

National Committee on Plant Protection

**National Priorities
in
Plant Protection Research**

A Strategic Approach

2017-2021

**Ministry of Agriculture
Sri Lanka**

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in
Plant Protection Research**

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The National Committee on Plant Protection places its appreciation to the scientists especially Entomologists, Nematologists, Pathologists and Weed Scientists of the NARS Institutes and the academics from the Faculties of Agriculture for their voluble contribution and Corporation extended in formulating the National Priorities in Plant Protection Research.

***Message by the Chairman,
Sri Lanka Council for Agricultural Research Policy.***

The National Committee on Plant Protection of SLCARP was established under the purview of the Sri Lanka Council for Agricultural Research Policy (SLCARP), mandated to assist the SLCARP, in policy directives in Plant Protection Research. The Committee comprises of scientists and academia representing all organizations in the National Agriculture Research System (NARS) including Universities and the Private Sector organizations in the field of plant protection and has made every effort in supporting the decision making process of the SLCARP

The discipline of agriculture is always engaged with much reference to Plant Protection. The most common approach in plant protection is to select from a variety of techniques, the combination of control options that is best suited to a particular circumstance. This approach is highly flexible and has gained much support over the years amongst the scientists. Integrated Management strategies in response to the pest outbreaks and resistance development, has been the best choice in Plant Protection. However, indiscriminate and excessive application of pesticides in the Sri Lankan agricultural scenario has raised immense concern, due to the residues left in the environment.

Taking into account the vital role of plant protection in agriculture, the national priorities have been formulated and updated to address and strengthen the various spheres in plant protection research activities within the Sri Lankan context aiming at delivering targeted results. This document has correlated the thrust areas and urgent requirements with an inter disciplinary approach, involving collaborative research ventures.

Dr. SDG Jayawardena
Chairman, SLCARP.

*Message by the Secretary,
Sri Lanka Council for Agricultural Research Policy.*

Development of sustainable agriculture is the key to achieving food security for our Nation. In this, use of effective and environmentally sound management strategies to overcome the threats caused by pests plays a vital role in determining agricultural production and productivity.

The National Plant Protection Committee, established under the purview of the Sri Lanka Council for Agricultural Research Policy (CARP), is mandated to assist the SLCARP in deciding on the policy directives and their implementation in the field of Plant Protection in Sri Lankan agriculture. The Committee, comprise of scientists and academia representing organizations in the National Agriculture Research System (NARS) including Universities and the Private Sector organizations.

The National Plant Protection Committee has gone through a rigorous and a comprehensive process of stake holder consultations in preparing this document. The National Priorities in Plant Protection has identified strategies and action plans, specific research and development themes, lead organizations and collaborators in conducting research and development, keeping in line with the vision and mission identified for the each subject area as reported in this document.

I hope that this document will be a guide to the stake holders in this important field of study, in terms of research and national level policy-making.

Dr JDH Wijewardena
Secretary/SLCARP

*Message by the Chairman
National Committee in Plant Protection*

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Introduction

The global population has grown from 3 billion in 1960 to nearly 6.8 billion in 2010, and the United Nations (UN) predicts that the world's population will reach 9.15 billion in the year 2050. The global data available also indicated that there would be 1.7 billion more people to be fed by 2030.

Providing adequate food for this growing population is a challenge that every nation has to face despite biotic and abiotic constraints faced by the agriculture sector. In terms of crop production, insect pests, nematodes weeds and pathogens have contributed significantly as the key biotic elements that affect quality and quantity of crop yields globally, and Sri Lanka is no exception.

Many approaches have been adopted by the practitioners and scientists to overcome the negative impacts of these important biotic constraints in agriculture from time immemorial. Among the techniques used, an integrated approach has been found to be the most effective and environmentally sensitive that relies on a combination of common-sense practices. The integrated techniques used to manage insect pests, weeds and pathogens use current, comprehensive information on the life cycles of the organisms and their interaction with the environment. This information, in combination with available control methods, is used to manage the damages caused by the most economical means, and with the least possible hazard to people, property, and the environment.

With the introduction of novel crop production strategies, the Sri Lankan crop production systems have also faced new threats/outbreaks of insect pests, weeds and disease incidences, thus highlighting the requirement of prioritizing plant/crop protection activities in the country to support the crop production systems. Taking into account the need of the hour, the National Priorities in Plant Protection has been formulated with a comprehensive process of stakeholder consultations, to address national requirement and reorient plant protection research and development thrusts, with a view to design and implement plant protection activities for the benefit of the mankind.

The strategies outlined provide substantial coverage to cater to the nation's requirement and to address agriculture with a safer approach. In the document, the national priorities are divided into plant pathology, weed science, agricultural entomology and nematology. Each section comprises of the Vision, Mission, agents (insect pests/weeds/pathogen) of National Significance, an Action Plan and a Strategic Research Plan with responsible institutes for addressing the related objectives. The institutions in the National Agriculture Research Systems including universities, and the private sector have been identified as responsible as well as collaborating organizations.

The objective would not only help strengthening collaborative research, but also acts as a guide to the Sri Lanka Council for Agricultural Research Policy (CARP), and the government as a whole in the decision-making process to direct funds and for human resource development.

National Strategy on Agricultural Entomology, Acarology and Nematology

Priorities under Entomology, Acarology and Nematology in the agriculture sector of Sri Lanka have been identified. An action Plan for National level Insects, Mites, Nematodes and other pest Management in Agriculture has also been formulated.

1 Mission

Development of safe, effective, economically viable and environment friendly pest management methods for the enhancement of Sri Lanka's agricultural productivity.

2 Pests of National Significance

Pests of National Significance have been identified based on the scientific information available and the research conducted by the Department of Agriculture, Department of Export Agriculture, Plantation Crop Research Institutes (Tea, Rubber, Coconut, Sugarcane and cashew) and Universities are listed below under different crop categories. Management of vertebrate pests of higher orders should take as a national priority to develop a national policy.

(a) Rice:

Common Name	Scientific Name
Leaf folder	<i>Cnaphalocrossismedinalis</i>
Paddy bug	<i>Leptocorisaoratorius</i>
Brown plant hopper	<i>Nilaparvatalugens</i>
Nematodes	<i>Meloidegynesp.</i>
Yellow stemborer	<i>Scirpophagaincertula</i>
Rice sheath mite	<i>Steneotarsonomusspinkii</i>
Rice leaf mite	<i>Oligonychussp.</i> <i>Hemitarsonemussp.</i>
Rice thrips	<i>Stenchaetothripsbiformis</i>
White-back Planthopper	<i>Sogatellafurcifera</i>
Rodents	<i>Rattussp.</i> <i>Bandicotasp.</i>
Rice gall midge	<i>Orseolia oryzae</i>

(b) Stored Grains and Pulses:

Common Name	Scientific Name
Rice weevil	<i>Sitophilusoryzae</i>
Lesser grain borer	<i>Rhyzoperthadominica</i>
Angoumois grain moth	<i>Sitotrogacerealella</i>
Red flour beetle	<i>Triboliumcastaneum</i> , <i>T. confusum</i>
Pulse beetle	<i>Callosobruchusmaculatus</i> <i>C. chinensis</i>
Maize weevil	<i>Sitophiluszeamais</i>
Khapra beetle	<i>Trogodermagranarium</i>
Cigarette beetle	<i>Lasiodermaserricorne</i>
Drug store beetle	<i>Stegobiumpanicium</i>
Rodents	<i>Rattussp.</i>

(c) Field Crops:

1. Chilli leaf curl complex
Thrips (*Scirtothripsdoarsalis*)
Mites (*Hemitarsonemuslatus*)
Aphids (*Aphis gossypii*, *Myzuspersicae*)
Whiteflies(*Bemisiatabaci*)
2. Chilli pod borers (*Helicoverpaarmigera* and *Spodopteralitura*)
3. Onion thrips(*Thripstabaci*)
4. onion caterpillars (*S. litura* and *S. exigua*)
5. Onion bulb mite (*Rhizoglyphus* sp.)
6. Legume pod borers (*Marucavitrata* and *H. armigera*)
7. Bean fly (*Ophiomyiaphaseoli*)
8. Pod sucking bug (*Nezaraviridula*, *Anaplocnemissp* and *Riptortussp*)
9. Maize stem borer (*Chilopartellus*)
10. Root knot nematode (*Meloidogyne* sp.)
11. White grub in groundnut
12. Aphids in groundnut (*aphis craccivora*)
13. Thrips in groundnut (*Scirtothrips* spp. and *Thrips palmi*)
14. Leaf webber in sesame (*Antigastra catalaunalis*)

(d) Vegetables and Tuber Crops:

1. Root knot nematode (*Meloidogyne* sp.)
2. Melon flies (*Bactocera cucurbitae* and *B. invadens*)
3. Fruit flies
4. Thrips, whiteflies, leaf hoppers and aphids
5. Mites
6. Mealy bugs

7. Scale insects
8. Leaf miner (*Liriomyza* sp.)
9. Cabbage caterpillar complex (*Plutellaxylostella*, *Chrysodeixiseriosoma*, *Hellulaundulalis*, *Crocidolomiabinotalis*, *S. litura*)
10. Leaf hoppers (*Amrasca* sp.)
11. Fruit/ pod borers (*H. armigera*, *Maruca. vitrata*, *Eariasvitella*, *Leucinodes orbonalis*)
12. White grubs (*Anomalasp*)
13. Cut worms (*Agrotissp.*)
14. Sweet potato weevil (*Cylasformicarius*)
15. Potato tuber moth (*Phthorimaeaoperculella*)
16. Potato cyst nematode (*Globodera* sp.)
17. Slugs and snails
18. Flea beetle
19. *Aulacophora* sp
20. Gall fly
21. Root maggot
22. Stem borers (brinjal, Thibbatu, winged bean)
23. Tree borer (Jack, bread fruit)

(e) Fruit Crops:

