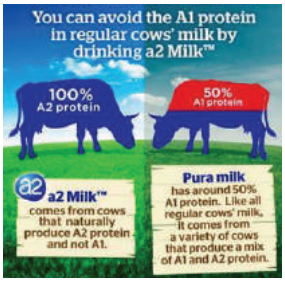
WAY FORWARD





I wonder which way is forward?





Sunil Gamage
Former Deputy Director – Veterinary Research
Livestock Specialist – JICA

Food Expenditure

- Annual Food bill – US $ 5 billion
- Our farmers produce – US $ 4 billion worth food
- Import US $ 1 billion worth food
- Substantial proportion - Milk & milk product imports

GROWTH – Livestock Sector Growth from 1970 to 2013

Product	Broiler	Egg	Milk	Pork	Beef	Mutton
Total growth	640%	469%	130%	48%	-22%	-48%
Annual growth	14.6%	10.7%	3.0%	1.1%	-0.5%	-1.1%
Food restriction	None	None	None	YES	YES	None

REF: DAPH, FAO and DCS

Annual compound growth (%) in value of output at constant prices, 1981–2010

Country	Crops	Livestock	Agriculture
Bangladesh	2.5	3.4	2.6
India	2.5	4.0	2.9
Nepal	3.7	2.4	3.3
Pakistan	2.9	4.9	3.8
Sri Lanka	0.5	1.6	0.7
South Asia	2.5	4.1	3.0
Developing	3.0	4.7	3.5
Developed	0.4	0.1	0.2
World	**2.5**	**4.1**	**3.0**

Source: FAOSTAT (2012).

THEME:

LIVESTOCK AS A CATALYST TO INCREASE GROWTH IN CROP FOOD PRODUCTION

WAY FORWARD

- MIXED FARMING – (Crop-Livestock)
- DRY ZONE – Over 60% of Livestock products
- MILK – All Ruminants - Supply - Demand
- YOUTH - Employment Generating businesses
- TECHNOLOGY – Pellet, Hydroponic fodder, Silage
- WOMEN (RURAL)–37.7% economically unemployed
- EXTENSION - Accountable

FAO Statement on MIXED FARMING

- Livestock are important to the livelihoods of rural women, men and children.
- They play a number of different roles, from

i. Income generation,

ii. Utilize idling labor,

iii. Utilize underutilized crop-residue,

iv. Utilize marginal land,

v. Enhancing resilience to drought

vi. The provision of inputs into a mixed farming systems (crop-Livestock) to

providing a buffer against environmental and economic shocks.

http://www.fao.org/docrep/012/i0680e/i0680e03.pdf

Question ?

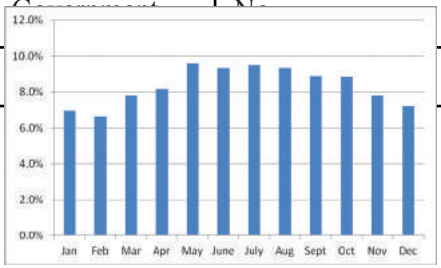
- Mixed farms (Crop-Livestock) system in Sri Lanka
  - In 1960s - 60% of all agricultural land holdings
  - In 2013 – 20% of all agricultural land holdings

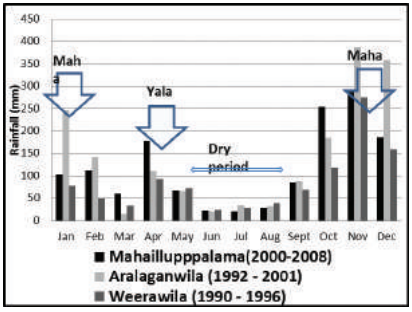
Commercial Poultry Production System

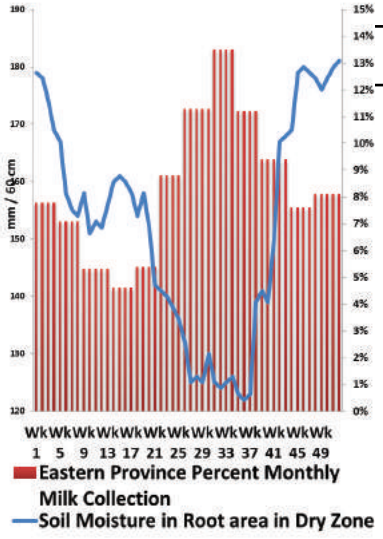
Organization	Customer of Poultry Producer	Purchase Price	Services
Government	No	No	No
Processors	Yes	Yes	Yes

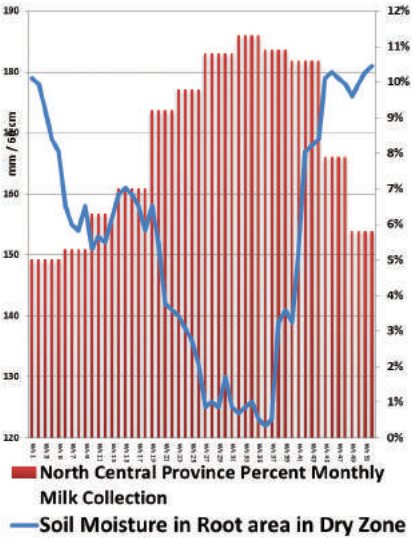
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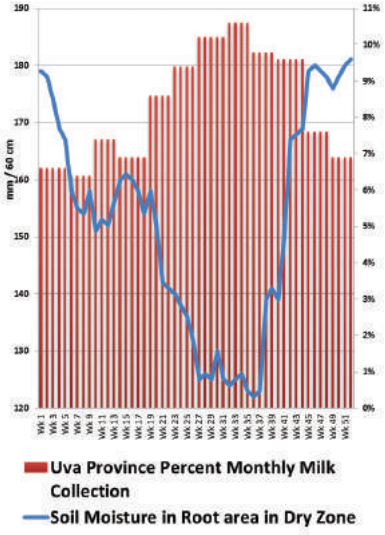
Organization	Customer of Milk Producer	Purchase Price	Services
Government	No	Yes	Yes

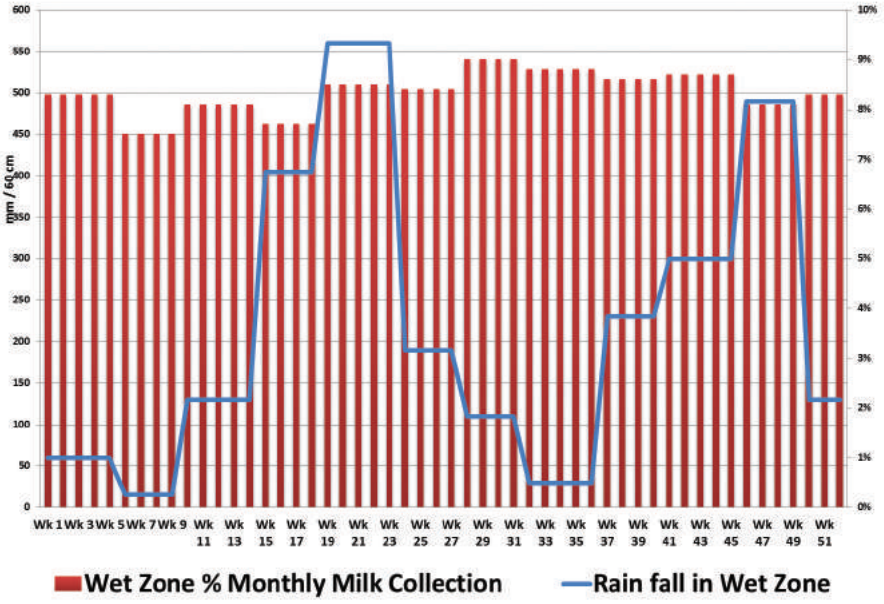







mm / 60 cm
North Central Province Percent Monthly Milk Collection
Soil Moisture in Root area in Dry Zone


mm / 60 cm
Uva Province Percent Monthly Milk Collection
Soil Moisture in Root area in Dry Zone


mm / 60 cm
Wet Zone % Monthly Milk Collection
Rain fall in Wet Zone

Estimated Milk Production loss due to seasonal variation

Province	Milk loss Liters/ year	Loss %
Central	3,240,782	8.9%
Eastern	13,704,604	37.5%
North Central	6,388,100	17.5%
North Western	4,453,724	12.2%
Sabaragamuwa	482,890	1.3%
Southern	1,354,125	3.7%
Uva	6,896,051	18.9%
National Loss	36,520,279	12.2%

Reasons for Underperformance 1

- Milk collection and production – lower in Dry Zone (DZ) cropping season, This is not so in Wet Zone
- Underperformance in the cropping period results in a loss of 36.5 million liters (12.2%) of milk.
    - Reproductive and physiological losses not included

Reasons for Underperformance 2

- DRY SEASON
    - Livestock are relocated during the cropping season in marginal lands with no water and is in mostly inaccessible locations
- WET SEASON
    - In the cropping season, there is too much grass and farmers lose in two ways.

