The Impacts of Alien Invasive Plant Species on Livelihood and Agriculture

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1. Executive Summary

Alien invasive plants are non-native species that have spread over one or more habitats depending on their ability to grow and reproduce rapidly, adapt to new ecosystems, and propagate adequately in the area. These species are endangering biodiversity and posing negative impacts on the economy, agriculture, tourism and society. Agriculture is severely affected by crop damage, degradation of pasturelands and farmlands. Similarly, it creates numerous issues on economy, health and the society. At present, Sri Lanka has identified 20 high-invasive alien plants with priority and 15 potential invasive species. Among these species, there are aquatic plants such as Salvinia *(Salvinia molesta),* Water Hyacinth *(Eichhornia crassipes),* Parthenium *(Parthenium hysterophorus),* Yoda Nidikumba *(Mimosa pigra),* Alligator *(Alternanthera Philoxeroides),* Ludvigia *(Ludvigia sedoides)* andGinithana*(Panicum maximum)* ,and terrestrial plants. Similarly, a strenuous and costly effort has to be taken to prevent the invasive growth and spread of this host.

Likely, the Plant Protection Act No. 35 of 1999 has been introduced to deal with the invasive plants in Sri Lanka and Plant Protection Service of the Department of Agriculture is functioning as the implementing authority. Accordingly, the main objective of the Plant Protection Service is to identify the organisms that are harmful or destructive to the plants in Sri Lanka, prevent them from spreading and to preserve the health of the plants in Sri Lanka. Similarly, the Plant Protection Service has to deal with minimizing the effects of aquatic weeds and invasive weeds on agriculture. Despite the lapse of more than 20 years since the enactment of the Act, no regulations have yet been formulated to initiate legal action against a person convicted under the Act. Similarly, the Director-General or Authorized Officers have the power to take action, to carry out work and to recover costs incurred thereon in accordance with the Act, but it has not been established that action has been taken accordingly in respect of invasive plants scattered throughout Sri Lanka. Although the Plant Protection Service has indicated that 933 authorized officers have been designated throughout the island to assist in the implementation or enforcement of the provisions of the Act, it was observed that they were not actively involved in carrying out such activities and there was no regular and positive linkage between the authorized officers and the Plant Protection Service.

These alien invasive plant species have been spreading in Sri Lanka for more than a century. Although insects had been introduced to control the spread of Salvinia and Water Hyacinth, Salvinia had been administered to a considerable extent. Nevertheless, such measures had not been successful in suppressing Water Hyacinth. There was no indication that the Department of Agriculture had conducted a successful research for this purpose or focused its attention on conducting such research, even at present. Although some strategies had been used to control invasive plants, they had proved to be unsuccessful and impermanent. For example, Yoda Nidikumba plants were spreading aggressively throughout the island. Although that species had been removed and burned, it could be reproduced shortly thereafter and accordingly, it was observed that the time, effort and expense involved thereon had become fruitless. In the year 2016, a project had been implemented and completed by the Biological Secretariat of the Ministry of Environment at a cost of Rs.120.55 million in order to control the entry and spread of the invasive species into the country. Although it had provided policy, strategic and action plans and raise awareness, it had not been found to play a significant physical role in preventing and controlling the spread of invasive plant species in Sri Lanka.

Accordingly, audit concludes that all the public institutions, including the Department of Agriculture should take measures to provide lasting solutions in this connection based on new researches by way of establishing regulations in accordance with the Plant Protection Act No 35 of 1999, maintaining an up-to-date information system for the Authorized Officers, and formulating a mechanism for monitoring their activities, providing adequate training for officers and authorized officers of the institute, identifying invasive alien plant species, implementing a systematic program for the control and prevention of spreading invasive flora, taking steps to obtain adequate funds for control and prevention of expansion, levying substantial fines from the persons convicted under the Act, and establishing an incentive scheme to encourage the performance of the functions of the Authorized Officers .

2. Introduction, Background and Nature of the Report

2.1.1 Introduction

Sri Lanka is a country highly rich in biodiversity (flora and fauna species found in a plot of land). Sri Lanka with a tropical climate is about 65,610 square kilometers in extent. The biodiversity in a part of the country, where a large number of flora and fauna are endemic to Sri Lanka, cannot be found in any other tropical country in the world. The origin of this diversity is further supported by the fact that it is an island with no connection to another country.

There are many potential threats to such a beautiful ecosystem. But it is only humanity who is at the forefront of these threats.