1. Fruit flies (*Bactrocera dorsalis* and other spp)
2. Mango hoppers (*Idioscopusclypealis*, *I. nireosparus*, *Amritodusbrevistylus*)
3. Banana weevils (*Cosmopolitussordidus* and *Odioporuslongicollis*)
4. Scale insects
5. Mealybugs
6. Root knot nematodes (*Meloidegynesp.*) and Root burrowing nematode (*Radopholussimilis*)
7. Fruit borers
8. Mites
9. Thrips
10. Aphids
11. White grubs
12. Leaf miners
13. Fruit piercing moths (*Educima fullonia*)
14. Stem borers
15. Helopeltis bug (*Helopeltis antoni*)

(f) Cashew:

Common Name	Scientific Name
Helopeltisbug	<i>Helopeltisantoni</i>
Stem borer	<i>Plocaederusferrugeneus</i>

g) Export Agriculture Crops:

Common Name	Scientific Name
Cinnamon wood boring moth	<i>Ichneumonipteracinnamomumi</i>
Cardamom capsule and stem borer	<i>Dichocrosis punctiferalis</i>
Coffee berry borer	<i>Hypothenemus hampei</i>
Pepper lace bug	<i>Diconocoris distanti</i>
Cocoa capsid bug	<i>Helopeltis ceylonensis</i>
Nematodes	<i>Meloidogyne sp.</i> , <i>Pratylenchus sp.</i> , <i>Radopholus similis</i>
Cardamom thrips	<i>Seiothrips cardamom</i>
Shot hole borer	<i>Xyleborus sp.</i>
Pepper wine borer	<i>Pterolophia annulata</i>
White grubs	<i>Anomala sp.</i>
Cinnamon thrips	
Vertebrate pests (pea cock, barking deer, mouse deer)	
Scale insects (cloves, nutmeg and Garcenia)	

(h) Tea:

Common Name	Scientific Name
Shot hole borer	<i>Xyleborus fornicatus</i>
Up country live wood termite	<i>Postelectrotermes militaris</i>
Low country live wood termites	<i>Glyptotermes dilatatus</i>
Mites	<i>Oligonychus coffeae</i> <i>Brevipalpus californicus</i> <i>Acaphylla theae</i>
Nematodes	<i>Pratylenchus loosi</i> <i>Radopholus similis</i>
Made tea pests (cigarette beetle and dust mites)	<i>Lasioderma serricornis</i>
Tea tortrix	<i>Homonacoffearia</i>
White grubs	<i>Holotrichia sp.</i> <i>Anomala sp.</i> <i>Microtrichia costata</i>

(f) **Coconut:**

Common Name	Scientific Name
Plesispa beetle	<i>Plesispa reichei</i>
Coconut mite	<i>Aceria guerreronis</i>
Black beetle	<i>Oryctus rhinoceros</i>
Red weevil	<i>Rhynchophorus ferrugineus</i>
Vertebrate pests (Wild boar, rats, bats, bandicoots, porcupines, squirrels, monkeys)	-
Coconut black headed caterpillar	<i>Opisina arenosella</i>

(j) **Sugarcane:**

Common Name	Scientific Name
Sugarcane woolly aphid	(c) <i>Ceratovacunalanigera</i>
Plant hopper	<i>Pyrillaperpusilla</i>
Internode borer	<i>Chilosacchariphagus</i>
Pink borer	<i>Sesamiainferans</i>
Termites	Odontermesredemani, O. ceylanicus, O. horni, Coptotermesceylanicus, Heterotermesceylanicus, Nasutotermesceylanicus
Leaf hopper (vector of WLD/GSD)	<i>Celtocephalusmenoni</i>
Sugarcane spider mite	
Nematodes	<i>Pratilenchuszeae</i> <i>Melodogynesp.</i>
Wild boar and elephants	

(k) **Rubber**

Common Name	Scientific Name
Cockchafer grubs	1. <i>Lachnosterna (Holotrichia)</i> <i>bidentata</i> 2. <i>Psilopholisvestita</i> . 3. <i>Leucopholisrorida</i> 4. <i>Leucopholisnummicudens</i> 5. <i>Leucopholistristis</i> 6. <i>Exopholishypoleuca</i> 7. <i>Lepidiota stigma</i>

(l) Plantation Forestry

	Common Name	Scientific Name
1.	Black twig borer	<i>Xylosandruscompactus</i>
2.	Red Stem borer	<i>Zeuzeracoffeae</i>
3.	Eucalyptus gall wasp	<i>Leptocybeinvasa</i>
4.	Shoot borer (Mahagoni)	<i>Hypsipylarobusta</i>
5.	White grubs	
6.	Termites	
7.	Rodents	
8.	Scale insects	
9.	Mealybugs	

(m) Floriculture

1. Thrips
2. Scales and mealy bugs
3. Whiteflies
4. Shoot and bud borers (Lepidopterans)
5. Mites
6. Nematodes: *Rhadopholussimilis*, *Pratylenchus* sp., *Meloidogyne* sp. *Xiphenema* sp.
7. Aphids
8. Leaf miners
9. Leaf eating caterpillars

(e) Vertebrate pest management (monkey, simion, pea cock, wild boar, giant squirrels, barking deer, bats, mouse deer, rodents, elephants, porcupine etc.

3. Action Plan for National Insect, mite and nematode Management in Sri Lanka

	Goal	Objectives	Strategies	Responsibility
1	To reduce the impact of insect pests of national significance (suppression of pest levels)	To find solutions to the problems of established pests (insects, mites and nematodes)	Encourage crop health/GAP based IPM strategies	All stakeholders, CARP Faculties of Agriculture, DOA Faculties which involve studies in crop pests.
Assessment of pest damages / modeling and forecasting			NPQS, DOA, SLCARP,FA, DEA, MA, Plantation crop research institute and faculties of Universities	

		To make use of biological agents mandatory for insect pest management.	Assessment of natural enemy complex in the field to strengthen Biological control as a tool of insect pest management	MA, FA, TRI, CARP, HORDI /DOA All stakeholders. Faculties which involve studies in crop pests.
		To ensure use of chemicals for pest management in an environmentally sound manner.	Encourage judicious use of chemical pesticides (registration and de-registration)	ROP, All stakeholders, CARP, Faculties of Agriculture All research institutes
			To minimize risks associated with pesticides, through quality assurance and standards of monitoring pesticide use and residues in food. And by assessing effects on Natural enemy complex and pollinators	ROP, ITI Faculties which involve studies in crop pests.
		Establishment of breeding and cultivation of resistant varieties of crops.	To promote breeding of resistant crop varieties.	CARP Research institutes, universities and stakeholders
2	Prevent emergence of new pest problems.	To have a strict mechanism for practice of quarantine regulations	Create awareness amongst and imports growers	NPQS, PPS, Research and Extension wings of the Research Institutes and Universities
			Prevention of spread within the country	NPQS, PPS, Research and Extension wings of the Research Institutes and Universities
			Effective reporting system	NPQS, PPS, Research and Extension wings of the Research Institutes and Universities
			Adoption of speedy control measures	NPQS, PPS, Research and Extension wings of the Research Institutes and Universities

			Periodical monitoring system/ pest surveillance	NPQS, PPS, Research and Extension wings of the Research Institutes and Universities
3	Prevent Introduction of new pest species	To prevent introduction of new pest species	Improvement of National Reference Collection and Identification Services at all ports including revise the import condition/ requirements.	NPQS,CARP, Faculties of Agriculture
			Correct identification of pests, plant pathogens and natural enemies and identification of future research. Including development of suitable quarantine treatments & eradicate the pest.	NPQS and relevant experts in Sri Lanka, Faculties of Agriculture
			Establishment of identification services through foreign collaborations.	NPQS and relevant experts in Sri Lanka, Faculties of Agriculture
			Strengthening of NPQS laboratories	NPQS and relevant experts in Sri Lanka
	Create awareness on Pests among farmers. Including importers treatment customs.	Improvement of special & specific extension programs.	NPQS and relevant experts in Sri Lanka, Faculties of Agriculture	
	Assessment of pest damages	Improvement of reference insect collection for insect identification	DOA All research institutes	
		Development of practical pest forecasting and surveillance methods.	NPQS and relevant experts in Sri Lanka, Faculties of Agriculture	

			Develop an effective reporting system.	NPQS and relevant experts in Sri Lanka
				NPQS and relevant experts in Sri Lanka

4. The Strategic Research Program on Agricultural Entomology, Acarology and Nematology

(1) Establishment of National Reference Collection and Pest Identification Service

1. Establishment of a national identification unit.
2. Maintenance of identification keys.
3. Development of necessary human resources through training and scholarships.

Responsible Institute(s)	National Plant Quarantine Service
Collaborating Institute(s)	All institutes in the National Agricultural Research System Universities

(2) Assessment of Pest Damages

1. Carrying out a national survey on pest problems of crops and stored products.
2. Development of practical pest forecasting and surveillance methods
3. Studies on action threshold levels for economically-important pests
4. Studies on population dynamics of pests, natural enemies and pollinators

Responsible Institute(s)	Department of Agriculture Coconut Research Institute Rubber Research Institute Tea Research Institute Department of Export Agriculture Sugarcane Research Institute
Collaborating Institute(s)	Faculties of Agriculture

(3) Prevention of Introduction of New Pests

1. Inclusion of exotic pests of quarantine importance in the reference collection.
2. Development of pest eradication methods.
3. Establishment of pest risk analysis methods.
4. Revise the impact requirements based on the pest risk analysis.

Responsible Institute(s)	National Plant Quarantine Service
Collaborating Institute(s)	National Agriculture Research System Faculties of Agriculture

(4) Utilization of Biological and Non Chemical control Methods in Pest Management.

1. Biological control of pest management should be facilitated by CARP to the NARS and made mandatory.
2. Evaluation of indigenous natural enemies of pests like thrips, mites, whiteflies, scales, aphids, leaf miners and leafhoppers where no previous studies have been carried out.
3. Mass of natural enemies for commercial use in pest management programs.