- The grass become overgrown and poorer in nutritional quality, and
- They do not benefit from the re-growth than would have happened if it had been cut in regular intervals.

Reasons for Underperformance 3

- Crop farmers (Male dominated) give lower priority to livestock during cropping season.
- Relocated to marginal areas, which are overgrazed and neglected
- Crop cultivation limits the farmer's time for tending livestock and
- Prevent crop damage by livestock

Month	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**Jul**	**Aug**	**Sep**
Land	Maha - 100% cultivable land							Yala - 55% cultivable land				
Cultivation	Rice planting and growing				Rice harvest			Rice planting and growing			Rice harvest	
Cattle movement	Restricted grazing in Village	Migration to inaccessible / marginal lands						Village	Restricted grazing in uncultivated dry crop land			
Grazing area	Restricted grazing crop land	Stubble consumption in overgrazed pasture land					Grazing in uncultivated moist crop land		Grazing in uncultivated dry crop land and water shortage		**Restricted grazing crop land**	
Residue usage	Crop residue wasted	Grass and fodder residue wasted in crop cultivation area			Crop residue wasted			Crop residue available for consumption	Depleted amounts of crop residue available for consumption		Crop residue wasted	
Standard week	40-43	44-47	48-52	1-4	5-8	9-12	13-17	18-19	21	22-25	26-30	31-34	35-39

Reasons for Underperformance 4

- Milk collection is disrupted as these areas fall beyond the normal milk collecting routes
- Rice and crop cultivation are the main farming activities of almost all farmers rearing livestock
- Non-availability of adequate feed continuously / throughout the year for livestock
- Processing crop-residue

Annual Availability of Rice and Other Field Crop Residue

Rice straw	DZ paddy cultivation (ha)	DM per ha (m tons)	Crop residue for soil improvement (%)	Available for animal feed (m tons)	Total availability (m tons)
Maha	650,000	8.75	50%	4.38	2,843,750
Yala	325,000	8.75	35%	3.06	995,313
					3,839,063
OFC residue – Maize, cowpea, black gram, sweet potato and manioc					2,000,000
					5,839,063
		Availability Million M tons			5.839

Ref: JICA 2012

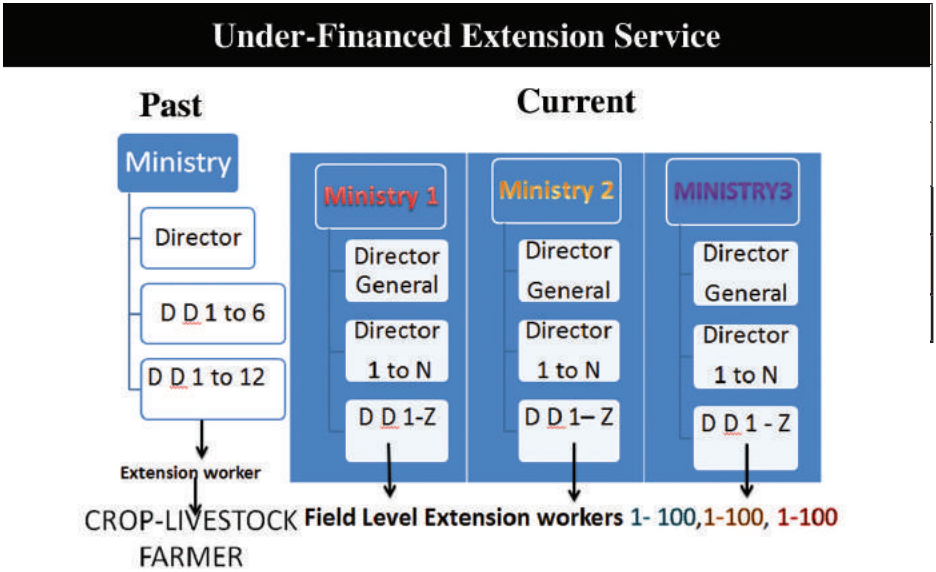
Demand for crop reside by milking cows in the Dry zone

Type	Number	Total Animal Units	Annual DM need for body maintenance (M.tons)
Cattle	928,070	832,278	1,831,012
Buffalo	218959	260,024	572,052
Goat	224,452	22,024	48,453
		1,114,326	2,751,517
Demand Million metric tons			2.752

Ref: JICA 2012

Land use – Dry Zone dry matter availability

	Category	Area Sq.Km	Hectares	Dry Matter (M tons)	Possible usage %	Availability DM (M tons)
1	Paddy	6,529	652,900	5,712,875	50%	3,839,063
2	Un-irrigated highland	3,250	325,000	325,000	40%	130,000
3	Villus	500	50,000	200,000	30%	60,000
4	Herbage from grazing land	1200	120,000	120,000	80%	96,000



Land use – Dry Zone dry matter availability

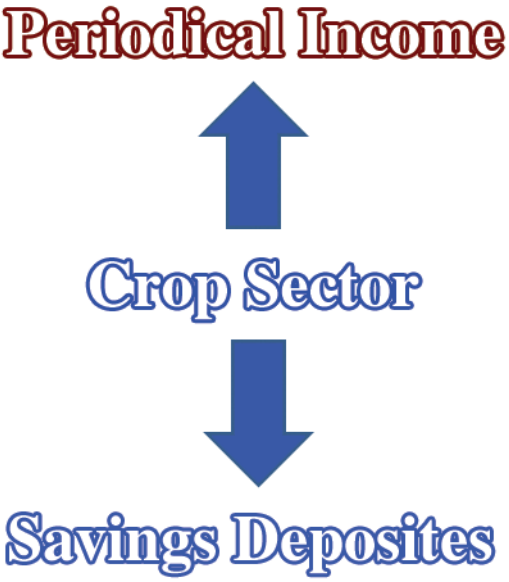
	1970 Number	2013 Number	Total Growth	Annual Growth
Buffalo	735,708	380,760	-48.2%	-1.12%
Cattle	1,593,306	1,169,040	-26.6%	-0.62%
Goat	556,362	331,150	-40.5%	-0.94%
Ruminants	**2,885,376**	**1,880,950**	**-34.8%**	**-0.81%**

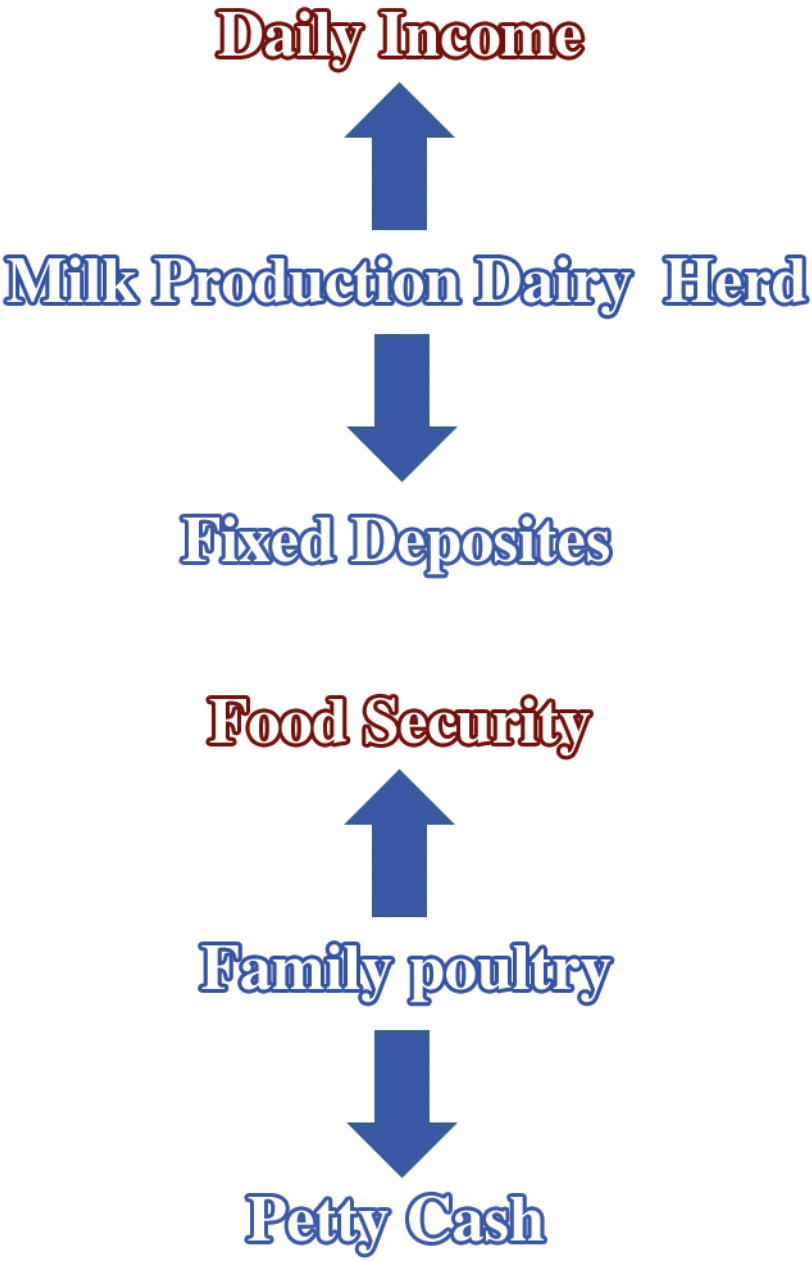
Reasons cited by experts in the livestock sector for this underperformance

