

Sustainable approaches for improving fruit sector in Sri Lanka

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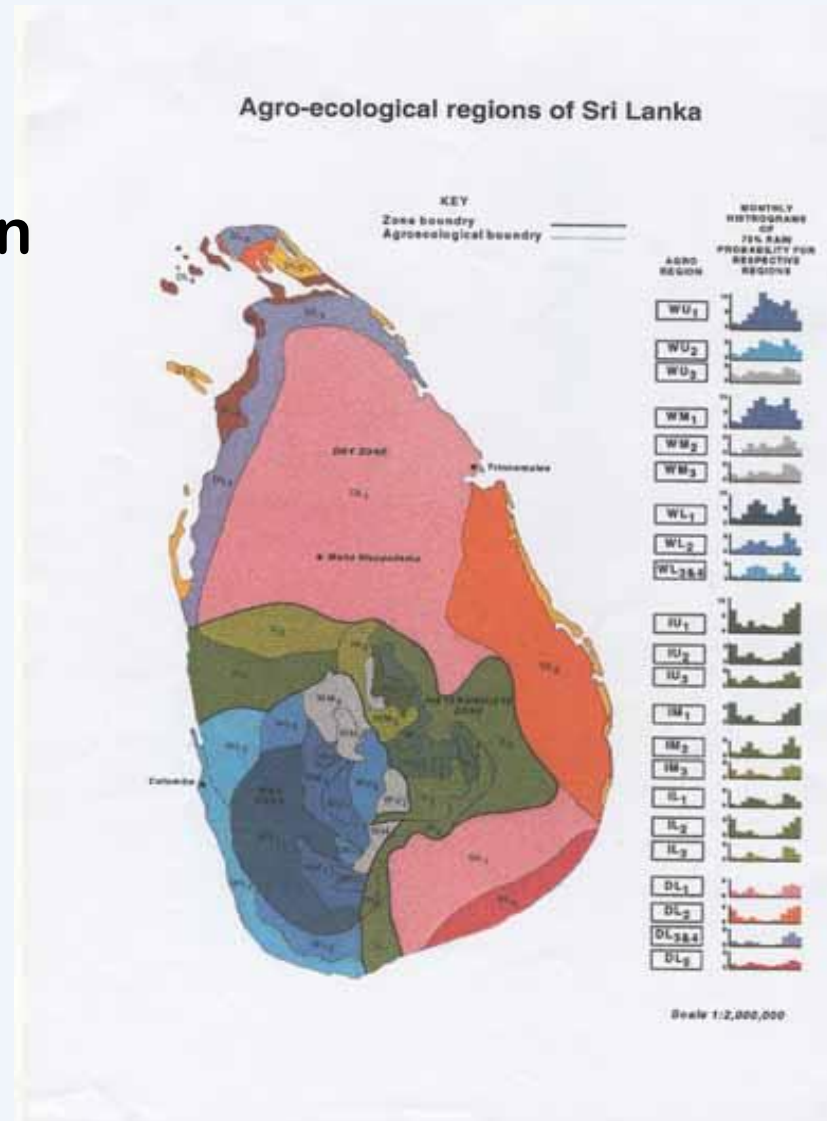
Additional Secretary (Agriculture Technology)

Ministry of Agriculture

Sri Lanka

Sri Lanka at a glance

- Tropical island in Indian ocean
- Agricultural economy
- Population 21 m
- Agro-ecology: 46 regions
- Home gardens: 14.8%
- Self sufficient in rice production
2.7 m t/yr
- Rice requirement: 2.5 m t/yr



Sri Lanka Agricultural land use in 2015

- **Total land area – 6.56 m ha**

	ha	%
• Tea	229,261	3.5
• Rubber	207,628	3.1
• Coconut	295,551	4.5
• Paddy	922,151	14.0
• FRUIT CROPS	150,000	2.3
• Forest	1187,728	18.1

Exportation of fruits

Crop	Exports Income (' 000 Rs.)	
	2010	2014
Banana	212,545	2002,892
Pineapple	116,990	355,706
Avocado	144	5,100
Mango	16,301	28,521
Mangosteen	-	2,883
Sweet orange	7,552	823
Lemon	448	24,828
Watermelon	135	2,734
Papaw	82,831	240,834
Guava	272	10,949
Total	437,218	2675,270