4. Facilitation of mass culture and formulation of microbial pesticides for commercial application.
5. Establishment of a central bio-control facility for sustainability of these programs.
6. Training of technical personnel to undertake these activities.
7. Identification and formulation of Semio-chemical based pest management strategies/ male annihilation techniques
8. Exploration of botanical based pest management strategies
9. Use of sterile insect techniques

Responsible Institute(s)	Department of Agriculture
Collaborating Institute(s)	All institutes in the National Agricultural Research System Faculties of Agriculture

(5) Judicious use of Chemical Pesticides.

1. Regularizing and monitoring of pesticide application. Including quarantine & reshipment purpose.
2. Expansion of pesticide residue analysis facility at ROP as a national center for residue analysis
3. Expansion of pesticide monitoring programmes in relation with the safety of natural enemy complex and pollinators in the crop ecosystem.
4. Training of personnel involved with pesticide usage on correct application techniques. Including make aware disposal methods & various products of
5. Chemical control with special reference to pesticide residue monitoring, laboratory standards and agricultural product quality
6. Monitoring the pesticide resistance development of field populations of pests.

Responsible Institute(s)	Registrar of Pesticides, National Plant Quarantine Service
Collaborating Institute	All institutes in the National Agricultural Research System Faculties of Agriculture

(6) Establishment of Breeding and Cultivation of Resistant Varieties of Crops

1. Acquisition of new genetic material for improvement of crop varieties.
2. Carrying out awareness programs among growers on management of resistant varieties
3. Identification of landraces showing resistance to pests.

Responsible Institute(s)	Department of Agriculture
Collaborating Institute(s)	All institutes in the National Agricultural Research System Faculties of Agriculture

(7) Use of Molecular Biology Techniques in Plant Protection Research

Responsible Institute(s)	Department of Agriculture
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| | Collaborating Institute(s) | All institutes in the National Agricultural Research System
Faculties of Agriculture |
| (8) | Studies on Management of Nematodes | |
| | Responsible Institute(s) | Department of Agriculture, Tea Research Institute, National Plant Quarantine Service |
| | Collaborating Institute(s) | All institutes in the National Agricultural Research System, Faculties of Agriculture |
| (9) | Studies on Agricultural Biodiversity with respect to natural pest management | |
| | Responsible Institute(s) | Department of Agriculture, Universities |
| | Collaborating Institute(s) | All Institutes in the National Agricultural Research System |
| (10) | Studies on stored-product (post-harvest) pests | |
| | Responsible Institute(s) | Faculties of Agriculture, Department of Agriculture, All Institutes in the National Agricultural Research System |
| | 11. Studies on climate change and effect on pests | |
| | 12. Use of ecological engineering tools for pest management | |
| | 13. Host range studies specifically for newly emerged pests | |

National Strategy on Plant Pathology

Priorities under plant pathology in the agricultural sector of Sri Lanka have been identified. An action Plan for National Management Strategy of priority diseases has also been formulated.

1. Mission

To develop a National Plant Disease Strategy to reduce the detrimental impact of plant diseases and achieve sustainable agricultural productivity in Sri Lanka.

2. Plant Diseases of National Significance

Plant Diseases of National Significance have been identified based on the scientific information available and the efforts made in terms of research by the Department of Agriculture, Department of Export Agriculture, Department of National Botanic Gardens, Forest Department, Institute of Post Harvest Technology, Commodity Research Institutes (Tea, Rubber, Coconut and Sugarcane) and Universities. Crop category based diseases of national significance have been identified and listed below in alphabetical order.

(a) CEREAL CROPS

1. Rice grain discolouration
2. Rice brown spot disease
3. Sheath blight of rice
4. Bacterial blight of rice
5. Rice blast

(b) EXPORT AGRICULTURAL CROPS

1. Nutmeg leaf fall
2. Clover leaf blight & leaf fall
3. Bacterial leaf blight of beetle
4. Rhizome rot & bacterial wilt of ginger
5. Pepper yellow mottle virus (PYMV)
6. Cinnamon rough bark disease
7. Pepper yellowing/slowing
8. White root disease of cinnamon & nut meg
9. Quick wilt of pepper
10. Leaf blight disease of cinnamon

11. Brown root disease of cinnamon

(c) FIELD CROPS

1. Chilli leaf curl virus
2. Anthracnose (chilli, onion)
3. Purple blotch of onion
4. Bacterial bulb rot of Onion
5. Fungal bulb rot of Onion
6. CMV of chilli
7. TSWV of chilli
8. Collar rot of chilli
9. Powdery mildew of chilli
10. Chilli narrow leaf disorder

Coarse grains

11. Maize sheath blight (*Rhizoctonia solani*)
12. Maize erwinia stalk rot (*E. crysanthemii*)
13. Finger millet blast (*Magnopothae grisea*)
14. Aspergillus ear rot in maize
15. Maize rust (*Puccinia polysora*)

Legumes

1. Viral diseases (YMV, GNBV)
2. Collar rot
3. Powdery mildew
4. Anthracnose
5. Purple seed stain of soybean

Oil crops

1. GNBV
2. Collar rot of ground nut
3. Early & late leaf spots of ground nut
4. Rust of GN
5. Phyllody of sesame

(d) HORTICULTURAL CROPS

(i) Vegetables, Root & Tubers

Viral Diseases

1. Cucurbits virus complex
2. Tomato virus complex (CMV, YLCV, TSWV,CTV)
3. Begomo viruses of bean/cucurbits
4. Capsicum virus complex

5. Mosaic virus in manioc
6. Okra yellow vein mosaic virus

7. Leaf roll virus of potatoes
8. Bean yellowing (Horse Gram Yellow Mosaic Virus)

Phytoplasma diseases

1. Little leaf disease of Brinjal,
2. Phytoplasma disease of Cucurbits

Bacterial Diseases

1. Bacterial wilt (*Erwinia* sp./ *Ralstonia* sp., Solanaceae & Cucurbitaceae)
2. Bacterial rots (*Erwinia* sp. and *Xanthomonas* sp.)
3. Xanthomonas leaf spots
4. Common and netted scab of potato
5. Canker disease (*Clavibacter michiganensis* sp *michiganensis*) of tomato
6. Powdery scab of potato

Fungal Diseases

1. Early and Late blight of potato & tomato
2. Root & Collar rots bean, solanaceae, cucurbitaceae
3. Powdery and Downy mildew
4. Tomato anthracnose
5. White rust (*Albugo* sp), *Cercospora* and other leaf spots/diseases of leafy vegetables
6. Anthracnose of capsicum and bean
7. Rust of bean
8. Botrytis mold of lettuce, capsicum and Tomato
9. Leaf Spot diseases in Capsicum and Bean

(ii) Fruits

Viral diseases

1. Papaya ring spot virus disease
2. Banana bunchy top virus disease
3. Pineapple wilt
4. Citrus greening

Phytoplasma diseases

1. Papaya phytoplasma

Fungal diseases

1. Panama disease of banana and fungal rot of banana
2. Anthracnose of guava, mango, pomegranate, papaya, avocado, passion fruit, cashew, dragon fruit, grapes, strawberry
3. Phytophthora & Phythium root rots/dieback of Papaya, Jack, Guava, Durian
4. White root disease of Durian, Jack
5. Sigatoka & Codana disease of banana (leaf disease of banana)
6. Powdery mildew of Rambutan
7. Downy mildew of grapes
8. Dragon fruit-stem spots
9. Botrytis mold of strawberries, grapes

Bacterial diseases

1. Bacterial fruit blotch of water melon
2. Bacterial canker of citrus

(iii) Floricultural Crops

1. Bacterial blight of Anthurium
2. Downy and powdery mildews and black spot of roses
3. Rust of cut flowers
4. Bacterial wilt of cut flowers, ornamental plants and foliages
5. Fungal leaf spots, root and collar rots of all flower plants
6. Bacterial leaf spots
7. Fusarium and Phytophthora rots on Gerbera & Fusarium rot in Carnation
8. Fusarium rots in flower spike of orchids
9. Botrytis spotting in flower petals
10. Virus diseases of cut flowers and foliage plants

(e) PLANTATION CROPS

(i) Coconut

1. Weligama coconut leaf wilt disease
2. Crown, stem and bole diseases of coconut(bud rot, leaf blight, stem bleeding, Ganoderma root & bole rot)

(ii) Rubber

1. White root disease
2. Corynespora leaf fall disease
3. Phytophthora diseases
4. Patch canker disease
5. Brown Root Disease

(iii) Sugarcane

1. White leaf disease
2. Smut disease
3. Leaf scald

4. Yellow led Syndrome

(iv) Tea

1. Blister blight of tea
2. Canker diseases of tea
3. Bush dieback

3. Action Plan for National Plant Disease Management in Sri Lanka

	Goal	Objectives	Strategies	Responsibility
1	To prevent the introduction and spread of new diseases and proper implementation of post quarantine measures.	To ensure early detection of pathogen/ causal agent	Develop technologies for rapid and precise identification of pathogens.	SCPPC, HORDI, RRDI, FCRDI. Crops Research Institutes.
			Collection and maintenance of reference cultures of plant pathogens (fungi and bacteria) for research studies and identification.	SCPPC, HORDI, RRDI, FCRDI, Crop Research Institute
		To upgrade phytosanitary measures to international standards	Promotion of export /import of pest free commodities.	SCPPC, All stakeholders. Crops Research institutes
			Improving awareness among people at all levels.	All stakeholders, PP/CARP
2	To reduce the impact of diseases of national significance.	To apply integrated and cost effective disease management techniques to solve the problems of established and new pathogens. Disease monitoring & Forecasting with special reference to climate change	Encourage research on disease management and controlled agriculture.	CARP, FA, DOA, Crops Research Institutes.
			Improving awareness among people at all levels.	All stakeholders, PP/CARP

3	To provide the framework and capacity for management of diseases of national significance.	To strengthen national research, education and training capacity to ensure cost effective, efficient and sustainable disease management.	Capacity building	All stakeholders, PP/CARP
			Provide financial assistance.	CARP
		To encourage the development and implementation of strategic plans for disease management at all levels.	Develop a coordinated mechanism to implement disease management strategies.	All stakeholders, CARP.
			Define the role of stakeholders in disease management programmes.	PP/CARP
			Adopt a Reward scheme.	CARP

4. The Strategic Research Programme on Plant Pathology

(a) CEREAL CROPS

(1) Management of grain discolouration of rice with emphasis on;

1. Studies on grain discolouration and sterility in relation/with reference to different cultivation methods and different environment conditions.
2. Screening of fungicides for effective application with minimum MRLs.