What we call “alien invasive plants" are plants that have become a threat to the balance of the ecosystem and threatened to degrade it. Such plants are often a foreign-born plant with no link to that environment. That is, plants enter a foreign ecosystem that does not have their own heritage and that grows beyond the flora and fauna of the ecosystem, thus posing severe threats to the survival of endemic plants and animals in that country. The damage caused by such plants affects agriculture, ecosystems, forests, aquatic and wetlands, day-to-day lives of human beings and animals, and the health. These plants degrade the existence of all ecosystems and this problem is increasing annually. Over the last several decades, a large number of invasive species have entered Sri Lanka, well positioned, spread throughout the country, and endangered the ecosystem. These plants have been introduced into the country as plants grown for home gardening, introduced to the Peradeniya Botanical Gardens, mixed with other seed varieties, and as plants used for soil conservation. For example, plants such as the Water Hyacinth, salvinia, and Yoda Nidikumba can be named.

Characteristics of alien invasive plants

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i. Rapid growth (alligator plant)
ii. Short-term breeding (thorns)
iii. Producing a large number of spores (Podisigngnomarn)
iv. Seed Propagation through different means(water, wind, animals, humans)
v. Propagation by plant parts in addition to seeds. (Water Hyacinth)

vi. Adaptation to different climatic and environmental conditions.

vii. Growth potential beyond the local plant species (myconia, thorns)

viii. Providing habitat for disease-borne insects (Salvinia, Water Hyacinth)

ix. Reducing crop yield.

x. Causing damages to the environmental beauty. (Yoda Nidikumba)

Common Characteristics of Alien Invasive Species

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i. They have a long history of being invasive outside the natural environment.

ii. It is widespread in different ecosystems

iii. They grow and reproduce rapidly and mature quickly.

iv. They breed efficiently and show great success in spreading.

v. They can cope with hard conditions. Eg:- Capability to last for a long period without water and various adaptation to withstand environmental conditions.

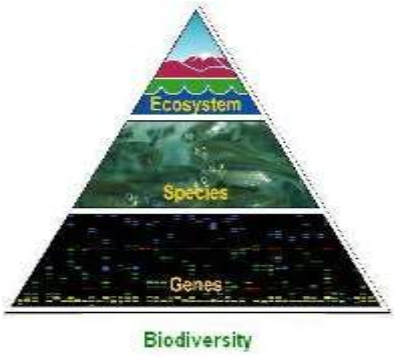
vi. These plants have the potential to produce chemical substances that inhibit development of other plants.

2.1.2 Alien Invasive Plants

These invasive species are found in the dry zone, low country wet zone, upcountry dry zone and island wide and have been observed spread in tanks, reservoirs, marshes, streams, forests, grasslands and barren land etc. Details appear in Annexure 01.

2.1.3 Influence of Alien Invasive Plants

Biodiversity



Biodiversity= Gene diversity+ Species diversity + Ecosystem diversity

Due to the undisturbed ecosystems and high biodiversity, the following benefits are received.

(a) The effectiveness of the ecosystem increases.
(b) Helps the survival of a large number of flora and fauna Species.
(c) Protects the water resource
(d) Accelerates soil generation and protection.
(e) Helps with nutrient retention and recycling.
(f) Helps destroying pollutants.
(g) Contributes to climate stability.
(h) Provides more food resources.
(i) Provides medicines and other medicinal resources.
(j) Helps rapid recover for damages caused by natural resources.
(k) Provides more opportunities for recreational sports and tourism

The spread of invasive species is a major cause of biodiversity destruction. The effects of invasive plant species on biodiversity and the environment can be specified as follows.

(a) Exerts threats on local species and destroys them.
(b) Compete maximum for resources.
(c) Hybridizes with local species.
(d) Acts as a carrier of certain diseases.

These alien invasive species threaten the biodiversity and have the following negative impacts on the economy, agriculture, tourism and society. Details are as follows.

(a) Negative Impact on Agriculture

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i Crop damage

- Whilst competing vehemently for soil nutrients, water and space, significantly reduces the growth and yield of crops.

- Invasion of agricultural lands affects food production and the quality.

ii Decrease in value of pasturelands/farmlands

- This reduces the value of livestock foods in pasturelands.
- Reduces the productive land area of farmland.
- Poses impacts on special animal husbandry and agriculture.

iii Depletion of water resources

- Invasive alien species such as the Water Hyacinth reduces water quality and flow of water while accelerating water loss in reservoirs. It also reduces the population of fish and various aquatic organisms.
- Fills tanks and canals and reduces water capacity.
- Evaporative transpiration leads to increase water damage.