Major fruit extent and production

Crop	Extent (ha.)		Production, mt
	1995	2014	2014: mt
Mango	25,825	29,744	72,700
Banana	46,659	56,216	468,612
Papaya	2,953	6,943	23,711
Pineapple	4,766	5,410	54,901
Passionfrt	441	509	533
Orange	3,704	6,725	4,100
Lime	6,691	12,138	5,387
Other			

National average yield

Crop	Average yield t/ha.	Potential Mt/ha
Banana	10.0	20.0
Pineapple	8.9	20.0
Papaya	13.5	20.0
Passion fruit	1.2	12.0
Mango	4.5	8.0
Rambutan	6.0	20.0
Lime	1.0	3.5

Status

- Diverse tropical and temperate types of fruits scattered.
- 50 fruit *spp.* Home garden 90%
- Seedling origin: 90%
- Irregular yields and quality
- Non systematic orchard and tree management
- Poor management level
- Unattractive economics
- Ineffective extension service for fruits
- Per capita consumption: 30-40 kg/yr

Commitment for fruit security

- **More emphasis**
 - on ensuring fruit availability
 - Affordable price
 - Yield and productivity
 - Quality and safety
 - Availability throughout
 - Local minor fruits
 - Processing and value addition
- **Fruit security requirement in priority in National Food Production Programme 2016-2018**

1. Expanding cultivation

- **Fruit villages** under National Food Production Programme 2016-2018, Target: 15,000 villages in 25 districts
- 2000 ha in 2016

Crop	No of villages	No of plants
Avocado	23	20,700
Durian	23	20,700
Mango	175	157,500
Mangosteen	9	8,100
Mandarin	51	45,900
Pasionfruit	89	80,100
Pear	1	900
Pomegranate	100	90,000
Rambutan	31	27,900
Soursop	172	154,800

1. Expanding.....

Crop	No of villages	No of plants
Pineapple	173	1730,000
Papaya	443	398,700
Woodapple	21	18,900
Ambarella	1	900
Banana	72	64,800
Guava	176	158,400
Sweet orange	338	304,200
Other citrus	102	91,800
TOTAL	2000	

1. Expanding.....

Home gardens

Crop	No of home gardens	No of plants
Mango or Rambutan or Durian Sweet orange Mandarin, pear	295,000	590,000
Guava, sapodilla, carambola, woodapple, beli, garcinea, roseapple, lime, lemon		885,000
TOTAL		1475,000

1. Expanding

Fruits under coconut

Crop	Total Extent ha
Mango, Sweet orange, Soursop, Banana, Pineapple, Papaya, Guava, Jakfruit, Durian, Rambutan, Avocado	1,000

2. Increasing availability of planting material

- Sustainable fruit production depends on availability of high quality plants of superior varieties
 - Main players:
 - Dept of Agri. (SPMDC)
 - Dept. of Agri. (Fruit Research & Dev. Institute)
 - Registered Private Nurseries
 - Registered Bio-tech laboratories

2. Increasing availability of

DOA-SPMDC: Targeted planting material production-2016

•SPMDC: Seed Farms: 20

Crop	No of plants
Mango, Avocado, , Rambutan, Durian, Sweet orange, Lime, Mandarin, Guava and many more varieties	1189,000

More than 50% of the need is supplied

2. Increasing availability of.....,

DOA- FRDI: Targeted planting material production- 2016- 2018

Crop	No of plants/ year	
	Grafts	Seedlings
Mango	5,000	
Rambutan	5,000	
Soursop		22,000
Mangosteen		5,000
Passionfruit		10,000
Durian	3,000	
Sweet orange	14,000	
Mandarin	5,000	
Citrus other	5,000	5,000
Avocado	3,500	
Woodapple	7,000	