Responsible Institute(s)	RRDI/Department of Agriculture
Collaborating Institute(s)	Faculties of Agriculture

(2) Integrated Management of sheath blight (*Rhizoctonia solani*) of rice with special emphasis on biological, agronomic, chemical methods and plant extract based bio pesticides.

Responsible Institute(s)	RRDI/Department of Agriculture
Collaborating Institute(s)	Faculties of Agriculture

(3) Management of bacterial leaf blight disease in rice with emphasis on;

1. Identification of resistant varieties.
2. Identification of resistant genes and incorporation into new varieties.

Responsible Institute(s)	RRDI/Department of Agriculture
Collaborating Institute(s)	Faculties of Agriculture

(4) Management of rice blast disease with special emphasis on;

1. Identification of resistant genes and incorporation into new varieties.
2. Studies on disease management under different agronomic and management methods, and environmental conditions.
3. Identification of suitable, environmentally friendly fungicides.

Responsible Institute(s)	RRDI/Department of Agriculture
Collaborating Institute(s)	Faculties of Agriculture

(5) Management of rice brown spot disease

1. Identification of resistant genes and incorporation into new varieties.

2. Studies on disease management under different agronomic and management methods, and environmental conditions.
3. Identification of suitable, environmentally friendly fungicides.

Responsible Institute(s)	RRDI/Department of Agriculture
Collaborating Institute(s)	Faculties of Agriculture

(b) FIELD CROPS

Coarse grain

- (1) Integrated Management of sheath blight (*Rhizoctonia solani*) of maize with special emphasis on biological, agronomic, chemical methods and plant extract based bio pesticides.

Responsible Institute(s)	FCRD/Department of Agriculture
Collaborating Institute(s)	Faculties of Agriculture

- (2) Management of Erwinia stalk rot of maize (*E. chrysanthemi* pv. *zetae*)

1. Study of appropriate management methods special emphasis on biological & agronomic control methods
2. Selection/screening of resistant varieties to *E. chrysanthemi*
3. Breeding for resistance to *E. chrysanthemi*

Responsible Institute(s)	FCRDI/Department of Agriculture
Collaborating Institute(s)	Faculties of Agriculture

- (3) Management of finger millet blast disease;

1. Identification of resistant sources.
2. Breeding for resistant
3. Studies on disease management under different agronomic and biological management methods, and environmental conditions.

Responsible Institute(s)	FCRD/Department of Agriculture
Collaborating Institute(s)	Faculties of Agriculture

- i. Management of Aspergillus ear rot and aflatoxin production in maize with special emphasis on;

1. Identification of different isolates of *Aspergillus sp.*
2. Selection of resistant varieties to *Aspergillus sp.* and aflatoxin production.
3. Studies on storage conditions on growth of *Aspergillus sp.*
4. Awareness programmes to mobilize the grower/producer to adopt improved post harvest technologies to minimize aflatoxin contaminations.

Responsible Institute(s)	FCRDI/Department of Agriculture
Collaborating Institute(s)	Faculties of Agriculture

- (4) Management of maize rust;

1. Breeding for resistant
4. Studies on appropriate disease management methods

Condiments	Responsible Institute(s)	FCRD/Department of Agriculture
	Collaborating Institute(s)	Faculties of Agriculture

(1) Management of Chilli Leaf Curl Virus (CLCV) with special emphasis on;

1. Identification of viruses/vectors involved
2. Management through vector control
3. Identification of resistant genes and incorporation into new varieties
4. Integrated disease management approaches
5. Breeding for resistance to leaf curl virus complex
6. Use of novel technologies

Responsible Institute(s)	FCRDI/PVIC/Department of Agriculture
Collaborating Institute(s)	Faculties of Agriculture

(2) Anthracnose of (chilli, onion)

1. Identification/recommendation of appropriate management practices
2. Screening of suitable, environmentally friendly fungicides with low MRLs
3. Identification/screening of resistant sources

Responsible Institute(s)	FCRDI/Department of Agriculture
Collaborating Institute(s)	Faculties of Agriculture

(3) Management of Onion Purple Blotch

1. Selection of resistant varieties for purple blotch
2. Identification of environmentally friendly fungicides
3. Identification of appropriate management practices

Responsible Institute(s)	FCRDI/Department of Agriculture
Collaborating Institute(s)	Faculties of Agriculture

(4) Management of bacterial bulb rot of onion

1. Selection of resistant varieties
2. Identification / recommendation of appropriate management practices

Responsible Institute(s)	FCRDI/Department of Agriculture
Collaborating Institute(s)	Faculties of Agriculture

(5) Management of fungal Bulb Rot of Onion

1. Selection of resistant varieties for onion bulb rot
2. Efficacy of cultural practices
3. Screening of environmentally friendly fungicides

Responsible Institute(s) FCRDI/PVIC/Department of Agriculture
 Collaborating Institute(s) Faculties of Agriculture

(6) Management of CMV of chili

1. Identification of viruses/vectors involved
2. Management through vector control
3. Selection of resistant varieties for virus diseases
4. Acquisition of resistant varieties from other countries
5. Identification of resistant genes and incorporation into new varieties
6. Introduction of Integrated disease management approaches
7. Identification of resistance to virus diseases in grain legumes
8. Identification of Impact of different agronomic practices; intercropping, mixed cropping, crop rotation, *etc* in reducing virus diseases in grain legumes

Responsible Institute(s) FCRDI/PVIC/Department of Agriculture
 Collaborating Institute(s) Faculties of Agriculture

(7) Management of TSWV of chili

1. Identification of viruses/vectors involved
2. Management through vector control
3. Selection of resistant varieties for virus diseases
4. Acquisition of resistant varieties from other countries
5. Identification of resistant genes and incorporation into new varieties
6. Introduction of Integrated disease management approaches
7. Identification of resistant varieties
8. Identification of Impact of different agronomic practices; intercropping, mixed cropping, crop rotation,

Responsible Institute(s) FCRDI/PVIC/Department of Agriculture
 Collaborating Institute(s) Faculties of Agriculture

(8) Management of Collar rots of chilli

1. Selection of resistant varieties for collar rots of chilli
2. Identification of cultural practices in reducing collar rots of chilli
3. Identification of environmentally friendly fungicides

Responsible Institute(s) FCRDI/Department of Agriculture
 Collaborating Institute(s) Faculties of Agriculture

(9) Management of powdery mildew of chilli

4. Selection of resistant varieties for purple blotch
5. Identification of environmentally friendly fungicides
6. Identification of appropriate management practices

Responsible Institute(s) FCRDI/Department of Agriculture
Collaborating Institute(s) Faculties of Agriculture

(10) Management of Chilli Narrow leaf disorder (NLD)

1. Identification of causal agent, using molecular based techniques
2. Integrated disease management approaches in reducing NLD

Breeding for NLD resistance

Responsible Institute(s) FCRDI/Department of Agriculture
Collaborating Institute(s) Faculties of Agriculture

Legumes

(1) Management of viral diseases (YMV, GNBV)

1. Identification of viruses/vectors involved
2. Management through vector control
3. Selection of resistant varieties for virus diseases
4. Acquisition of resistant varieties from other countries
5. Identification of resistant genes and incorporation into new varieties
6. Introduction of Integrated disease management approaches
7. Identification of resistance to virus diseases in grain legumes
8. Identification of Impact of different agronomic practices; intercropping, mixed cropping, crop rotation, *etc* in reducing virus diseases in grain legumes

Responsible Institute(s) FCRDI/PVIC/Department of Agriculture
Collaborating Institute(s) Faculties of Agriculture

(2) Management of Collar rots of legumes

1. Selection of resistant varieties for collar rots
2. Identification of cultural practices in reducing collar rots
3. Identification of environmentally friendly fungicides

Responsible Institute(s) FCRDI/Department of Agriculture
Collaborating Institute(s) Faculties of Agriculture

(3) Management of powdery mildew

7. Selection of resistant varieties
8. Identification of environmentally friendly fungicides
9. Identification of appropriate management practices

Responsible Institute(s) FCRDI/Department of Agriculture
Collaborating Institute(s) Faculties of Agriculture

(4) Management of Anthracnose of

1. Identification/recommendation of appropriate management practices
2. identification of suitable, environmentally friendly fungicides with low MRLs
3. Identification/screening of resistant sources

Responsible Institute(s) FCRDI/Department of Agriculture
Collaborating Institute(s) Faculties of Agriculture

(5) Management of purple seed stain of soya bean

1. Identification/recommendation of appropriate management practices
2. Identification of suitable, environmentally friendly fungicides with low MRLs
3. Identification/screening of resistant sources

Responsible Institute(s) FCRDI/Department of Agriculture
Collaborating Institute(s) Faculties of Agriculture

Oil crops

(1) Management of GNBV

1. Identification of viruses/vectors involved
2. Management through vector control
3. Selection of resistant varieties for virus diseases
 1. Acquisition of resistant varieties from other countries
5. Identification of resistant genes and incorporation into new varieties
6. Introduction of Integrated disease management approaches
7. Identification of resistance to virus diseases in grain legumes
8. Identification of Impact of different agronomic practices; intercropping, mixed cropping, crop rotation, *etc* in reducing virus diseases

Responsible Institute(s) FCRDI/PVIC/Department of Agriculture
Collaborating Institute(s) Faculties of Agriculture