- National policies (Public–Private Partnership)
- Lack of new technology
- Lack of genetically superior animals
- Small farm size
- Youth not interested
- But none talks about 37.7% rural women

Government policy on milk sector

- Milk Prices- GAME CHANGER FOR PRODUCERS
- To introduce the milk production trait into the local cattle population,
- Improve animal health service provision,
- R
- L
- D
- E

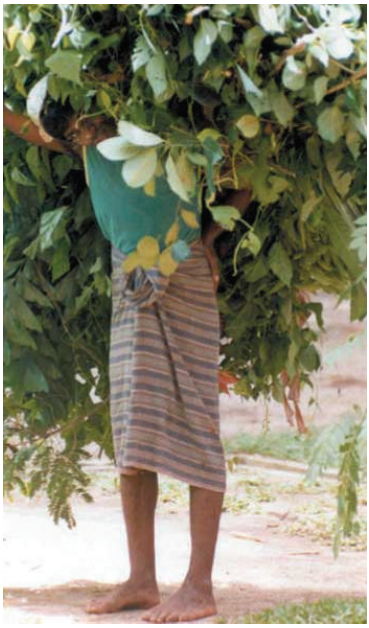



Daily Income
Milk Production Dairy Herd
Fixed Deposites
Food Security
Family poultry
Petty Cash

Assest Builder

Goat Sector

Current Account



Dry zone farmers' ability to produce milk with fewer inputs

Supplies 64 % of milk and 60% of ruminant meat – National production



Dry zone produces all this milk and meat by consuming



Poor quality grass,

Browsing vegetation, and

Nonfood biomass – crop residue

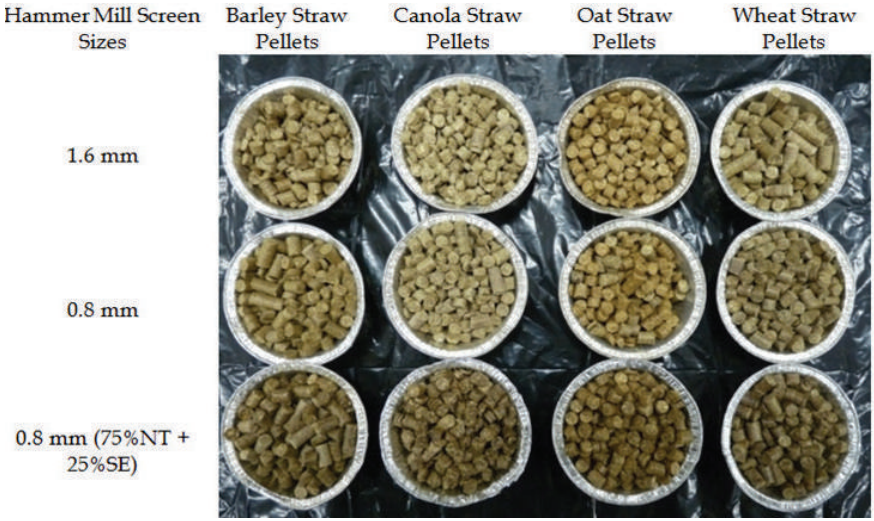
Increases efficiency of land & water

Cattle 42% crossbred,

Buffalo 88% crossbred

Mercedes Benz running on Kerosene oil

Pellets - WF 6



- This form will increase the shelf life of crop residue and increase the nutritive levels
- Livestock will receive sufficient amount of feed throughout the year
- Smallholder farm having less than 3 cows in a two hectare land can keep 20 to 50 cows
- Land fragmentation will have no effect on the dairy sector as it is with the poultry sector

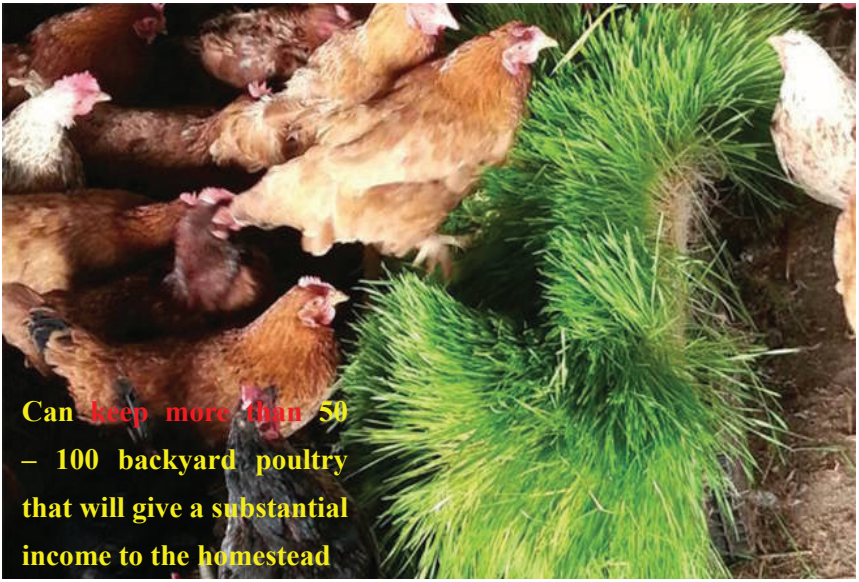




HYDROPONIC FODDER PRODUCTION- WAY FORWARD 7 –









CAN PROVIDE STALL FED SUFFICIENT FEED DURING THE CULTIVATION TIME – Business for youth



Can compensate for the loss of grazing and pasture land and arrest the negative growth and increase supply of mutton and milk reduce the dependency on broiler meat





This could support the disposal of vegetable and fruit refuse (500 m.tons) from the Dedicated Economic Center – Dambulla, and utilize this refuse too for a productive activity.




This introduction will have the similar impact of developing formulated rations for poultry in the early 1960's with the establishment of the Oils and Fat

INDUSTRY	ITEM	SUB-ITEM	MAIN RESPONSIBILITY	Accountability
Industrial Poultry sector OLIGOPOLY	Health	Bio-security	Vertical Integration Enterprise	DAPH
		Health Monitoring	DAPH	Vertical Integration Enterprise
	Management	Layers	Vertical Integration Enterprise	DAPH
		Broilers	Vertical Integration Enterprise	DAPH
		Plant Management	Vertical Integration Enterprise	
	Planning	Layers	Vertical Integration Enterprise	DAPH
		Broilers	Vertical Integration Enterprise	DAPH
		Plant Management	Vertical Integration Enterprise	DAPH
	Litter Management	odour management	Vertical Integration Enterprise	Relevant authorities
		Litter removal	Vertical Integration Enterprise	Relavant authorities
	Inputs	Feed, drugs other	Vertical Integration Enterprise	Relavant authorities
		Equipment	Vertical Integration Enterprise	Relavant authorities
	Pollution	Water	Vertical Integration Enterprise	Relavant authorities
		Soil	Vertical Integration Enterprise	Relavant authorities
	Data	Input - Production	Vertical Integration Enterprise	DAPH
		General	Vertical Integration Enterprise	DC&S
	Marketing	Planning	Vertical Integration Enterprise	GOSL
		Retail	Retail outlets	Other authorities

INDUSTRY	ITEM	SUB-ITEM	MAIN RESPONSIBILITY	Accountability
Family Poultry Sector FOOD SECURITY	Health	Bio-security	Farmer	DAPH
		Health Monitoring	DAPH	Farmer
	Sustainance	Stocks	DAPH	Societies
		Extension	DAPH	Farmer Societies
	Conservation	Indegenous bird	DAPH	Farmer Societies
		Indigenous Knowledge	DAPH	Farmer Societies
	Data	System	DAPH	DC&S
		Conservation	DAPH	VRI
	Marketing	Planning	Provincial DAPH	DAPH
		Retail	Farmer societies	Retailers