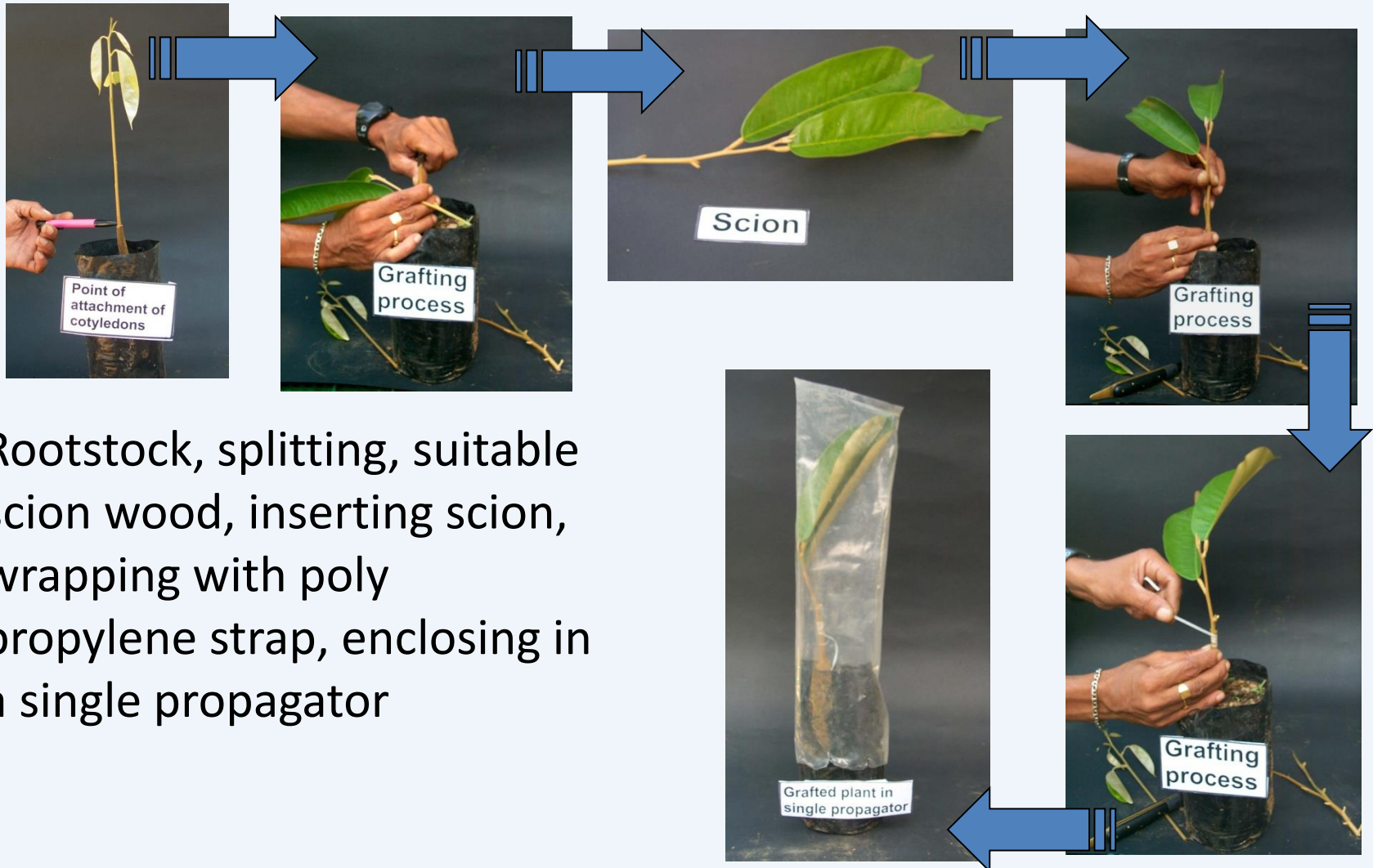
2. Increasing availability of.....

Private Nurseries: Targeted planting material production -2016

Total no of nurseries: 316

Crop	No of plants
Mango, Rambutan , Soursop, Mangosteen, Durian, Sweet orange, Mandarin, Other citrus, Avocado, Woodapple	3.0 million

Early grafting of durian



Rootstock, splitting, suitable scion wood, inserting scion, wrapping with poly propylene strap, enclosing in a single propagator

3. Adapting improved agro-techniques

- Improved varieties and selections for cultivation
- New crops/ super fruits
- Introduced varieties
- Irrigation and water management
 - New irrigation techniques (low cost drip irrigation)
 - Mulching and material
 - Soil moisture retaining polymer gel
 - Opening new areas for cultivation under water management technology

3. Adapting improved agro....

- **Selection of rootstocks**
 - Heavy yield of good quality fruits
 - Drought tolerant (woodapple)
 - Flood tolerant (woodapple)
 - Year-round fruiting (lemonime, *C. madurensis*)
 - Compact architecture (Willard, woodapple)
 - Pest/ disease tolerant (rough lemon)