(2) Management of Collar rots of oil crops

4. Selection of resistant varieties for collar rots
5. Identification of cultural practices in reducing collar rots
6. Identification of environmentally friendly fungicides

Responsible Institute(s) FCRDI/Department of Agriculture
Collaborating Institute(s) Faculties of Agriculture

(3) Management of early and late leaf spots of GN

- Selection of resistant varieties
- Identification of environmentally friendly fungicides
- Identification of appropriate management practices

Responsible Institute(s) FCRDI/Department of Agriculture
Collaborating Institute(s) Faculties of Agriculture

(4) Management of rust of GN

1. Identification/recommendation of appropriate management practices
2. identification of suitable, environmentally friendly fungicides with low MRLs
3. Identification/screening of resistant sources

Responsible Institute(s) FCRDI/Department of Agriculture
Collaborating Institute(s) Faculties of Agriculture

(5) Management of phyllody sesame

1. Identification/recommendation of appropriate management practices
2. Identification of suitable, environmentally friendly fungicides with low MRLs
3. Identification/screening of resistant sources

Responsible Institute(s) FCRDI/Department of Agriculture
Collaborating Institute(s) Faculties of Agriculture

(c) **HORTICULTURAL CROPS**

(i) **Vegetable, Root & Tuber Crops:**

Viral Diseases

- (1) Management of Cucurbit and capsicum virus complex .
- (2) Management of Tomato virus complex (CMV, YLCV, TSWV,CTV)
- (3) Management of Begomo viruses of beans
- (4) Management of mosaic virus of Manioc
- (5) Management of Okra yellow vein mosaic virus
- (6) Management of leaf roll virus of Potato
 1. Development of IDM Package
 2. Use of bio-control

Responsible Institute(s) HORDI/Department of Agriculture
Collaborating Institute(s) Faculties of Agriculture

Phytoplasma diseases

- (1) Management of Papaya phytoplasma disease
 1. Introduction/development of resistant varieties
 2. Screening for disease resistance
 3. Identification of resistance genes
 4. Integrated management through vector control

Responsible Institute(s) HORDI/Department of Agriculture
Collaborating Institute(s) Faculties of Agriculture

Bacterial Diseases

- (1) Management of Bacterial wilt diseases (*Erwinia* sp./ *Ralstonia* sp.) of Cucurbitaceae and Solanaceae crops
- (2) Management of Bacterial rots (*Erwinia* sp. and *Xanthomonas* sp.)
- (3) Management of *Xanthomonas* leaf spots
- (4) Management of Common and netted scab of potato

(5) Management of Tomato Canker disease (*Clavibacter michiganensis* sp *michiganensis*)

Use of Biocontrol agents, biopesticides, botanicals

1. Study of appropriate management methods
2. Selection/screening of resistant varieties to *Erwinia* sp., *Ralstonia* sp. & *Xanthomonas* spp.
3. Incorporation of organic matter
3. Study of IDM strategies

Responsible Institute(s)
Collaborating Institute(s)

HORDI/Department of Agriculture
Faculties of Agriculture

Fungal Diseases

(1) Management of Early and Late Blight of Potato & Tomato

1. Study of different strains of blight causing fungi (*Phytophthora* & *Alternaria*)
2. Screening of resistant varieties
3. Screening of environmentally friendly fungicides
4. Development of disease forecasting models

Responsible Institute
Collaborating Institutes

HORDI/Department of Agriculture
Faculties of Agriculture

(2) Management of Potato Powdery scab (*Spongospora* sp.)

1. Screening of resistant varieties
2. Screening of environmentally friendly fungicides
4. Field sanitary measures
5. Post harvest disease management

(3) Management of tomato anthracnose

- a. Study of the prevalence of the disease
- b. Identification of the strains of the pathogen
- c. Investigation of proper management methods

Responsible Institute(s)
Collaborating Institute(s)

Faculty of Agriculture, University of Ruhuna
Department of of Agriculture

(4) Management of Root & Collar rots: bean, solanaceae, cucurbitaceae

1. Changes of soil chemical / physical properties
2. Incorporation of organic amendments
3. Use of bio-control agents
4. Screening of environmentally friendly fungicides

Responsible Institute(s) HORDI/Department of Agriculture
Collaborating Institute(s) Faculties of Agriculture

(5) Management of Powdery and Downy mildew in vegetables

1. Development of resistant varieties
2. Use of IDM strategies
3. Screening of environmentally friendly fungicides
4. Use of botanicals

Responsible Institute(s) HORDI/Department of Agriculture
Collaborating Institute(s) Faculties of Agriculture

(6) Management of white rust (*Albugo* sp), Cercospora and other leaf spots/diseases of leafy vegetables

2. Development of resistant varieties
3. Screening of environmentally friendly fungicides and botanicals
4. Incorporation of organic matter and cultural practices

Responsible Institute HORDI/Department of Agriculture
Collaborating Institutes Faculties of Agriculture

(7) Management of Anthracnose of capsicum and bean

1. Development of resistant varieties
2. Screening of environmentally friendly fungicides ,botanicals and microbial-pesticides
- 3.
4. Incorporation of organic matter and cultural practices

Responsible Institute HORDI/Department of Agriculture
Collaborating Institutes Faculties of Agriculture

(8) Management of Rust of bean

1. Development of resistant varieties
2. Screening of environmentally friendly fungicides and botanicals
3. Incorporation of organic matter and cultural practices

Responsible Institute HORDI/Department of Agriculture
Collaborating Institutes Faculties of Agriculture

(9) Botrytis mold of lettuce

1. Development of resistant varieties
2. Screening of environmentally friendly fungicides , botanicals and microbial -pesticides
3. Incorporation of organic matter and cultural practices

Responsible Institute(s) HORDI/Department of Agriculture

Collaborating Institute(s) Faculties of Agriculture

(9) Management of club root disease of cabbage

1. Improvement of farmer adaptation of the available management package
2. Introduction of resistant varieties
3. Screening of environmentally friendly fungicides and botanicals
4. Incorporation of organic matters and cultural practices

Responsible Institute(s) HORDI/Department of Agriculture
Collaborating Institute(s) Faculties of Agriculture

(ii) Fruit crops:

Viral diseases

(1) Management of Papaya ring spot virus

1. Development of resistant/tolerant varieties
2. Cultural methods and nutrient management
3. Integrated approaches in disease management

Responsible Institute(s) FRDI/PVIC/Department of Agriculture
Collaborating Institute(s) Faculties of Agriculture

(2) Management of Banana bunchy top viral (BBTV) disease

1. Production of virus free planting material
2. Methods on early detection of BBTV
3. Integrated approaches in disease management
4. Vector control

Responsible Institute(s) FRDI/PVIC/Department of Agriculture
Collaborating Institute(s) Faculties of Agriculture

(3) Management of Pineapple wilt viral disease

1. Production of virus free planting material
2. Methods on virus diagnosis
3. Integrated approaches in disease management
4. Vector control

Responsible Institute(s) FRDI/PVIC/Department of Agriculture
Collaborating Institute(s) Faculties of Agriculture

(4) Management of Citrus greening viral disease

1. Production of disease free mother plants/planting materials
2. Development of resistant varieties

3. Cultural control

Responsible Institute(s)
Collaborating Institute(s)

FRDI/PVIC/Department of Agriculture
Faculties of Agriculture

- (5) Management of Passion Fruit Virus
Development of resistant varieties
Cultural control

Responsible Institute(s)
Collaborating Institute(s)

FRDI/PVIC/Department of Agriculture
Faculties of Agriculture

- (6) Management of Banana Black Mosaic Virus and CMV
Development of resistant varieties
Cultural control

Responsible Institute(s)
Collaborating Institute(s)

FRDI/PVIC/Department of Agriculture
Faculties of Agriculture

- (7) Management of Root Disease of Pineapple
Development of resistant varieties
Cultural control

Responsible Institute(s)
Collaborating Institute(s)

FRDI/PVIC/Department of Agriculture
Faculties of Agriculture

Phytoplasma diseases

- (1) Management of Papaya phytoplasma

1. Production of disease free mother plants/planting materials
2. Development of resistant varieties
3. Cultural control

- (2) Management of phytoplasma in Avacado

1. Production of disease free mother plants/planting materials
2. Development of resistant varieties
3. Cultural control

Fungal diseases

- (1) Panama disease of banana and fungal rot of banana

1. Selection of resistant clones/cultivars
2. Use of cultural and bio-control methods
3. Integrated Disease Management

Responsible Institute(s)

FRDI/Department of Agriculture

Collaborating Institutes

Faculties of Agriculture

(2) Anthracnose of Guava, Mango, Pomegranate, Papaya, Avocado, Passion fruit, Dragon fruit, Grapes, Strawberry

1. Development of resistant varieties
2. Development of tree management systems
3. Screening of environmentally friendly fungicides and botanicals
4. Introduction of cultural practices

Responsible Institute

FRDI/Department of Agriculture

Collaborating Institutes

Faculties of Agriculture

(3) Development of management systems for Phytophthora & Phythium root rots/dieback of Papaya, Jak, Guava and Citrus

1. Selection of resistant cultivars
2. Use of cultural and bio-control methods
3. Integrated Disease Management
4. Resistant rootstocks
5. Screening fungicides

Responsible Institute(s)

FRDI/Department of Agriculture

Collaborating Institute(s)

Faculties of Agriculture

(4) Development of management systems for White root disease of Durian, Jak, Rambutan and Anona

1. Selection of resistant cultivars
2. Use of cultural and bio-control methods
3. Integrated Disease Management

Responsible Institute(s)

FRDI/Department of Agriculture

Collaborating Institute(s)

Faculties of Agriculture

(5) Management of Sigatoka & Codana diseases of Banana (leaf diseases of banana)

1. Selection of resistant clones/cultivars
2. Screening of environmentally friendly fungicides
3. Use of cultural and bio-control methods
4. Integrated Disease Management

Responsible Institute(s)