- Causing damages to irrigation structures, obstructing operations of the canals and gates.
- Causing water pollution

(b) Negative impact on the economy

A colossal amount of expenditure has to be incurred to control and manage the invasive plants species, thus resulting the following disadvantages.

- Reduces the usable land areas for agricultural production.
- Posing threaten with extinction of naturally grown edible plants.
- Increasing in annual maintenance costs. (Reservoirs, tanks, canals, paddy fields etc.)
- Loss of fishing grounds and obstructing use of fishing boats and equipment.
- Inability to provide adequate irrigation water for agricultural purposes with the decreased amount of water collected in the reservoirs due to filling of those reservoirs.

(c) Negative impact on health, society and environment

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i. Alien invasive species cause health problems. Some invasive plant species are at risk of spreading unprecedented diseases.
ii. Indigenous plants of medicinal value are threatened by invasive species and many invasive plants cause damages to the beauty of the growing areas. Often the toxins contained therein, stings, thorns, and overgrowth can hamper the life pattern of the people in the area.
iii. Causing damages to aesthetic value, environmental value and disappearance of native aquatic plants.
iv. Interrupting the social benefits obtain in association with the irrigation system and creating health problems.
v. When invading an ecosystem, it invades the entire ecosystem and destroys other plant species.

vi. Whilst spreading in clusters, these species affect the biodiversity balance, occupy habitats and breeding grounds, obstruct drainage patterns, deposit sediment in water systems, reduce the flow of water and affect native aquatic organism.

vii. Greatly reduces the biological diversity of aquatic ecosystems by blocking the arrival of sunlight and oxygen. Often, native plants are unable to compete with such species and gradually become extinct. As a result, invasive species in this ecosystem become prominent and endangered the native species.

viii. The alien invasive plants such as Gandapana, Ginithana and Iluk spread over the gazing areas of the elephants and cattle in the national parks reduce the foods for these animals, and Gandapana has reduced the productivity of grasslands. Further, it is a poisonous food to cattle.

ix. The Ginithana has contributed to forest fires and soil degradation.

(*Reference: Alien invasive plant species in Sri Lanka: S.S.Weligama*)

2.1.4 Background

The Plant Protection Service of the Department of Agriculture is directly entrusted with the control and suppression of invasive weeds and in addition, the Department of Agrarian Development, Department of Irrigation, Sri Lanka Mahaweli Authority and Coconut Development Authority indirectly intervene in this connection.

2.2 Authority for Audit

This performance audit was carried out under my direction in terms provisions in Article 154 (I) of the Constitution of the Democratic Socialist Republic of Sri Lanka and in terms of sections 3 (1) (d), 5 (2) and 12 (h) of the National Audit Act.

2.3 Objective of the Audit

2.3.1 Main Objective

Identification of the impact of invasive plants on agriculture and livelihood of the people

2.3.2 Sub-objectives and Criteria

Sub-objectives	Criteria
i Evaluation of the timeliness and adequacy of existing laws and regulations	i Section 3 of Part 1, Sections 4 (1), 4 (2), 06 (3), 7 (1), 7 (2), 7 (3), 7 (5) of Part II and Sections 10 (2) and 11 under Offenses and Penalties in Part V of the Plant Protection Act, No. 35 of 1999.
ii Identifying threats from invasive plants and conducting discussions on their mitigation.	i Section 23 G (1) under the Environmental Status in Section 4 (b) of the Environment Act No. 47 of 1980.
	ii Section 10 of Part V and Section 12 of Part VI of the Plant Protection Act No. 35 of 1999.
	iii Evaluation of the measures taken to control the propagation of invasive plants.

		iv Pictorial Guide for the identification of invasive species in Sri Lanka presented by the Biodiversity Secretariat, and the Ministry of Mahaweli Development and Environment
	iii Streamlining the duties of Authorized Officers and regulating their responsibilities.	Section 3 of Part I and Sections 4 (1)" and 4(2) of Part II of the Plant Protection Act No.35 of 1999.

2.4 The basis for selecting the title for the audit

(a) Increasing in the impact of these aquatic weeds and invasive plants on agriculture day by day.

(b) Poor progress of the researches and findings over the control of such situations.

(c) A threat to exhausting the water resources.