INDUSTRY	ITEM	SUB-ITEM	MAIN RESPONSIBILITY	Accountability
Ruminant Milk Production	Production Management	Replacement	Clients	DAPH
		Housing	Clients	DAPH
		Herd Management	Clients	DAPH
		Monitoring	DAPH	
		Training	Clients	DAPH
	Milk	Collection	Clients	DAPH
		Cold chain	Clients	DAPH
		Proceesing	Clients	Chamber of commerce
	By Products	Meat	Meat Processors - Client	DAPH - etc
		Skins	Leather industry	Other authorities
		Effluent system	Clients	Farmer
	Inputs	Feed, drugs other	Clients	DAPH
		Equipment	Clients	DAPH
	Data	System	DAPH	DC&S
		Conservation	DAPH	VRI
	Planning	Sytem	Government - DAPH-MILCO	Clients - Chamber of Commerce
		Management	Clients	DAPH

INDUSTRY	ITEM	SUB-ITEM	MAIN RESPONSIBILITY	Accountability
Ruminant Meat Production	Collection	Clients	Collectors	DAPH - Other authorities
		Collectors	DAPH	Other authorities
	Slaughter and processing	Dedicated slaughter plant	Clients	Other authorities

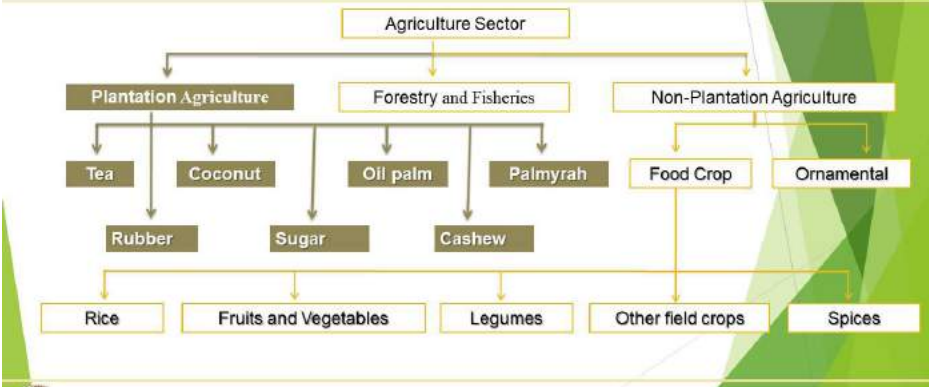
INDUSTRY	ITEM	SUB-ITEM	MAIN RESPONSIBILITY	Accountability
SWINE SECTOR	Production Management	Replacement	Clients	DAPH
		Housing	Clients	DAPH
		Herd Management	Clients	DAPH
		Monitoring	DAPH	
		Training	Clients	DAPH
	Collection	Clients	Collectors	DAPH - Other authorities
		Collectors	DAPH	Other authorities
	Slaughter and processing	Dedicated slaughter plant	Clients	Other authorities

Thank you for your attention

Present Status and Challenges for Future Development of the Plantation Sector

I Sarath B Abeysinghe
Director
Tea Research Institute of Sri Lanka

Agriculture Sector in Sri Lanka



Plantation Agriculture

- Plantation agriculture - Established over 250 years ago by the Dutch with cinnamon.
- This changed to coffee in the late 1820s, by the British.
- Until 1869 the main crop produced in Sri Lanka was coffee (90,000acres).
- With the disease coffee rust, the coffee industry came to a dramatic halt and by 1880 it collapsed
- Coffee estates were diversified into other crops - initially cinchona and followed by tea

Land Utilization for Agriculture

- Total Land Extent in Sri Lanka :6,270,500 ha
- Agricultural Land :2,417,471 ha
- (37.5% of land area)

Crop	Extent (ha)	% of total agricultural land
Paddy	1,088,374	45.02
Vegetables	139,788	5.78
Fruits	105,566	4.37
Spices	111,095	4.60
Other field crops	94,005	3.89
Plantation crops	878,643	36.35

Land Utilization - Plantation Crops

Crop	Extent (ha)	% of total land under Plantation crop
Tea	203,000	23
Rubber	135,000	15
Coconut	455,000	52
Sugar cane	12,325	1
Other plantation crops	73,318	8
Total	878,643	100

Source: Central Bank of Sri Lanka & Plamyrah Development Board

Sri Lankan Economy

GDP of Major Economic Activities

Sector	Value (Rs.mn)	% of GDP
Agriculture	676.899	7.85
Industry	2,259,223	26.20
Services	4,881,273	56.61
Taxes less subsidies on products	805,431	9.34
GDP	8,622,825	100.00

Source: Central Bank of Sri Lanka

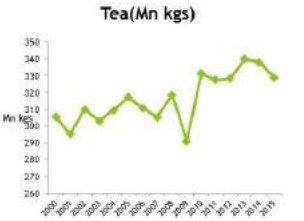
Sri Lankan Economy

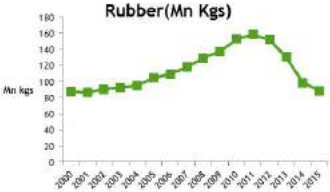
Contribution to Agriculture Sector

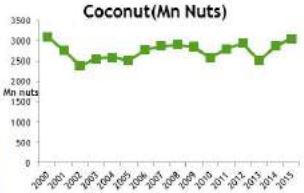
Sector	Export Earnings (Rs. mn)	As a % of Agric. Export Earning	As a % of Total Export Earning	As a % of GDP
Tea	182054	59.41	12.77	0.8
Rubber	3548	1.16	0.25	0.3
Coconut	47745	15.58	3.35	0.8
Total	233347	76.15	16.37	1.9

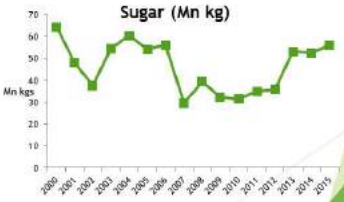
Source: Central Bank of Sri Lanka

Changes in production



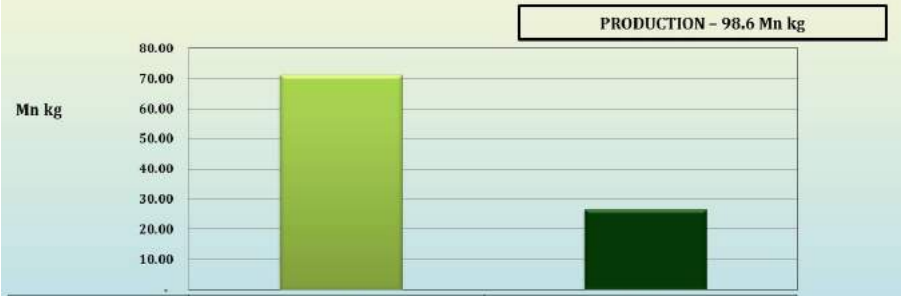






Source: Statistical Information on Plantation Crops, MPI

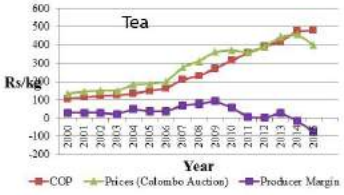
RUBBER PRODUCTION

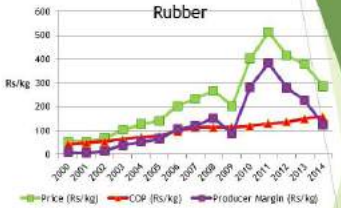


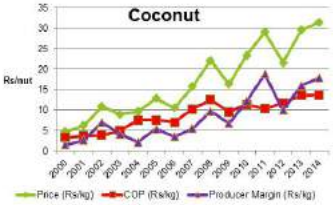
	RSH	RPC
Production (Mn Kg)	71.2	26.5
%	80%	20%

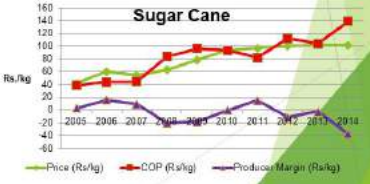
Ministry of Plantations Industries-2014

Changes in tea prices, COP & Producer margin

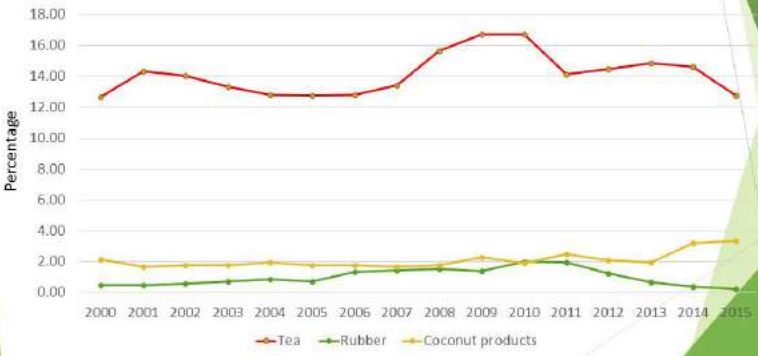




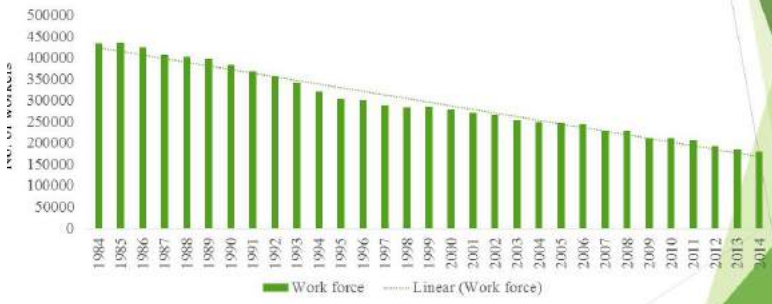




Changes of contribution to export earnings (as a % of total export earnings)