3. Adapting improved agro.....

- Cultural practices
 - Girdling (rambutan, mango, avocado)
 - Smudging (mango)
 - Discriminative nutrition (potassium spray)
 - Stressing withholding irrigation (grapes)
 - Pruning and training (Mango, grapes, guava)

3. Adapting improved agro....

- **Use of flowering inducers**
 - Paclobutrazole (mango, durian, soursop, jakfruit, grapes)
 - KNO_3 (mango, grapes)
 - KClO_3 (rambutan, longan litchee)
 - Ethephon (pineapple)
 - NAA (pineapple)
- **Foliar nutrition: micro nutrients (pineapple, citrus, ramburtan, mango, papaya, melon etc)**

4. Manipulation of fruit season

- Main seasons: May to August and December to February
- Early-late and off-season flowering fruit varieties (mango, durian etc)
- Agro-ecological zones for different fruit seasons: 46 zones, different times of flowering
 - 5 natural off-season zones (NCP-1; CP-1; UP-2; SP-1)
 - CROPS: rambutan, durian, mangosteen, avocado, sweet orange, mandarin
 - **More than 1,000 ha**
- Flowering induction
 - Agro-techniques
 - Chemical induction: paclobutrazol etc.

5. Productivity enhancement of mature trees

- Majority in home gardens (90% of 150,000 ha)
 - Almost seedling origin- genetic diversity
 - Irregular fruiting, low yield, poor quality
- Rehabilitation and rejuvenation:
 - Pruning and training
 - Nutrition manipulation
 - Pest and disease management
 - Soil moisture management
- Top working (rambutan, mango)



Field work of projects

6. Post harvest handling and product development programmes

- Proper harvesting with appropriate tools and methods through various projects (Australian funded, NADeP)
- Harvesting at correct maturity
- Storage and packaging (sorting, grading facilities and packing houses)
- Product development (processing, new products, new fruits – super fruits: Ceylon olive)
- Branding for local and export

7. Research focus

Climate change is well taken into attention

Varietal improvement

- Selection of superior varieties/ accessions
 - Seedling origin fruit genetic diversity (250 edible fruit spp., 46 agro-ecological zones, centuries continued with seedling propagation, agro-forest type home gardens of about 150,000 ha)- great diversity
 - Major fruit spp and super fruit spp
 - Many superior selections (rambutan, durian, mango, sweet orange, mandarin, soursop, and many minor fruit spp.)

Varietal improvement.....

- **Breeding**

- Conventional breeding programme for papaya (hybrids), passionfruit, citrus, durian, soursop etc.
- Biotechnological approaches (mutational breeding) for banana, pineapple, grapes, citrus etc)

- **Introduction of new varieties**

- Mango (48), sweet orange (10), mandarin (5), pummelo (5), grapefruit (5), lemon, lime, citrus rootstock spp, avocado (18), guava (8), carambola (5), waxapple, litchi, apple, pear, strawberry, nectarin, plum, Ziziphus spp, atemoya, etc
- From Australia, India, Thailand, Pakistan, USA etc.

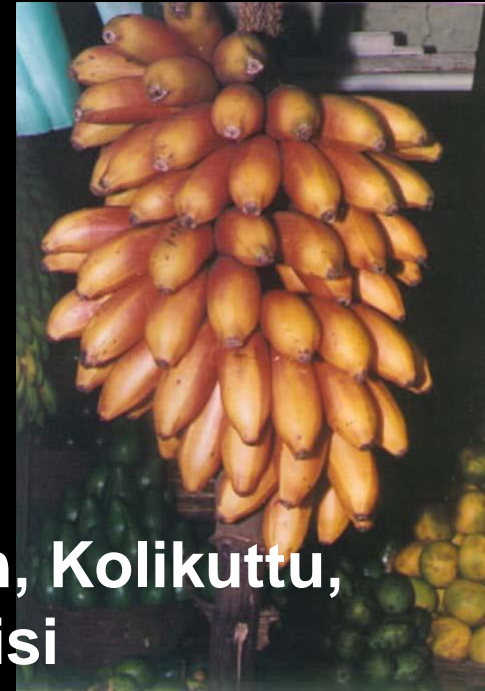


Mango diversity

Improved varieties



Red Lady; Rathna



**Ambon, Kolikuttu,
Pulathisi**



Pineapple



Improved varieties...