2.5 Related Institutions

Institution	Applicability
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Department of Agriculture	To be the pioneer in agriculture in Sri Lanka.
Plants Protection Service	Performing the expected functions of the Plant Protection Act No.35 of 1999.
Department of Agrarian Development	Vision Sustainable development of all agricultural land and farming community in Sri Lanka. Goals - Formulation and implementation of agrarian laws in order to protect the rights of tenants and landlords. - Strengthening and development of farmer

	institutions. - Management of agricultural lands - Management of water resources
Department of Irrigation	Vision Optimal use of irrigation systems with sustainable water resources. Mission Sustainable irrigation systems through integrated water resources management to provide the farmer community with the water they need fairly in time
Mahaweli Authority of Sri Lanka	Contribution for providing water for agriculture
Coconut Development Authority	Assisting the development of agriculture
Department of Health	To create a healthy nation that contributes to the economic, social, psychological and spiritual development of the country.
Divisional Secretariats Department of Co-operative Development Department of Animal Production and Health	For the control of Pathenium in Northern Province.
Road Development Authority Sri Lanka Railways Pradeshiya Sabhas" Urban Councils and Municipal Councils.	As the alien invasive species are spreading over the territory of this institution obtaining its active contribution to control and suppress such species.

2.6 Audit Access

Implementation of the audit was carried out based on the information and evidence obtained through the legal provisions, information obtained from the institutions and the physical audit examinations.

2.6.1 Sources of Evidence

(a) Examining the compliance with the provisions of the Plant Protection Act No 35 of 1999.
(b) Physical audit inspection on the identification of sustainable development goals and targets related to the topic.
(c) Examining the compliance with the provisions of the Environment Act No. 47 of 1980
(d) Physical inspection and obtaining information from institutions such as Irrigation Department, Wildlife Department, Mahaweli Authority of Sri Lanka, Coconut Cultivation Board, and Agrarian Development Department.
(e) Obtaining information pertaining to research carried out by the Department of Agriculture, Hector Kobbekaduwa Agrarian Research and Training Institute, Industrial Technology Institute, National Science Foundation etc. in relation to this field.

2.6.2 Physical Sources

Conduct of physical inspection on the invasive plant propagation and its control in Kandy, Matale, Nuwara Eliya and Kurunegala districts in collaboration with the officers of the National Audit Office and Plant Protection Service of the Department of Agriculture.

2.7 Scope of Audit

2.7.1 Compliance with International Auditing Standards

I conducted my audit in accordance with the International Auditing Standards of the Supreme Audit Institutions (ISSAI 3000 -3200 and ISSAI 5110 -5140). In this environmental audit, it was examined as to whether the Plant Protection Service of the Department of Agriculture, the authority responsible for the implementation of the Plant Protection Act No. 35 of 1999, had complied with these provisions, obstacles for the implementation of the Act, measures taken for the invasive flora propagation and control in Sri Lanka and its impact, and identification of the actions taken and costs incurred by the responsible agencies.

2.7.2 Limitations of Audit Scope

(a) The detailed information on the invasive species propagation in Sri Lanka, the name of the invasive plant, the extent of the propagation and the parties responsible thereon was not presented to audit.

(b) At present Sri Lanka has not come up with a mapping of alien invasive plants.

(c) Although the government institutions had spent money for the control and removal of invasive plants, it was not specifically substantiated costs incurred thereon.

(d) Although inquiries were made regarding the spread and control of invasive plant species in the Central Provincial area of Agrarian Development Department, details of 22 Agrarian Services Centers in Nuwara Eliya District and 17 Agrarian Services Centers in Kandy District were not furnished to audit even as of 17 February 2020.

3. Observations

3.1 Legal and institutional background for invasive plant management

3.1.1 National Policies on Alien Invasive Plants

At present, alien invasive plant species have spread all over the island of Sri Lanka, of which 20 plant species have been identified as the top 20 most invasive species whilst 15 species have been identified as potential invasive species. The invasion of agricultural lands by the spread of these plants leads to numerous issues, thus affecting the food production and quality, depleting water capacity, causing water pollution, disrupting balance of the biodiversity, disappearance of beneficial plants, affecting the soil fertility, and causing forest fires in parks due to *Ginithana.* Accordingly, the spread of these invasive plants is daily on the increase, but there is no formulated national policy in this respect.

3.1.2 Plants Protection Act, No.35 of 1999

3.1.2.1 Functions of the Authorized Officers

(a) In terms of Section 3 of Part I of the Act, the Director-General shall nominate such number of officers as may be necessary for the purposes of assisting him in carrying out or giving effect to the provisions of this Act, who shall be known as "Authorized Officers". Accordingly, 933 Authorized Officers had been appointed up to 22 October 2019. The following matters were observed in that connection.

(i) No updated data system had been maintained relating to the appointed Authorized Officers.

(ii) The number of active Authorized Officers as at 29 November 2019 had been limited to 310 officers.