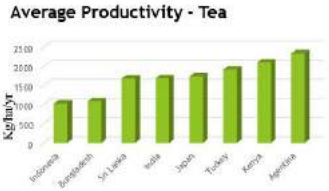


Workforce in Plantation Sector (1984-2014)

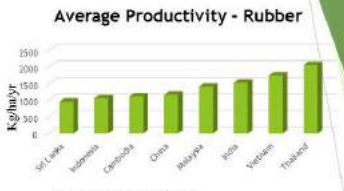


Source: Statistical Information on Plantation Crops, MPI

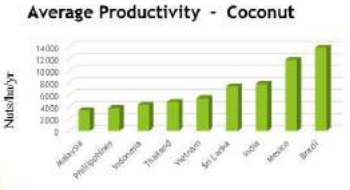
Productivity Comparison



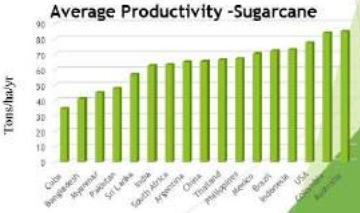
Source: International Tea Committee,



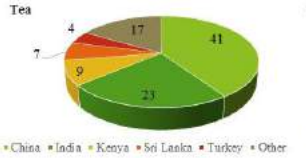
Source: ANRPC Estimate



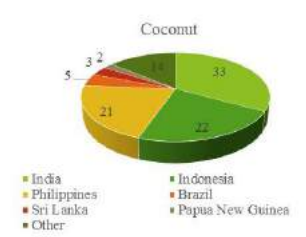
Source: Coconut Statistical year book, APCC,

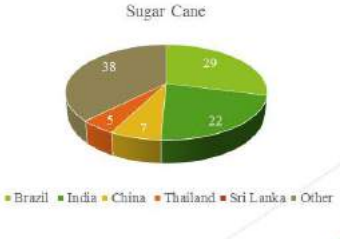


Production Comparison









Tea sector challenges

- Ageing of tea and expansion of degraded tea lands due to inferior replanting rate
- Increasing COP which cannot negate with the existing NSA
- Heavy cost component on worker - wage hikes and social costs
- Ever increasing input costs such as for agro-chemicals, machinery, fuel and processing items
- Mandatory certifications for production and processing to satisfy International food, environment and worker safety requirements

Tea sector challenges

- Food safety and hygiene protocols specific to tea subsequent to transfer of tea from a commodity to a beverage
- Penetration of tea into new markets and maintain / retain market shares
- Changing climate and experiencing of unusual weather conditions in different planting regions
- Scarcity of labour
- R and D Investment

Potential of Agro-product for Value Addition

Tea (Rs/kg)				
	Green leaves	Bulk tea	Packeted tea	Theanine
	55 - 65	350 - 400	415 – 744	4500 (100 tablets)

Rubber Sector Challenges

- 1. Remaining in the commodity market
- 2 Longer immature period and costly inputs
- 3. Low Productivity and High COP
- 3. Unskilled workforce
- 4 . Aging workforce
- 5. Lack of soil conservation practices a

Coconut Sector - Challenges

- **Low yield/ha:** The potential yield of the recommended hybrid varieties of coconut under optimal conditions varies from 20,000 – 24,000 nuts /ha, and average nuts/palm is around125. The average yield is around 6,000-6,250 nuts/ha and 40-60 nuts/palm.
- **Inadequate supply of high quality seed-**Currently CRI produce only 25% of the national seed requirement.
- **Low land productivity under coconut -**the adoption rate of farming systems has been less due to lack of interest for intercropping and animal rearing etc,
- **High cost of production**- The current COP varies between Rs.11-17/nut
- **Land fragmentation-**. The loss of land in each year varies and 7% of the coconut land has declined from 1982 - 2002.

Coconut Sector - Challenges

- Extreme weather events due to climate change effects
- Scarcity of skilled labour
- Inadequate quality control and assurance system
- Poor access to markets and market intelligence

Sugarcane Sector - Challenges

Sugarcane yields have been low; average about 56 t/ha, due to unavailability of water, not planting recommended varieties, poor crop establishment and management practices

Low sugar recovery rates (8.2%) due to poor quality of cane and low level of processing efficiencies

High COP due to Mill capacities have been hardly fully utilised due to insufficient cane supplies and regular disruptions to mill operations

The total area under cane in the country has been dwindling up to about 2009 due to diversion to other crops such as rubber, coconut, paddy, banana, pepper, etc.

Scarcity of labour has also become a serious problem

Sugarcane cultivators do not receive any assistance provided to other food crop sectors by the government such as free water, cultivation subsidies, etc.

Sugarcane sector - challenges

- Product diversification of the Sri Lankan sugar industry has been minimal.
- Cane price has not been linked to sugar price
- High volatility of the world sugar price sugar producer is adversely affected during price depressions

History
Sri Lankan Tea Industry

- The tea plant was introduced to Sri Lanka by the British from China in 1824
- In 1939 seeds from Assam tea plants arrived in Sri Lanka - from the botanical gardens in Calcutta, India
- *These early arrivals were ignored for the more lucrative coffee*



Sri Lankan Tea Industry

First Commercial Tea Plantation (19 acres) was established in 1867 at Loolecondera Estate by James Taylor



Tea expanded steadily from the 1880s with the demise of the coffee industry.



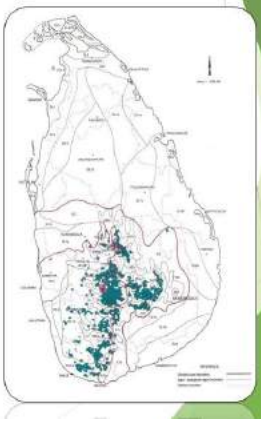
Tea Growing Regions in Sri Lanka

- Tea plantations are distributed among
  - ▶ 23 Agro Ecological Regions





- ❖ High Grown (Above 1220 m)
- ❖ Medium Grown (610-1220 m)
- ❖ Low Grown (Below 610m)



History

Sri Lankan Rubber Industry

- **First Rubber Plantation in Sri Lanka introduced in 1876 at Henarathgoda Botanic Garden Gampaha in Sri Lanka.**
- In 1895, Henry Ridley from the Singapore Botanical Garden was able to convince two coffee growers to test plant in two acres of rubber.
- By 1905 more than 300,000 hectares of rubber was growing in Ceylon and Malaysia.
- Rubber cultivation which was introduced by British colonial rulers to the island spread majorly in wet zone Sabaragamuwa, Southern and Western Provinces
- Today, Sri Lanka has an area of over 122,000 hectares of rubber plantation and produces 129,000 metric tons of latex annually.

Rubber Growing Regions in Sri Lanka

History

Sri Lankan Coconut Industry

- The Coconut (Cocos Nucifera Linn) is regarded to be of ancient origin and cultivated by people of Ceylon for its various uses.
- Earliest records show that reference to coconuts in Ceylon was made by Megasthenes Ambassador of Seleucus Nicator to the Indian King Chandragupta about the year **300 B.C.**
- The coconut was established in Ceylon by the dispersal and dissemination from the original home of Coeds Nucifera Linn either by the hand of man or by nature.
- Systematic cultivation of coconuts in recent times began in **1841 when Jaffna and** Batticaloa, were opened out in coconuts at a great cost.
- Europeans opened out plantations in Chilaw, Puttalam and Kalpitiya area and from i860 onwards cultivation spread inland in the Western and North-Western Provinces. In the South alone 5,000 acres were estimated to be under coconuts. In early twentieth century coconuts were also planted in the Sabaragamuwa'and the Central Provinces.