FRDI/Department of Agriculture

Collaborating Institutes

Faculties of Agriculture

(6) Management of Powdery mildew of Rambutan and Citrus

1. Screening of fungicides and time of application
2. Testing of plant extract based products against the pathogen
3. Cultural control

Responsible Institute(s) FRDI/Department of Agriculture
Collaborating Institute(s) Faculties of Agriculture

(7) Management of Downy mildew of grapes

1. Screening of low residue fungicides and time of application
2. Testing of botanicals
3. Cultural control

Responsible Institute(s) FRDI/HORDI/Department of Agriculture
Collaborating Institute(s) Faculties of Agriculture

(8) Management of Dragon fruit-stem spots

1. Screening of environmentally friendly fungicides and time of application
2. Testing of botanicals
3. Cultural control

Responsible Institute(s) FRDI/Department of Agriculture
Collaborating Institute(s) Faculties of Agriculture

(9) Botrytis mold of strawberries, grapes

1. Screening of low residue fungicides and time of application
2. Testing of botanicals
3. Cultural control

Responsible Institute(s) HORDI/FRDI/Department of Agriculture
Collaborating Institute(s) Faculties of Agriculture

(10) Management of Scab Disease of Citrus

1. Screening of environmentally friendly fungicides and time of application
2. Testing of botanicals
3. Cultural control

Responsible Institute(s) FRDI/Department of Agriculture
Collaborating Institute(s) Faculties of Agriculture

(11) Management of Collar Rot Disease of Passionfruit

1. Screening of environmentally friendly fungicides and time of application
2. Testing of botanicals
3. Cultural control

Responsible Institute(s) FRDI/Department of Agriculture
Collaborating Institute(s) Faculties of Agriculture

(12) Management of Guava Wilt Disease

1. Screening of environmentally friendly fungicides and time of application

2. Testing of botanicals
3. Cultural control

Responsible Institute(s)
Collaborating Institute(s)

FRDI/Department of Agriculture
Faculties of Agriculture

Bacterial diseases

(1) Management of Bacterial fruit blotch of water melon and Erwinia Root Rot of Banana

1. Study of appropriate management methods
2. Selection/screening of resistant varieties
3. Adoption of cultural methods
4. Study of IDM strategies

Responsible Institute(s)
Collaborating Institute(s)

HORDI/FRDI/Department of Agriculture
Faculties of Agriculture

(2) Management of Bacterial canker of citrus

1. Study of appropriate management methods
2. Selection/screening of resistant varieties
3. Adoption of cultural methods
4. Study of IDM strategies

Responsible Institute(s)
Collaborating Institute(s)

FRDI/Department of Agriculture
Faculties of Agriculture

(iii) Floricultural crops:

- (1) Management of Bacterial blight of Anthurium
- (2) Management of Bacterial wilt of cut flowers, ornamental plants and foliage

1. Screening of varieties against bacterial blights and wilts
2. Induction of resistance to bacterial diseases
3. Development of cultural control packages to manage bacterial blights & wilts
4. Use of botanicals and microbial bio control agents to manage bacterial pathogens

Responsible Institute(s)
Collaborating Institute(s)

Department of Botanic Gardens /Department
of Agriculture
Faculties of Agriculture

- (3) Management of Downy and powdery mildews of roses
- (4) Management of Rust of cut flowers
- (5) Management of Fungal leaf spots, root and collar rots of all potted flowering plants
- (6) Management of Bacterial leaf spots

1. Epidemiological studies
2. Development of a disease management package for poly tunnels
3. Identification of causal organisms of above important diseases and recommendation of environmentally friendly pesticides
4. Development of methods to minimize post-harvest diseases of flowers and cut foliage

Responsible Institute(s) Department of Botanic Gardens /Department of Agriculture
 Collaborating Institute(s) Faculties of Agriculture

- (7) Management of Fusarium rots on Gerbera & Carnation
- (8) Management of Fusarium rots in flower spike of orchids
- (9) Management of Botrytis spotting in flower petals

1. Development of cultural and disease management packages
2. Identification of least toxic chemicals to manage cut foliage diseases
3. Development of methods to minimize post-harvest diseases of cut foliage
4. Development of methods to minimize post-harvest diseases of flowers and cut foliage

Responsible Institute(s) Department of Botanic Gardens /Department of Agriculture
 Collaborating Institute(s) Faculties of Agriculture

- (10) Management of Viral diseases of cut flowers and foliage plants

1. Vigilance of viral diseases cut flowers & foliage
2. Prevention of spread of viral diseases of cut flowers & foliage
3. Elimination of viral diseases cut flowers & foliage
4. Introduction and multiplication of resistant cultivars

Responsible Institute(s) Department of Botanic Gardens /Department of Agriculture
 Collaborating Institute(s) Faculties of Agriculture

(d) PLANTATION CROPS

(i) Coconut

- (1) Management of Weligama coconut leaf wilt disease (WCLWD)

1. Develop a readily diagnostic method for identification of diseased palms
2. Determine vectors transmitting the disease and develop management strategies for those insects
3. Develop tolerant / resistant varieties to the disease
4. Determine spread pattern of the disease
5. Determine the impact of the disease on economy

Responsible Institute(s) Coconut Research Institute

Collaborating Institute(s)

Faculties of Agriculture and Science,
Department of agriculture

(2) Management of Crown, stem and bole diseases of coconut (bud rot, leaf blight, stem bleeding, Ganoderma root & bole rot)

1. Recommendation of effective management strategies
2. Screening of environmentally friendly new fungicides

Responsible Institute(s)
Collaborating Institute(s)

Coconut Research Institute
Faculties of Agriculture

(ii) Rubber

1. Management of white root disease

- 1) Screening of potential fungicides to identify effective chemicals for the management of the disease
- 2) Introduction of advance application technologies for the management of the disease
- 3) Screening of clonal materials to select a resistant root stock towards white root disease
- 4) Establishment of the disease distribution – survey and to assess the economic impact
- 5) Studies on the introduction & improvement of biological control measures against white not disease

Responsible Institute(s)
Collaborating Institute(s)

Rubber Research Institute
Agriculture Faculties

2. Management of Corynespora leaf fall disease

- 1) Studies on the disease distribution and the biology of new pathogen population
- 2) Screening of clones against CLFD to identify disease resistant clones
- 3) Development of management strategies against Corynespora leaf fall disease
- 4) Identification of alternative hosts of *C cassiicola* to avoid cross inoculation abilities

Responsible Institute(s)
Collaborating Institute(s)

Rubber Research Institute
Agriculture Faculties

3. Management of phytophthora disease

- 1) Studies on the new pathogen population
- 2) Introduction of substitute chemicals to control the phytophthora bark rot disease
- 3) Screening of clones against phytophthora leaf disease and phytophthora bark rot.

Responsible Institute(s)
Collaborating Institute(s)

Rubber Research Institute
Agriculture Faculties

4.

Management of Patch Canker disease

- 1) Identification of the associated pathogens of the rot condition – Patch Canker
- 2) Identification of possible pre-disposing factors of the disease

- 3) Screening of chemicals to unholy the disease
- 4) Studies an the life of the pathogen

Responsible Institute(s)	Rubber Research Institute
Collaborating Institute(s)	Agriculture Faculties

Management of Brown disease

- 1) Establishment of disease distribution – Survey
- 2) Collection of the new pathogen population and studying the biology of pathogen
- 3) Improvement of management strategies

Responsible Institute(s)	Rubber Research Institute
Collaborating Institute(s)	Agriculture Faculties

(iii) Sugarcane

(1) Management of White leaf disease

1. Screening for phytoplasma disease resistance
2. Studies on vector management
3. Development of novel and rapid technologies for supplying healthy seed cane for WLD

Responsible Institute(s)	Sugarcane Research Institute
Collaborating Institute(s)	Faculties of Agriculture & Science

(3) Management of Smut disease

(Include both newly-bred varieties & germplasm screening for smut)

1. Screening for smut disease resistance
2. Development of novel and rapid technologies for supplying healthy seed cane

Responsible Institute(s)	Sugarcane Research Institute
Collaborating Institute(s)	Faculties of Agriculture & Science

(4) Management of Leaf scald disease

Newly-bred verities & germplasm screening

1. Screening for leaf scald disease resistance

Responsible Institute(s)	Sugarcane Research Institute
Collaborating Institute(s)	Faculties of Agriculture & Science

(iv) Tea

- (1) Development of high yielding tea cultivars with resistance to blister blight disease

1. Screening of High productive biotics from old seedling tea fields
2. Screening of Progenies coming from the plant breeding programmes
3. Use of quick, reliable and advanced screening techniques

Responsible Institute(s)	Tea Research Institute
Collaborating Institute(s)	Faculties of Agriculture

(2) Screening of environmentally friendly approaches in the management of blister blight disease

1. Bio-efficacy of low toxic fungicides against *Exobasidium vexans*
2. Bio-efficacy of low toxic new fungicides against non-target friendly organisms (fungi)
3. Natural defense elicitor/inducer and bio control of *E. vexans*
4. Monitoring/establishing acceptable residue levels of new fungicides

Responsible Institute(s)	Tea Research Institute
Collaborating Institute(s)	Faculties of Agriculture

(3) Development of high yielding tea cultivars with resistance to canker diseases

1. Screening of High productive biotics from old seedling tea fields
2. Screening of Progenies coming from the plant breeding programme
3. Use of quick, reliable and advanced screening techniques

Responsible Institute(s)	Tea Research Institute
Collaborating Institute(s)	Faculties of Agriculture

(4) Management of Bush dieback of selected cultivars/regions

1. Establishing the causes of bush debilitation and die back
2. Develop management strategies to contain bush debilitation/die back

Responsible Institute(s)	Tea Research Institute
Collaborating Institute(s)	Faculties of Agriculture

(v) Nuts

(1) Management of Cashew Inflorescence die-back

1. Identification of causative agents and associated factors in the development of inflorescence die-back of cashew
2. Effective management of cashew die back