(iii) The specific information to deal with this matter was not available in the institution.

(iv) The instances of occurring vacancies due to transfers, retirements and deaths of the appointed authorized officers had not been recognized and action had not been taken to retrieve the identity cards issued to them as the authorized officers.

(v) No report whatsoever had been obtained or carried out follow-up measures in relation to discharge of duties by the authorized officers up to 29 November 2019 from the date of appointment.

(vi) Alien invasive plants have spread all over the island and they have invaded the premises belonging to the institutions such as Sri Lanka Mahaweli Authority, Coconut Cultivation Board, Road Development Authority, Sri Lanka Railways Department, Department of Health, Pradeshiya Sabhas, Urban Councils and Municipal Councils. Since it had not been identified the institutions to specifically deal with that matter, action had not been taken to appoint the authorized officers in those institutions even by 29 November 2019.

(vii) It was not reported that authorized officers had been actively engaged in the removal or control of alien invasive plants. However, from 2015 to date, individuals and organizations have informed the Plant Protection Service on 30 occasions and instructions, too, have been given thereon. But, no clear information on their performance status had been furnished to the audit even as of 29 November 2019 (Annexure 02)

(b) In terms of Section 4 (2) of Part II of the Act, after inspection and examination referred to in subsection 4 (I), if the Director-General or the authorized officer is satisfied that a pest or pests exist in any premises, and having regard to the nature of the pest or pests and the likelihood of its or their spread, the Director-General or the authorized officer shall communicate his decision , in writing with the reasons therefor, to the importer of such pest or pests or owner or occupier such premises

directing such importer, or owner or occupier of such premises, as the case may be, to carry out such measures or execute such work for the prevention of spreading of such pest or pests, as may be specified in such direction. Nevertheless, no information was revealed by the audit to the effect that the nature of any such pest or pests or any such thing had been communicated to the owner or occupier of the premises where such pest was likely to be spread.

(c) Under Sub-section (1) of Section 06 (3) of the Act, the Director General or any authorized officer may, for the purpose of carrying out any measures or executing any work in or upon any premises under subsection (I), recover any expenses incurred thereon for failure to comply with the provisions relating to removal or control of pests in any premises. Even though Sri Lanka is threatened with the gradual spread of invasive species at present, there has never been reported a single instance in which action has been taken as per the above Section during the period of 20 years since the enactment of the Act.

3.1.2.2 Issuance of Regulations

(a) In terms of Section 7 (1) of the Act, the Minister may, from time to time by Notification in the Gazette, declare the quarantine pests which shall not be imported into Sri Lanka as themselves or as infestations on any plant or plant product unless imported under the provisions of subsection (6) of this section. Nevertheless, only one regulation had been issued to prevent and control of the spread of the Parthenium Hysterophorus L weed plant in Sri Lanka on 20 December 2000, twenty years after the enactment of the Act.

(b) It was observed that the regulations for this Act had been formulated by October 2019 and the recommendations for those regulations were to be submitted by the Legal Draftsman, whereas it had been failed to implement the relevant regulations.

3.1.2.3 Implementation or Enforcement of the Provisions

(a) In terms of Section 7 (2) of the Act, if any person has proof of the presence of a quarantine pest or pests declared by the Minister under subsection 7(1), of this section, within any area in Sri Lanka, he shall forthwith inform in writing the presence of such pest or pests to the Director-General. Even though, Parthenium Hysterophorus L weed plant was found in Hambantota, Badulla, Jaffna, Vavuniya and Trincomalee , it was not observed that the Director General had been informed in writing of its presence as mentioned above.

(b) In terms of Section 7 (3) of the Act, no person shall knowingly keep, sell, plant, release, deliver, or otherwise dispose of, or knowingly cause or permit to be kept, sold, planted, released, delivered, or otherwise disposed of, any plant or plant product infested with any quarantine pest declared by the Minister under subsection (1) of this section, unless such person has specific written instructions from the Director-General to do so. Nevertheless, invasive plants have spread all over Sri Lanka and among them; there are 20 highly invasive species and 15 potential invasive species. It was observed that as there was no formal system of information such as the parties responsible for dealing with the above manner and the relevant authority, it had found difficult to act accordingly.

(c) In accordance with Section 7 (5) of the Act, if the Director-General receives any information regarding the presence of any quarantine pest or pests in any area within Sri Lanka, he shall forthwith take such action as may be deemed necessary to control such pest or pests. Nevertheless, invasive plants have spread all over the island and accordingly, it was observed that the Director General had not taken any satisfactory steps in relation to the spread of invasive species identified in the audit.