Coconut Growing Regions in Sri Lanka

History

Sri Lankan Sugarcane Industry

- Sugar industry in Sri Lanka dates back to more than millennia
- Development of this industry was started during the Dutch rule with the importation of sugarcane from South India, Mauritius, Indonesia, Malaysia, etc., and planting them on the plains of Deduru oya, Kelani ganga, Kalu ganga, Gin ganaga, and Nilwala ganaga in the Western and North-western provinces for the production of jaggery and sugar at cottage level.
- During the British rule with the further expansion of sugarcane cultivation on the plains of Nilwala, Kalu and Gin ganga and the establishment of two large sugar factories in 1890
- During the 1950s, sugarcane cultivation and jaggery manufacture was carried out in Haldummulla and Koslanda areas and further expanded to Passara, Wiyaluwa and Badalkumbura areas

History
Sri Lankan Sugarcane Industry

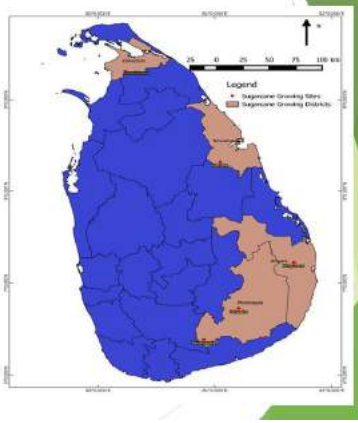
- Sugar development as a government venture was started in 1956
- The establishment of the Sri Lanka Sugar Corporation (SLSC) under the State Corporations Act No. 47 of 1957 to undertake sugar development in the country.
- Two government-owned mills with the crushing capacity of 2,000 TCD (tonnes of cane per day) and 1,200 TCD were established by SLSC in 1960 and 1961 at Hingurana and Kantale respectively, both in the Eastern province.
- In the early 1980s, the SLSC-managed sugarcane plantations were alienated to farmers, introducing a small-holder settler/allottee system
- In 1986, the sugar industry was expanded with the establishment of two more sugar processing complexes; one at Pelwatte
- In 1989, under the privatisation program, restructuring of the state-owned SLSC was started, converting it into a public company (Sri Lanka Sugar Company Ltd.) and then into a holding company in 1991.

History
Sri Lankan Sugarcane Industry

- In January 1997, the Kantale and Hingurana sugar companies were re-acquired by government
- In 2001, the Sevanagala and Pelwatte sugar mills were fully privatised
- In 2005, Gal Oya Plantations (Pvt) Ltd. was established with 51% shares for the government and the remaining 49% shares for the private sector to start operation of the Hingurana.
- It started development of plantations in 2006, bringing back the lands cultivated with paddy to sugarcane
- In 2011, Pelwatte and Sevanagala sugar industries were vested in the government under the Act No 43 of 2011 on underutilised assets. In 2012, the government-owned Lanka Sugar Company (Private) Ltd. was formed, and it presently runs the sugar industries at Sevanagala and Pelwatte
- In 2015, the Kantale Sugar Industries Ltd. which has been non-functioning since 1992, was handed over to MG Sugars Lanka (Pvt) Ltd. as a joint venture of the government and private sector

Sugar Cane Growing Regions in Sri Lanka

Sugarcane lands in Sri Lanka are mainly located in agro-climatologically dry and intermediate zones; Moneragala and Badulla districts in Uva Province and Ampara and Trincomalee in Eastern Province



Changes in tea prices, COP & Producer margin

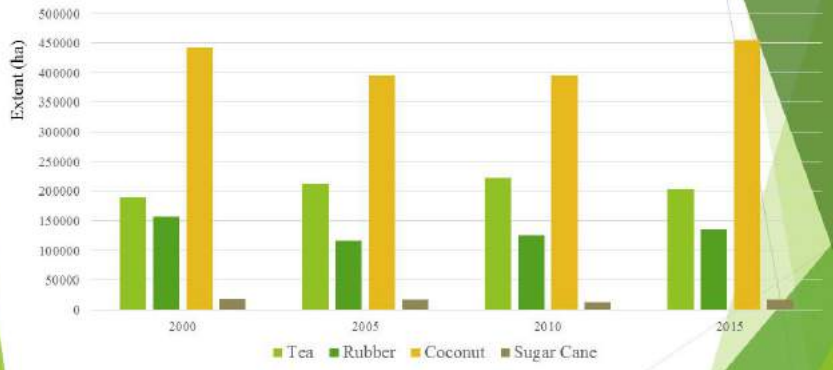


Rubber

Coconut

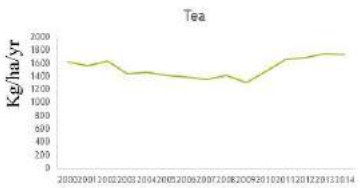
Sugar Cane

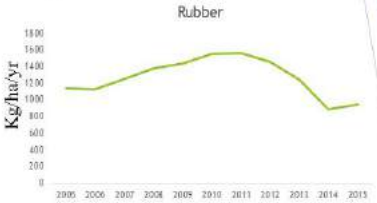
Changes in land extent

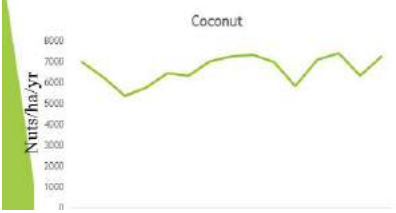


Source: Statistical Information on Plantation Crops, MPI

Changes in productivity

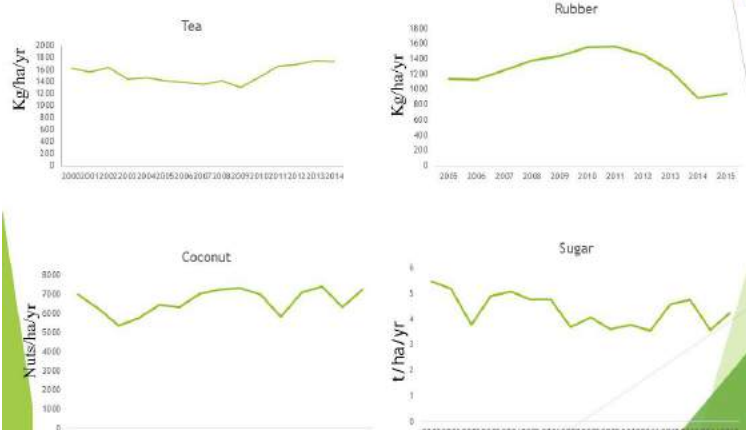








Changes in productivity



Major Constraints in Sugarcane Production

- **Lack of irrigation water**
- **Non--availability of certified seed cane of the improved varieties recommended by SRI.**
- **Spread of pests and diseases** (white leaf disease and smut disease and sugarcane woolly aphid)
- **High cost** -cost of cultivation per hectare under rain-fed is about Rs 165,000 and that under irrigation is about Rs 230,000.
- **Low level of income** - Average income from sugarcane is about Rs 150,000/ha/year under irrigation and Rs 105,000/ha/year under rain-fed
- **Low level of adoption ofrecommended varieties and crop management practices**

Major Constraints in Sugarcane Production

- **Shortage of labour**-especially for harvesting and loading of sugarcane, labour charges for harvesting and loading of cane have increased as much as Rs 1000-1500 per tonne
- **Lack of finances and high interest rates on loans**
- **Competition from high-value crops**
- **Absence of quality-based sugarcane payment system**
- **Weaknesses in sugar companies**

Opportunities in Tea Sector

- Importance of tea in the national economy
- Employment Potentials-Plucking, Leaf Collection, Leaf transport,
- Rural and township development, Indirect employment opportunities
- Potential of Tea product for Value Addition-Development of value added industry – increase value addition from 35% to 65%

a. Tea & health and high value product development

- (e.g. anti oxidants, theamine)

a. Other beverages from tea

Employment opportunities

- Tea sector -1.5 million
- Total employment generated in the rubber industry -33, 095
- The coconut sector contributes to the employment of 135,000 people and provides livelihoods for about 700,000 people.