Responsible Institute(s)	Cashew Corporation of Sri Lanka
Collaborating Institute(s)	Faculties of Agriculture

(e) EXPORT AGRICULTURAL (SPICE) CROPS

(1) Management of Cloves & Nutmeg, leaf blight & leaf fall

1. Establishing the causes/identity of the causal organisms
2. Integrated approach to contain the disease/s

Responsible Institute(s)	Department of Export Agriculture
Collaborating Institute(s)	Faculties of Agriculture

(2) Management of Bacterial leaf blight of betel

1. Screening of local betel cultivars for disease resistance
2. Induction of variation and selection for resistance
3. Development of cultural control practices
4. Development of environmentally friendly chemical control methods
5. Use of plant extracts for the control of bacteria

Responsible Institute(s)	Department of Export Agriculture
Collaborating Institute(s)	Faculties of Agriculture

(3) Management of Rhizome rot & bacterial wilt of ginger

1. Identification of causal agent/s and associated factors in the development of the diseases
2. Identification of suitable management practices

Responsible Institute(s)	Department of Export Agriculture
Collaborating Institute(s)	Faculties of Agriculture

(4) Management of Pepper yellow mottle virus (PYMV) & pepper slowing

1. Adopting different agronomic practices for the management of PYMV
2. Molecular based methods for detection and screening against the pathogen
3. Biological control of vectors

Responsible Institute(s)	Department of Export Agriculture
Collaborating Institute(s)	Faculties of Agriculture

(5) Management of Cinnamon rough bark disease

1. Correct identification of the pathogen
2. Effective management of rough bark disease

Responsible Institute(s)	Department of Export Agriculture
Collaborating Institute(s)	Faculties of Agriculture

(6) Management of White root disease of Cinnamon & Nut meg

1. Biological and cultural control methods for management of white root disease
2. Development of IDM strategies to contain the spread of the disease

Responsible Institute(s) Department of Export Agriculture
Collaborating Institute(s) Faculties of Agriculture

(7) Management of Quick wilt/foot rot of pepper

1. Identification of the causal organism/s and other related factors that affect disease development
2. Use of biological control agents (i.e. *Trichoderma* sp.) for sustainable management of the disease

Responsible Institute(s) Department of Export Agriculture
Collaborating Institute(s) Faculties of Agriculture

(8) Management of Leaf Blight Disease of Cinnamon

1. Development of IDM Strategies to control the disease

Responsible Institute(s) Department of Export Agriculture
Collaborating Institute(s) Faculties of Agriculture

(9) Management of Brown Root Disease of Cinnamon

1. Identification of the causal organism/s and other related factors that affect disease development
2. Development of IDM Strategies to control the disease

Responsible Institute(s) Department of Export Agriculture
Collaborating Institute(s) Faculties of Agriculture

(f) POST-HARVEST MANAGEMENT

(1) Prevention of post harvest infection of EAC products by pathogens through pre-treatment and proper storage/packing systems

Responsible Institute(s) Department of Export Agriculture/ Institute
of Post Harvest Technology
Collaborating Institute(s) Faculties of Agriculture

(2) Management of post-harvest diseases of fruits , vegetables and other crops.

1. Pre-harvest disease management practices to manage postharvest quality
2. Post-harvest treatments (hot water, edible wax, etc.)

Responsible Institute(s) Institute of Post Harvest Technology
Department of Agriculture

Collaborating Institute(s) Faculties of Agriculture

(3) Control of post harvest diseases of fruits and vegetables using GRAS chemicals, natural products, biopesticides and chemical elicitors

Responsible Institute(s) Institute of Post Harvest Technology
HORDI/Department of Agriculture
Collaborating Institute(s) Faculties of Agriculture

(g) FOREST TREES

(1) Control of die-back of teak

1. Epidemiology of disease
2. Integrated management of die-back

Responsible Institute(s) Forest Department
Collaborating Institute(s) Faculties of Agriculture

(h) OTHERS

(1) Management of diseases in protected agriculture

1. Screening/selection of resistant varieties to major bacterial diseases
2. Screening/selection of resistant varieties to major viral diseases
3. Study of causes of physiological disorders

Responsible Institute (s) Department of Agriculture
Collaborating Institute (s) Faculties of Agriculture

(2) Elimination of non-target effects of agro-chemicals

1. Screening of environmentally safe agro-chemicals
2. Screening them against non-target, friendly organisms

Responsible Institute (s) Registrar of Pesticides
Department of Agriculture
Department of Export Agriculture
Cinnamon Research Institute
Tea Research Institute
Coconut Research Institute
Collaborating Institute (s) Faculties of Agriculture

(3) Contamination of agro-products

1. Bio-efficacy of low toxic pesticides against common pests & diseases
2. Monitoring/establishing acceptable residue levels of new pesticides

Responsible Institute (s)	Registrar of Pesticides Department of Agriculture Tea Research Institute & Tea Board Department of Export Agriculture, Coconut Research Institute & Board
Collaborating Institute (s)	Industrial Technology Institute, Faculties of Agriculture & Sciences

(4) Management of seed borne pathogens

1. Identification of major seed borne pathogens (SBP) associated with locally produced and imported seed lots of major crops grown in Sri Lanka
2. Development of management practices for SBP
3. Development of seed health standards for seed borne diseases
4. Development of quick detection techniques

Responsible Institute (s)	Department of Agriculture/SCPPC Department of Export Agriculture,
Collaborating Institute (s)	Faculties of Agriculture

(5). Development of a plant disease forecasting system for agricultural areas in Sri Lanka

Responsible Institute(s) Collaborating Institute(s)	Faculty of Agriculture, Department of of Agriculture
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(6). Understanding the taxonomic relationships and pathogenic behavior of different colletotrichum spp. In Sri Lanka

Responsible Institute(s) Collaborating Institute(s)	Faculty of Agriculture, Department of of Agriculture
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(7). Management of diseases in Medicinal plants

Responsible Institute(s) Faculty of Agriculture, Collaborating Institute(s)	Department of of Agriculture
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(8). Utilization of plant growth promoting bacteria for disease and stress tolerance

Responsible Institute(s) Collaborating Institute(s)	Faculty of Agriculture, Department of of Agriculture
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National Strategy on Weeds

An action Plan for National Weed Management has been formulated where weeds of national significance has been identified.

1. Mission:

A National Weed Strategy to reduce the detrimental impact of weeds on the sustainability of Sri Lanka's agriculture, forestry, wildlife and other natural resources.

2. Weeds of National Significance

Weeds of National Significance have been identified based on the scientific information available and the efforts made in terms of research by the Department of Agriculture, Department of Export Agriculture, Commodity Research Institutes (Tea, Rubber, Coconut, Sugarcane), Department of National Botanical garden and Universities. Weeds of national significance have been identified and listed below in alphabetical order.

Rice

	Common Name		Scientific Name
	English Name	Name used by Farmers	
01	Jungle rice, Bird rice	Heen-maruk, Wel-maruk	<i>Echinochloa colonum</i>
02	Barnyard grass, Water grass	Maha-maruk, Bajiri	<i>Echinochloa crus-galli</i>
03	Barnyard grass, Water grass	Maruk, Bajiri	<i>Echinochloa glabrescens</i>
04	Torpedo grass	Atawara	<i>Panicum repens</i>
05	Red sprangletop	Ashwa-waligaya	<i>Leptochloa chinensis</i>
06	Wrinkle duck beak	Gojarawalu, Goma-thana	<i>Ischaemum rugosum</i>
07	Buffalo grass	Gira-thana, Paspalum	<i>Paspalum distichum</i>
08	Finger grass, Tropical crab grass	Digitaria, Weedoru-wal	<i>Digitaria ciliaris</i>
09	Goose grass, Wire grass	Bela-thana	<i>Eleusine indica</i>
10		Batadella	<i>Isachne globosa</i>
11	Lesser fimbriatylis	Heen-kudamatta	<i>Fimbristylis miliacea</i>
12	Tall fringe rush	Maha-kudamatta	<i>Fimbristylis dichotoma</i>
13		Kuda-matta	<i>Scirpus supinus</i>
14	Umbrella sedge, Rice flat sedge	Thunessa	<i>Cyperus iria</i>
15	Small flower, Umbrella plant	Mottu, Bola-thunessa	<i>Cyperus difformis</i>
16	Purple nutsedge	Kalanduru	<i>Cyperus rotundus</i>
17	Monochoria, Pickerel weed	Diya-habarala	<i>Monochoria vaginalis</i>
18	Water orchid	Japan-jabara	<i>Eichhornia crassipes</i>
19	Yellow water lettuce	Diya-gowa	<i>Limnocharis flava</i>
20		Wel-karanbu	<i>Ludwigia octovalvis</i>
21		Wel-karanbu	<i>Ludwigia perennis</i>
22	Spreading dayflower	Maha-girapala	<i>Commelina diffusa</i>
23	Spreading dayflower	Heen-girapala	<i>Murdania nudiflora</i>
24		Mudu-mahana	<i>Sphaeranthus indicus</i>
25	Joint vetch	Wel-siyambala	<i>Aeschynomene indica</i>
26	Goose weed	Wel-anoda	<i>Sphenoclea zeylanica</i>
27	White heads, False daisy	Keekirindiya	<i>Eclipta alba</i>
28	Kariba weed	Salvenia	<i>Salvinia molesta</i>
29	Water clover, Clover fern	Pethi-pala, Hatarapethiya	<i>Marsilea quadrifolia</i>
30	Weedy rice	Pandisamba, Wal-goyam	<i>Oryza sativa, spontanea</i>

(a) Lowland Rice:

Common Name	Scientific Name
Weedy rice	(a) <i>Oryza sativa, spontanea</i>
Barnyard grass (<i>Wel maruk</i>)	(b) <i>Echinochloa crus-galli</i>
Red sprangletop (<i>Ashwa waligaya</i>)	(c) <i>Leptochloa chinensis</i>
Wrinkle grass (<i>Gojara</i>)	(d) <i>Ischaemum rugosum</i>
Swamp millet (<i>Batadella</i>)	(e) <i>Isachne globosa</i>
Willow primrose (<i>Kaha karabu</i>)	(f) <i>Ludwigia spp.</i>
Umbrell sedge	<i>Cyperus iria</i>
Small flower umbrella plant	<i>Cyperus difformis</i>

(b) **Upland Rice and Other Field Crops:**

Common Name	Scientific Name
Purple nutsedge (<i>Kalanduru</i>)	(a) <i>Cyperus rotundus</i>
Obscure morning glory (<i>Thelkola</i>)	(b) <i>Ipomoea obscura.</i>
Wire grass	(c) <i>Eleusine indica</i>
Diya meneriya	(d) <i>Commelina bengalensis</i>

(c) **Horticultural Crops:**

Common Name	Scientific Name
Purple nutsedge (<i>Kalanduru</i>)	(a) <i>Cyperus rotundus</i>
Cogongrass (<i>Illuk</i>)	(b) <i>Imperata cylindrica</i>

(d) **Plantation Crops:**

Tea

Common Name	Scientific name
Broad leaved weed	
Getakola	<i>Spermacoce species</i>
Val Niwithi (Passalaikodi)	<i>Anrederacordifolia</i>
Val Alakola	<i>Caladium species</i>
WelKohila	<i>Syngonium species</i>
Koster's curse	<i>Clidemiahirta</i>
Sudana (Alawangupillu)	<i>Erigeron sumatrensis</i>
Kadupahara (Thandampillu)	<i>Crassocephalumcrepidioides</i>
Girapala (Amalei)	<i>Commellinadiffusa</i>

Grasses	
Atora	<i>Panicumrepens</i>
HeenAtora	<i>Panicumtrichocledum</i>
Kalanduru	<i>Cyperusrotundus</i>
KammbiThanakola	- To be traced -

Coconut

Common Name	Scientific Name
Siam weed (<i>Podisinno maran</i>)	(a) <i>Chromolaena odorata</i>
Gandapana	(b) <i>Lantana camara</i>
Morning glory	(c) <i>Ipomoea violacea</i>
Pupula	(d) <i>Vernonia zeylanica</i>
	(e) <i>Hypis suaveolens</i>
Gunia grass	(g) <i>Panicum maximum</i>
	(h) <i>Rhynchophorus polystachion</i>

Rubber

Common Name	Scientific Name
Cogon grass (<i>Illuk</i>)	(a) <i>Imperata cylindrica</i>
Chinese creeper (<i>Wathu palu</i>)	(b) <i>Mikania micrantha</i>
Wathupalu	(c) <i>Mikania cordata</i>
Getakola	<i>Hedyotis auricularia</i>
Gini	<i>Brachiaria brizantha</i>
Podisinghomaran	<i>Chromolaena odorata</i>

Sugarcane

Common Name	Scientific Name
Guinea grass	(a) <i>Panicum maximum</i>
Cogon grass (<i>Illuk</i>)	(b) <i>Imperata cylindrica</i>
Kiri wel	<i>Ischenocarpus furtescens</i>
Morning glory	<i>Ipomoea spp</i>
Purple nutsedge (kalanduru)	<i>Cyperus rotundus</i>
Cogongrass (<i>Illuk</i>)	<i>Imperata cylindrica</i>
Atora	<i>Panicum ripens</i>

(e) Export Agriculture Crops:

Common Name	Scientific Name
Guinea grass	(a) <i>Panicum maximum</i>
Chinese creeper (<i>Wathu palu</i>)	(b) <i>Mikania micrantha</i>
Mission grass (<i>Rila thana</i>)	(c) <i>Pennisetum polystachyon</i>

(f) Floriculture crops

- a. *Lantana camara*
- b. *Ipomoea pudica*
- c. *Panicum maximum*
- d. *Maikania makaranta*
- e. *Ipomea violaceae*

(i) Non. Crops

Aquatic

Common Name	Scientific Name
Giant salvinia	(a) <i>Salvinia molesta</i>
Water hyacinth (<i>Japan jabara</i>)	(b) <i>Eichhornia crassipes</i>

Terrestrial

Common Name	Scientific Name
Giant mimosa (<i>Yoda nidikumba</i>)	(a) <i>Mimosa pigra</i>
Lantana (<i>Gandapana</i>)	(b) <i>Lantana camara</i>
Guinea grass	(c) <i>Panicum maximum</i>
Congress weed	(d) <i>Parthenium hysterophorus</i>
Aruna devi	(e) <i>Spagneticola trilobata</i>

3 Action Plan for National Weed Management in Sri Lanka

	Goal	Objectives	Strategies	Responsibility
1	To prevent outbreaks of new weed problems	To prevent introduction, entry and spread of new plant species with weed potential.	Develop inventories of plant species with weedy potentials (Global)	DOA , CARP Ministry of environment, NARA, Mahawelli Authority
			Ensure effective enforcement of the plant quarantine regulations	NPQS, DOA, SLC
			Improving awareness among people at all levels.	CARP, DOA, Wild life, Department of Irrigation, Ministry of Environment, Universities and Provincial councils, and Divisional secretarial
		To ensure early detection of and rapid action against weed problems.	Develop an effective reporting system.	FA, CARP, DOA, Institutions, Universities. Commodity research institute
			To reduce weed spread to new areas in the country.	MA, CARP , DOA/ Department of Forest, Ministry of Environment. Department of Irrigation and wildlife
2	To reduce the impact of weeds of national significance (WONS).	To facilitate the identification of WONS on agricultural land.	Establish criteria for identification of weeds.	CARP, DOA, NBG, Universities
		To apply integrated and cost effective weed management	Encourage research on weed biology and control.	All stakeholders, CARP, NARS, FA

		techniques to solve the problems of established weeds.	Explore the possibilities for utilization of the problem weeds	All stakeholders, CARP	
			Improving awareness among people at all levels.	All stakeholders, CARP	
3	To provide the framework and capacity for management of weeds of national significance.	To strengthen national research, education and training capacity to ensure cost effective, efficient and sustainable weed management.	Develop Programme for Capacity building.	All stakeholders All stakeholders, CARP	
			Provide financial assistance.	CARP.	
		To encourage the development and implementation of strategic plans for weed management at all levels.	Develop a coordinated mechanism for implementation of weed management strategies.	All stake holders, CARP	
			Define the role of stake-holders' in weed management programmes	All stake holders, CARP	
			Develop and implement reward scheme.	CARP	
4	To identify invasive plant species that may be potential weeds	To prevent introduction and spread of invasive plant	Identification and characterization of invasive plants	DNBG, DOA, All stake holders, MPQS	
				Creation of awareness of invasive plants	DNBG, DOA, All stake holders, MPQS
				Reporting and mapping of invasive plants spread	DNBG, DOA, All stake holders, MPQS
				Effective management	DNBG, DOA, All stake holders,

			strategies for invasive plants	MPQS
5	To reduce the impact of herbicides	Identification of safer herbicides and safer methods of weed control	Develop methods to identify safer weedicides Development of weed management techniques using allelopathic properties of crops	DOA, ROP and all stakeholders
		Management of herbicides resistant weeds	Screening of herbicides resistant weeds populations and particular herbicides	DOA, CARP and other stakeholders
			Propose integrated weed management strategies for their management	DOA, CARP and other stakeholders

4 The Strategic Research Program on Weeds

- (1) Integrated Weed Management (IWM) strategies for lowland paddy, vegetables, and Upland Agricultural Crops, with special reference to weeds of national significance in the relevant sector.

Responsible Institute(s)	Department of Agriculture Department of Export Agriculture
Collaborating Institute(s)	Faculties of Agriculture Crop Life Sri Lanka

- (2). Evaluation of new herbicides for rice, other field crops and Plantation Crops.

Responsible Institute(s)	Department of Agriculture Department of Export Agriculture Commodity Research Institutes
Collaborating Institute(s)	Faculties of Agriculture and Science Crop Life Sri Lanka

- (3) Area specific systematic monitoring of weed flora.

Responsible Institutes	Department of Agriculture Department of Export Agriculture Faculties of Agriculture and Science Commodity Research Institutes
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- (4) Control and management of noxious weeds in wastelands and aquatic habitats inclusive of irrigation canals *eg: Salvinia molesta, Eichhornia crassipes, Mimosa pigra* and *Parthenium hysterophorus*.

Responsible Institute(s)	Department of Agriculture National Aquatic Resources Agency Ministry of Forestry & Environment Irrigation Department
Collaborating Institute(s)	Faculties of Agriculture and Science Crop Life Sri Lanka

- (5) Development of low cost weed management systems for rubber and coconut lands, tea, sugarcane plantations, with special reference to areas in the relevant sector

Responsible Institute(s)	Tea, Rubber, Sugarcane Research Institutes Coconut Research Institute
Collaborating Institute(s)	Faculties of Agriculture, Science Crop Life Sri Lanka

(6) Effect of weeds and weed control measures on cinnamon

Responsible Institute(s)	Department of Export Agriculture
Collaborating Institute(s)	Faculties of Agriculture and Science Crop Life Sri Lanka

(7) Development of weed management techniques using allelopathic properties of crops

Responsible Institute(s)	Department of Agriculture Faculties of Agriculture Commodity Research Institutes
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(8) Management of environmental effects of herbicide-resistant weeds and reduced effect of herbicides.

Responsible Institute(s)	Department of Agriculture Faculties of Agriculture Commodity Research Institutes
Collaborating Institute(s)	Crop Life Sri Lanka

(9) Integrated (crops and animal) farming approach for weed management in mixed gardens and smallholder sector in wet and intermediate zones.

Responsible Institute(s)	Department of Agriculture Faculties of Agriculture Commodity Research Institutes
Collaborating Institute(s)	Crop Life Sri Lanka

10. Identification and dissemination of information for the general public

Responsible Institute(s) : Department National Botanic garden