(d) In terms of Section 10 (2) in Part V under the Offences and Penalties of the Act, any person who is guilty of an offence under this Act shall be liable, on conviction before a Magistrate, to imprisonment of either description to a term not less than one month and not exceeding six months, or to a fine not less than ten thousand rupees and not exceeding one hundred thousand rupees, or to both such fine and imprisonment. Alien invasive plants have spread throughout the island and

accordingly, a large number of individuals, public and private institutions have been found guilty under this Act. Although period of 20 years has elapsed since the enactment of the Act, the offenses and penalties have not been imposed in terms of the above section of the Act.

(e) In terms of Section 11 under the Offences and Penalties in Part V of the Act, where an offence against this Act or any order or rule made thereunder has been committed by a body of persons then

(i) If that body of persons is a body corporate, every director, manager, secretary, or officer of that body corporate; or

(ii) if that body is a firm, every partner and every manager of that firm, shall be guilty of that offence unless he proves that the offence was committed without his consent or concurrence and that he exercised all due diligence to prevent the commission of such offence. However, alien invasive plants have spread all over the island and public and private institutions, as well, have been guilty under this Act in large scale. Nevertheless, offenses and penalties have not been enacted in terms of the above section of the Act.

3.1.3 National Environmental (Amendment) Act No.56 of 1988

In terms of Section 23 (h) (1) under Part IV (b) Environmental Quality of the National Environmental (Amendment) Act No.56 of 1988,no person shall pollute any inland waters of Sri Lanka or cause or permit to cause pollution in the inland waters of Sri Lanka so that the physical, chemical or biological condition of the waters is so changed as to make or reasonably expected to make those waters or any part of those waters unclean, noxious, poisonous, impure, detrimental to the health, welfare, safety or property of human beings, poisonous or harmful to animals, birds, wildlife, fish, plants or other forms of life or detrimental to any beneficial use made of those waters. However, due to the presence of invasive plants in the Central, North Central, North Western and Mahaweli areas, the audit cannot be satisfied that the above legal provisions have been successfully implemented.

3.1.4 The Need to Accelerate Researches

(a) Sri Lanka is considered one of the world's 35 biodiversity hotspots due to the endemic flora and fauna species available. According to the National Red List of Fauna and Flora of Sri Lanka, there are about 3,150 flowering species in the island and many of them are endemic. In spite of this, alien invasive species are spreading rapidly throughout the country. Invasive alien species have been intentionally or accidentally introduced to Sri Lanka, and since then, rooting, spreading rapidly and competing with natural resources, they are causing damages to the beneficial plant species of the natural ecosystem. It was observed that no new methods of control and prevention of invasive plants have been introduced through the conduct of researchers paying attention on this matter.

(b) Even though programmes were conducted for inculcating awareness among the general public on minimization of damages caused by these plants and spread of the growth by spending a large sum of money annually in order to control and minimize the spread of alien invasive plants, a large area of cultivated land had become fallen by the weeds and this has affected the Gross Domestic Production as well. Accordingly, it was observed that the researches of the Research Officers of the Department of Agriculture should take a new path and this is a necessity of the present nation.

(c) It was observed that the officers of the Department of Agriculture had not initiated any measures to carry out research projects on the alien invasive plants species during the period of past 04 years and the departmental management too had not drawn attention or directed guidance in this connection.

(d) Established in 1972 as the Agrarian Research and Training Institute ant thereafter as the Hector Kobbekaduwa Agrarian Research and Training Institute of since 1995 aiming at strengthening the agrarian and rural sector through researches and trainings, this institute too has not conducted any research on invasive plants for the last 04 decades. It was observed in the audit that these institutions, as a major body of research in agriculture, should act in the control of the arising adverse conditions through the conduct of researches and arrangements are not yet in place in this connection.

(e) It was observed that no research had been conducted on alien invasive plants for over past 04 decades by the Industrial Technology Institute which is in operation with the vision of "a Center of Excellence in Scientific and Industrial Research for National Development".

(f) It was observed that the Science Foundation which is functioning with the objective of facilitating and supporting basic and applied science research in universities and technical institutions, strengthening scientific research potential, including social science research, scientific education programs, developing natural resources of Sri Lanka, promoting the welfare of the people, conducting private research on science and technology, sharing scientific information between scientists in Sri Lanka and foreign countries, maintaining a current scientific and technical personal record and otherwise collecting, interpreting and analyzing the data, had carried out only 03 researches during the period of past 04 decades.