Opportunities in Rubber Sector

Opportunities in Coconut Sector

Opportunities in sugar cane sector

- **Increasing demand-** At the current level of consumption, demand for sugar will increase to about 730,000 tonnes by the year 2020 and about 800,000 by the year 2030.
- **Increase of fossil oil prices-** the demand for alcohol as a source of energy will increase
- **Adverse impact of the balance of payments:** Total consumption requirement is on increasing trend and the world price sugar will not reduce significantly. As such, the cost of the importation of sugar will continue to increase
- **Possibility of diverse value-added products-** alcohol, electricity, animal feed, particle boards, fertiliser, etc
- **Suitability for diversification of small-scale agro industries in rural areas:** In addition to large-scale production of sugar and alcohol, small-scale cottage industries such as jaggery, syrup, vinegar, animal feed, mushroom, etc. can be produced from sugarcane/sugarcane by-products,
- **Contribution to poverty alleviation**
- **Feasibility of financing through carbon trading**

Potential of Agro-product for Value Addition

Tea (Rs/kg)				
	Green leaves	Bulk tea	Packeted tea	Theamine
	55 - 65	350 - 400	415 – 744	4500 (100 tablets)

Future of Tea Industry depends on production of high value added products (anti oxidants, Theamine)

Sustainability of the Industry

- Depends on
  - Productivity enhancement
  - Replanting
  - Safe & healthy tea production

Sustainability of the Industry Depends on Diversification Opportunities

- Dairy
- Horticulture
- Ornamental agriculture
- Hydro power
- Dendro-power
- Ecotourism
- Development of ancillary industries
- Mechanization opportunities

Meet UN Conventions on Global Requirements

- Proved as 'Ozone' friendly
- Is in par with 'Carbon friendly' measures
- Provides 'Climate Change Mitigation friendly' practices
- Qualifies as a 'POP Chemical Use Free System'
- Satisfies "Millennium Development Goals'

Export Agricultural Crop Sector : Present status and future challenges

Dr. A.P.Heenkende
Additional Director General (Research)
Department of Export Agriculture
Peradeniya

Export Agriculture Crops

Perennial spices
- Cinnamon
- Pepper
- Clove
- Nutmeg
- Cardamom

Annual Spices
- Ginger
- Turmeric

Stimulants
- Betel
- Areca nut

Beverages
- Coffee
- Cocoa
- Vanilla

Oil crops
- Citronella
- Lemon Grass

Priority crops

- Group - I
  - Pepper
  - Cinnamon
- Group - II
  - Arabica Coffee
  - Cloves
  - Nutmeg
  - Cocoa
- Group - III
  - Ginger
  - Arecanut
  - Betel
- Low priority crops
  - Turmeric
  - Citronella
  - Lemon grass
  - Other EACs

Present situation (in 2015)

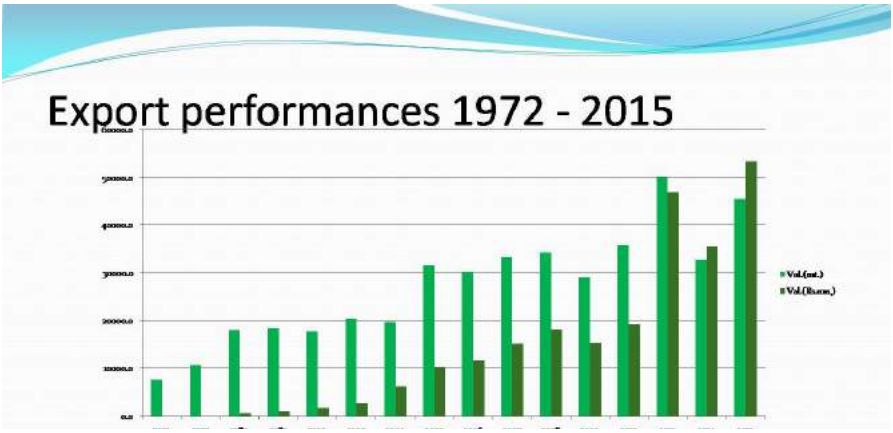
- Estimated Export Agricultural Crop (EAC) extent - 111,095 ha
- Export volume - 71,588 Mt
- Export earnings - 61,558 Rs. Mn.
- Contribution to export earnings of agriculture - 12.2%
- Contribution to GDP - 0.3%
- Number of families involved - 9.0 Mn.

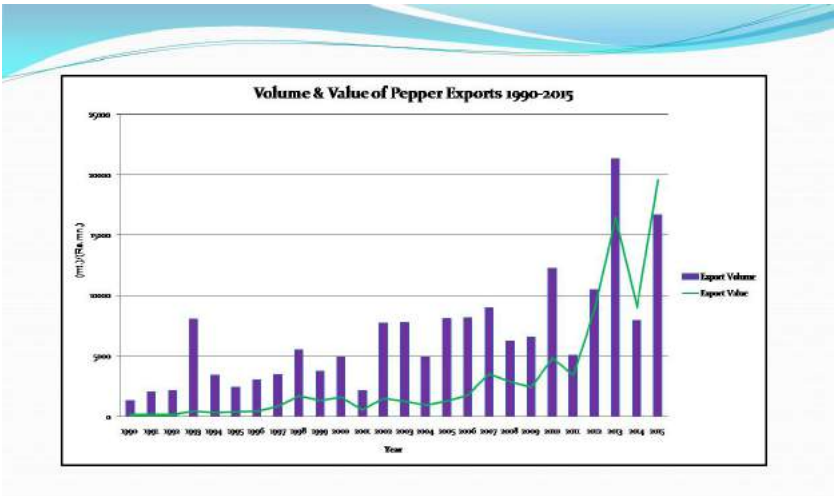
Agricultural sector export earnings in 2015 (percentage)

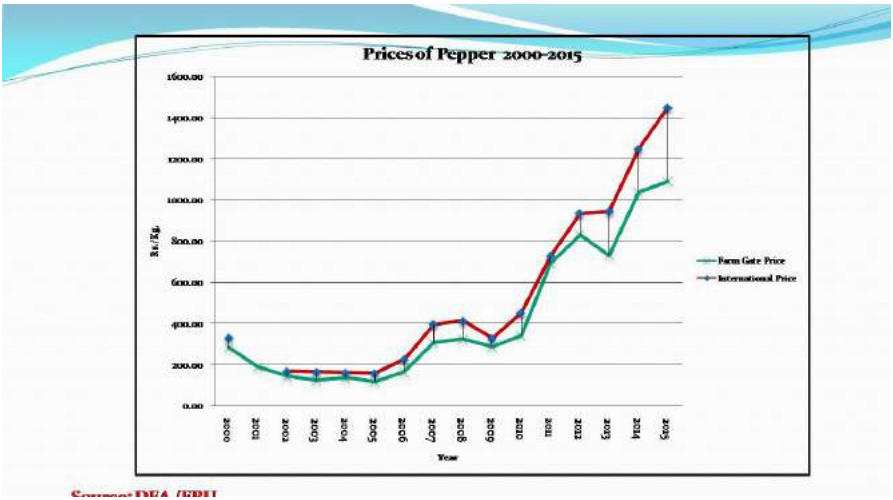
Crop	Export earnings (%)	Rank
Tea	51.1	1
Coconut	15.1	2
Pepper	6.4	3
Cinnamon	6.0	4
Clove	2.0	5
Nutmeg	1.4	6

Average export volume (Mt), value (Rs. Mn.) and average price of one Mt. (Rs. Mn.) of selected spice crops for a 5-year-period from 2011-2015

Crop	Volume (Mt.)	Value (Rs. Mn.)	Average price of one Mt (Rs. Mn.)
Cinnamon	13,788.03	16,470.58	2.19
Pepper	12,291.95	11,469.03	1.01
Clove	3,076.28	3,985.22	1.30
Nutmeg	1,601.39	1,900.00	1.19
Cardamom	30.84	61.05	1.99
Vanilla	0.34	5.76	16.94


Export performances 1972 - 2015
Vol.(mt.)
Vol.(Rs.cro.)


Volume & Value of Pepper Exports 1990-2015
Export Volume
Export Value
Year



Source: DEA /EPPI

Expected outcome by 2020

	2015		2020
Total extent (ha)	111,095	→	118,735
Total production (Mt)	125,000	→	170,000
Export volume (Mt.)	71,588	→	80,000
Export earnings (Rs. Mn.)	61,558	→	145,000

Projected Export Volume – Mt.

Crop / Year	2015	2016	2017	2018	2019	2020
Cinnamon	14,000	15,000	16,000	17,500	20,000	25,000
Pepper	18,000	23,000	26,000	30,000	34,000	38,000
Clove	4,500	4,800	5,100	5,400	5,700	6,000
Nutmeg	1,800	2,100	2,300	2,700	3,100	3,500
Cocoa	250	400	550	700	850	1,000
Coffee	60	190	450	840	1,360	2,010
Arecanut	2,750	3,000	3,500	4,250	6,000	7,000
Betel	3,000	3,100	3,300	3,600	4,000	6,000
Other EACs	25	30	35	40	45	50
Turmeric	70	80	100	125	155	200
Ginger	80	140	200	270	340	410
Total	44,535	51,840	57,535	65,425	75,550	89,170

Projected Export Earnings – US $ mn.