**Rambutan:
Malwana
Special**



Ehimi mandarin



**Arogya
sweet orange**



Madhu mandarin;



Improved.....



**Bullock's
heart**

Soursop



**Grapes:
Israel
Blue,
Cardinal,
Muscut of
MI**



Sapodilla

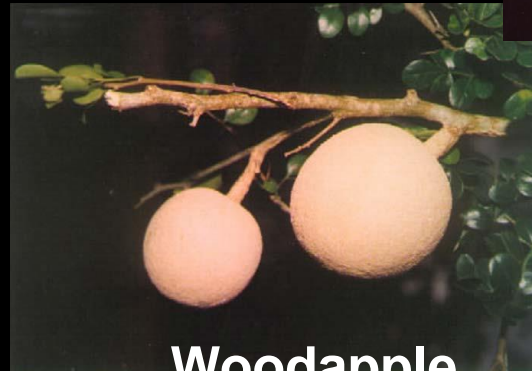


Potential new fruits

Many potential crops:

- For fresh/ table fruit
- For processing and value addition
- As industrial raw material
- Great potential in health food market

Nelli



Woodapple



Beli

7. Research focus....

- **New areas for cultivation**
- **Plant nutrition and water management**
- **Plant protection (Pests and diseases, natural enemies)**
- **Postharvest techniques**
- **Quality improvement**
- **Value addition/ preservation**
- **Medicinal and other uses**

7. Research focus....

- Rootstocks & Propagation techniques
- Change seasonality
- Productivity improvement
- Cropping patterns
- Conversion of traditional cultivations
- Bio-diversity restoration and conservation
- Standards and guidelines for organic fruits
-

8. Promotion of consumption

- National target: 200g/ person /day
- Increase availability
- School fruit stalls: 3 districts, 50 stalls, local fruits/ super fruits
- Department of Agri backed fruit stalls
- Ministry of Agriculture backed fruit stalls (HADABIMA)
- Mass media publicity/ education/ advertising

9. Quality and food safety improvement

- GAP certification: **SL-GAP** launched,
- Traceability (QR)
- IPM packages (biological pest management, organic manure based production, orchard sanitation, water sanitation, fruit bagging etc)

10. Extension and advisory

- Special Agribusiness Counseling Officers for fruit sector: SL-GAP programme
- Many mass media programmes by DoA
- Provincial Departments of Agriculture (9) practically embark on planting material, cultivation promotion , crop clinics, farmer training, facilitating trade interactions, technical advisory, sample testing, linking research institute with growers, trade shows etc
- **Sri Lanka Fruit Festival:** Grand Annual Event by FRDI in July.

National Fruit Festival



11. Lanka Association for the Advancement of Fruit Industry (LAAFI)

- **Formation of this association**
- **Platform for :**
 - **Growers, traders, handlers, exporters, processors, trainers and scientists**
- **Promotion of fruit sector**
 - **into lucrative industry**
 - **towards the development of national economy**

12. Special projects

- Foreign funded
 - Agriculture Modernization Project of the World Bank: will start immediately (more than 100 m US \$)
 - National Agriculture Development Project (NADEP) IFAD funding: Phase 2
- National funds:
 - National Food Production Project 2016-2018 (LkRs. 500 m)
 - Public-Private Partnership programmes
 - Fertilizer subsidy: Cash vouchers (papaya, pineapple, banana, mango)

13. Policy focus

- **Priority for commercial orchards/ land policy**
- **Priority for value addition, product development**
- **Soil conservation act**
- **Fertilizer subsidy/ cash vouchers**
- **Low interest credit / Farmers Trust Fund**
- **Subsidy on farm machinery**
- **Export promotion, assistance, trade shows, state support**
- **New ministries: Primary Industries, Rural Industries**

13. Policy.....

- Nutrition policy included promotion of fruit consumption
- Trade agreements/ MoUs with other countries export promotion. e.g. China, India, Pakistan, many more to come
- Food safety assurance: GAP, QR, NPQS, strict regulation of pesticide (banning of many), residual analysis laboratory
- Establishment and commissioning of **Fruit Research and Development Institute** under the Department of Agriculture: 2014
- A Director and Additional Director position for the Institute
- Infrastructure facilitation for research and development

Fruit Research and Development Institute



Thank you