	Title of the Project and Reference	Objective of the Project
i	Screening selected invasive plant extracts / compounds for antifungal activity against pathogens of ornamental foliage plants (RG/2015/EB/02)	• To isolate and identify common fungal pathogens in ornamental plants • To determine antifungal activity of plant extracts prepared from selected

		• To isolate and identify bioactive fractions/ compounds from the antifungal plant extracts. • To perform in vitriol and field plant testing for the efficacy of the most promising plant extracts/ fractions compounds with a view to subsequently formulating an eco-friendly commercial fungicide.
ii	Economic prospects of tank habitats: a case study of ecological restoration of alien invasive plant infested tanks in Dry Zone selected river basins (RE/2006/EPSD/04)	• To estimate the annual value of economic damage and ecosystem services lost to aquatic Weed invasion considering both market and non-market values. • To estimate the annual costs associated with controlling and eradication programs of aquatic Weeds infested areas. • To calculated the project Worth parameters like Net Present Value and Benefit Cost Ratio from preventing and controlling alien aquatic weeds over 25 year period.
iii	Production of environmentally friendly organic fertilizer by aquatic plants.	• Minimizing water pollution by systematically removing invasive aquatic plants from reservoirs. • Production of organic manure using invasive aquatic plants.

- Minimization of the use of chemical fertilizers.
- Creating a new market for organic fertilizer.

3.1.5 Process of controlling alien invasive plants

3.1.5.1 Role of the Plant Protection Service

(a) Corporate Control

Since these alien invasive plans are threateningly on the increase day by day, there must be a specific plan to control and prevent the spread of such species. Nevertheless, it was observed that the Department of Agriculture, which is the authorized body in this regard, has not worked out a future plan or corporate plan relating to control and combat of invasive plants.

(b) Progress of the Technical Activities

(i) In the inspection of the Technical Action Plan and its progress of the Plant Protection Institute pertaining to the period of last 06 years, the audit observed that the above institute had failed to prepare adequate action plans and meet the targets of the planned activities in order to fulfill the objectives and responsibilities of the Act.(Details appear in Annexure 03)

(ii) As set out in Section 3 of the Plant Protection Act No. 35 of 1999, Authorized Officers shall be appointed to carry out the functions of the Act. Accordingly, it was targeted to recruit and train 60 and 100 authorized officers in the year 2014 and 2016 respectively. However, no officers were recruited and trained as authorized officers in the year 2014 while 29 officers were not recruited in the year 2016.

(iii) It was observed that 50 new Authorized Officers were targeted to be appointed for the control of Parthenium in the year 2015. Nevertheless, the desired targets could not be achieved due to appointing only 13 Authorized Officers for that purpose.

(iv) Under the biological control of invasive aquatic weeds it was targeted to be conducted awareness programs for 300 farmers. Nevertheless, only 12 of them had been made aware on the relevant matter. Accordingly, it had been failed to meet the desired targets.

(v) Although specific targets have not been set in 2014 for the introduction of biological agents for infected water sources under the biological control of invasive aquatic weeds, 35 biological agents have been introduced for tanks / reservoirs. Even though the target during the years 2015, 2016 and 2018 was 25 each, it had not been possible to achieve the targeted level by 56 per cent, 48 per cent and 40 per cent respectively.

(vi) Under the control of invasive weeds in agricultural habitats during the period from 2014 to 2019, although the activity of conducting a survey on the present status of Parthenium infection had been included only once in the Action Plan, that is, in the year 2014, that activity too could not be carried out.

(vii) Although three instances of organizing Sramadana and occasional application of herbicides were planned under the control of invasive weeds in the agricultural habitats in the Action Plan 2014, neither of such instances had been implemented.

(viii) Relating to these invasive aquatic weeds and plants, provisions of Rs.1.2 million had been received under the National Food Production Programme of the Department of Agriculture during the period from 2014 to 2019, of which a sum of Rs.0.795 only had been spent. Accordingly, due to not receiving adequate provisions for the implementation of activities such as appointment of Authorized Officers, raising awareness among the farmers and introducing pests to the water sources and not utilizing the total provision received, at the inspection carried out on spending 66 per cent of the provision made for minimizing and control of the impact of aquatic weeds and plants to Sri Lanka and the achievement of the objectives of the project, it could not be satisfied with the effectiveness of the implementation of the relevant projects. Details are as follows.