Crop / Year	2015	2016	2017	2018	2019	2020
Arecanut	3.50	4.50	6.00	8.00	11.00	15.00
Betel	10.00	11.00	12.00	13.00	14.00	15.00
Cinnamon	135.00	150.00	170.00	200.00	250.00	305.00
Clove	43.00	50.00	60.00	75.00	95.00	120.00
Cocoa	1.20	1.30	1.40	1.60	1.80	2.00
Coffee	0.40	0.70	1.00	1.30	1.60	2.00
Ginger	0.40	1.20	2.00	2.90	3.80	5.00
Nutmeg	24.00	26.00	30.00	35.00	45.00	60.00
Pepper	170.00	190.00	230.00	300.00	375.00	475.00
Turmeric	0.50	0.60	0.70	0.80	0.90	1.00
Total	388.00	435.30	513.10	637.60	798.10	1000.00

Widening of scope under the Ministry of Primary Industries since August 2015

- Wider geographical coverage including non-traditional districts like Ampara, Anuradhapura, Polonnaruwa, Puttalam and Vavunia distircts
- Cultivation of crops having high export potential other than conventional 15 crops
- Major emphasis was given to processing, value addition and marketing
- Critical points of the value chain of EAC were identified and suggestions made to further improvement
- Foreign exchange earning projects have been identified and are to be implemented under the world bank assisted agricultural modernization project

Widening of scope under the Ministry of Primary Industries since August 2015 cont...

- **Expansion of conventional crops for a five-year-period**
  - Increase of cinnamon crop by 25,000 ac in plantation sector
  - Increase of Arabica coffee by 1,000 ac in upcountry tea plantations
  - Introduction of vanilla crop by 500,000 cuttings in homegardens
  - Planting of 5,000,000 arecanut seedlings along water resources and homegardens
  - Introduction of 750 ac of budded nutmeg and 750 ac of budded garcinea as intercrops in wet zone coconut plantations

Widening of scope under the Ministry of Primary Industries since August 2015 cont...

- **Expansion of conventional crops for a five-year-period cont...**
  - Introduction of 100 ac of citronella as an intercrop in Puttalam district
  - Planting of 500 ac of cocoa as an intercrop in Matale and Monaragala rubber and coconut plantations
  - Planting of 200 ac of cardamom in forest covers belong to tea plantations
  - Tamarind 50 ha in Chilaw and Puttalam
  - Use of hybrid varieties for expansion of cultivations (3 pepper varieties, 1 coffee variety and 2 cinnamon variety)

Introduction of EACs to estates

- In tea estates – Pepper, cloves, nutmeg, coffee, arecanut
- In rubber estates – Cocoa
- In coconut estates –
  pepper, cinnamon, cloves, nutmeg, cocoa, ginger, turmeric, arecanut

Tea + Coffee



Spacing of Coffee - 20' x 20' (Similar to Dadap – for medium shade)

Arabica coffee in higher elevation



Cinnamon + Coconut



Coffee + Coconut



Pepper +Coconut





Ginger +Coconut





Cinnamon peeling in early stages

Upgraded cinnamon peeling center



Upgrading oil distillation





Upgrading processing facilities (small scale & large scale)









Widening of scope under the Ministry of Primary Industries since August 2015 cont...

Establishment of medicinal plants/ new crops

- *Walla patta* 15 ha in Ratnapura and Kalutara
- Castor (Mukkara) 15 ha in Ampara
- Curry leaves 15 ha in Ampara
- Soursope (*katuanoda*) 15 ha in Central Province
- Moringa 15 ha in Jaffna and Killinochchi
- Papaya 200 ha in Vavunia and Anuradhapura

Widening of scope under the Ministry of Primary Industries since August 2015 cont...

Establishment of medicinal plants/ new crops

Walla patta (Gryinops walla) 15 ha in Ratnapura and Kalutara





Widening of scope under the Ministry of Primary Industries since August 2015 cont...

- Castor (*Ricinus communis*)(Mukkara) 15 ha in Ampara







•Curry leaves (*Murraya koenigii*)15 ha in Ampara





Widening of scope under the Ministry of Primary Industries since August 2015 cont...

Soursope (*katuanoda*) (*Annona muricata* L.)15 ha in Central Province





Implementing of programs in par with Sustainable Development Goals (SDG)

- Food safety issues
- Alleviation of poverty
- Mitigation/adaptation to climatic change
- Income generation
- Promotion of tourism

Implementing of programs in par with Sustainable Development Goals (SDG)cont...

- **Addressing food safety issues**
  - Maintenance of the existing pepper, nutmeg, clove, cardamom and vanilla cultivations agro-chemical free
  - Chemical fertilizer is applied after soil testing, if necessary
  - Promote soil conditioning methods (increasing of soil pH by applying dolomite) especially in cinnamon
  - Application of leaf-matter and rock phosphate to pepper
  - Application of organic manure to clove and nutmeg
  - Application of environment-friendly fungicides (Bordeaux mixture) whenever it is necessary

Implementing of programs in par with Sustainable Development Goals (SDG)cont...

Poverty alleviation (Dhana-saviya program)

- This program is an initiative of Ministry of Primary Industries
- This has been designed for women-farmers to improve their living standard
- Economic crops (cinnamon, pepper, arecanut, clove, nutmeg and vanilla etc) are introduced so that minimum of Rs, 100,000 annual income is expected
- Other economic crops (herbs and medicinal plants) are also introduced
- It is expected to established one million home gardens within five-year period

Implementing of programs in par with Sustainable Development Goals (SDG)cont...

Employment generation

- Teams comprising five members are trained, for maintenance (shade pruning, fertilizer application and weeding etc) of EAC cultivations , spraying, harvesting and cinnamon peeling etc
- A team is provided with tools such as pruning knives, ladders, augers, grass-cutters etc
- Needy growers of EAC can hire these teams to maintain their cultivations at a nominal charge
- Thereby it is expected to ease labor problem for crop-maintenance , leasing out

Implementing of programs in par with Sustainable Development Goal(SDG)cont..

Mitigation/adaptation to climatic change

- **Extreme weather (severe drought)**
  - **High number of plant causalities**
  - **Short supply of seeds (cinnamon) and cuttings (pepper and vanilla) and reduce their vigor**
  - **Difficulty in shade establishment, earth work and applying crop management practices like fertilizer application**
  - **Water stress leads to poor pollination and berry filling (pepper and coffee) and pod development (cocoa)**
  - **leaf scorching (coffee, cardamom and vanilla)**

- Dried field of Pepper vines



Implementing of programs in par with Sustainable Development Goal(SDG)cont..

Mitigation/adaptation to climatic change

- **Extreme weather (prolong and high intensity rains)**
  - Reduction of yield due to poor pollination, wash away of pollen and inadequate stress to trees/vines
  - High incidence of diseases
  - Establishment of plants are difficult due to water stagnate
  - Reduction of plant growth due to cloud effect

Implementing of programs in par with Sustainable Development Goal(SDG)cont...

Mitigation/adaptation to climatic change

- **Adaptive measures to overcome severe drought**
  - Introduction of irrigation methods (drip irrigation and sprinklers)
  - Improvement of soil moisture conservation methods (covercrops, moisture pits, rain water harvesting and application of anti-transpirants etc)
  - *In-situ* collecting of planting materials
  - Establishment of high value crops (cardamom and vanilla) in green-houses (protected farming)
  - Adequate hardening of plants

Implementing of programs in par with Sustainable Development Goal(SDG)cont...

Income generation

- **Approach markets in high profit zones through establishing traceability**
  - A separate unit (Business Advisory Unit) has established at DEA headquarters
  - Establish traceability through stakeholder (growers, collectors, traders, processors and exporters etc) through registration with the Department
  - Compilation of a database
  - Formation of farmer groups
  - Facilitate to obtain GAP and GMP and organic certificates and fair-trade benefits
  - Link farmers and buyers

Implementing of programs in par with Sustainable Development Goal(SDG)cont...

Income generation

- **Approach markets in high profit zones through quality improvement and value addition**
  - Establishment of 100 mini-labs across districts at Extension Officers' offices to test physical parameters of the EAC samples and issue a status report
  - Advice given for quality improvement after testing quality
  - Quality goods are linked to buyers
  - Promote GAP measures to be adopted
  - Encourage correct harvesting to obtain a good primary product
  - Encourage secondary processing and value addition through assistance schemes by providing with machineries



Implementing of programs in par with Sustainable Development Goal(SDG)cont...

Promotion of tourism

- Establishment of spice parks (at Matale and Delpitiya)
- All the department nurseries and farms are converted to spice parks and training centers
- Conducting food festivals
- Opening of outlets to market quality spice packs
- Promotion of gift-packs

Research directions

- Research on cropping models such as intensive and high density planting (clove and nutmeg)
- Enhancing methods of obtaining large quantity of planting materials
- Preservation and extend viability of seeds (cinnamon and ginger)
- Green-house farming for high value crops (cardamom and vanilla)
- Establishment of cultivations in dry zone

New technology for Propagation of Black Pepper






Research directions cont...

- Research on medicinal value of spices (cinnamon)
- Invention of value added products
- Evolving of drought resistant , high quality and high yielding varieties
- Induction of seasonal flowering (foliar application of potassium in pepper)
- Induction of off-season flowering
- Increase of yield through hormonal treatments
- Hormonal treatments for overcoming adverse weather



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