Year	Name of the Project	Objectives	Provision (Rs.Mn)	Expenditure (Rs.Mn)	Outcome of the project
2016	National Food Production Programme- Promotion of Environmentally Friendly pest and Disease management System.	Biological control of aquatic weeds	0.99	0.62	Construction of 6 tanks for rearing pests for biological control
2018	National Food Production Programme-Promotion of Environmental Friendly pest management practices.	Control of alien invasive plants	0.1	0.1	168 officers were trained under this programme.
2019	National Food Production Programme- Development& Dissemination of Sustainable pest Management Technologies	1.Biological control of aquatic weeds	0.02	0.005	Pets for the control of Salvinia and Water Hyacinth were released to 11 reservoirs at Galewela, Puttalam, Maduruoya and Tangalle.
		2. Training the	0.05	0.05	Sixty officers

	Authorized Officers			were trained.
3.	Control of alien invasive plants	0.04	0.02	Control of alien invasive plants. Three awareness programmes were conducted on the control of Yoda Nidikumba (*Mimosa pigra*,) and Aligator (*Alternantheraphi loxeroides*),
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		1.2	0.795	
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3.1.6 Human Resource Management

(a) The human resource is a significant factor in the success of an institute. Therefore, efficient and effective management of such resource immensely contributes to reach the vision of the institute. The operations of the top level officers as well as all other employees are greatly helpful in the achievement of the institutional objectives. Although the approved cadre of the Plant Protection Service was 61, actual cadre stood at 28 as at 31 October 2019, the date of audit. Accordingly, 36 vacancies and 3 excesses of the cadre were observed in audit. Out of 26 officers belonging to 04 top level posts, 23 remained vacant and it was observed as an impediment for the performance of the institution. This situation remained unchanged even during the past five years. Details appear in Annexure 04.

(b) According to the matters observed by the audit, alien invasive plants have engulfed for more than 2,510.6 hectares of land area in Kalutara District and the Bombuwala Plant Protection Service, a one of the sub-units functioning under the Plant Protection Service to deal with the above matter, has been closed down at present. Accordingly, these alien invasive plants have spread all over the country including Kalutara and the nearby districts. Therefore, it was essential to actively

operate the institutions throughout the country to make active contribution towards the control and prevention of that condition. Accordingly, it was observed in audit that the discontinuation of the operations of these sub-units in an instance where control and prevention of these types of invasive alien species was unsatisfactory, the threat of these plants remained increasing day by day.

(c) The human resource is a significant factor in the success of an institute and therefore, efficient and effective management of such resource immensely contributes to reach the vision of the institute. High-ranking officials provide the foundation for achieving corporate objectives, and decisions made and implemented by a strong foundation are keys to the success of an institute. A proper program should be put in place for timely identification of suitable persons for senior management positions and development of appropriate human resources for the institute, to attract and retain the right persons, identify the unique skills required for senior positions and develop the necessary skills. Further, in order to ensure proper and uninterrupted functioning of the institution, the Succession Plan with appropriate successors for top officials should be prepared and implemented in an updated manner. The followings are the benefits received by a company that implement such a plan.

- Ensure that the right people are put in the right place at the right time.
- Develop a group of qualified officers holding special positions.
- Identify the staff needs of senior management and carry out possible employee training and development targeting such needs.
- Enabling the officers to achieve their career plans in the institution.
- Capacity building of officers according to changing environmental demands
- Providing opportunity to share knowledge of an organization on a timely basis

The success and productivity of the activities of the of the Plant Protection Service which is one of the distinguished institutions of the Department of Agriculture depends on the experience and skills acquired from engaging in the work thereof. There were vacancies of 23 officers out of the 26 approved officers in 04 key posts of that section and two of the three officers currently serving in key positions had participated in the duties of the Plant Protection Service from the year 2007 and 2019. The Additional Director of Agriculture, Mrs. M.T.M.D.R Perera, the Head of that section, who has gained competency in the relevant field through her long period of service in the relevant duties, is due to retire on 06 April 2021, that is, after a period of 01 year and 04 months. It is observed that there will be a problem in recruiting experienced and veteran officers to fill the vacancy occur after her retirement. The audit is of the view that the future performance of the Plant Protection Service may be difficult to reach or impossible to achieve due to failure in the preparation of qualified personnel for such specific positions.

(d) Foreign Trainings and Scholarships

(i) Lack of Training Plan

The duties of this institute are based on technical activities and in order to get the best possible service from the officers and employees working in the institute, it is possible to develop the human capital by providing training opportunities in keeping with the changing technology and thereby achieve better the objectives of the institute. Accordingly, in considering the year 2019 and subsequent years, this Plant Protection Service had not prepared a training plan by identifying the training needs of the officers and employees. It was observed that three officers of the Plant Protection Service had received opportunities to participate in foreign scholarships, training courses and sessions relating to the control of invasive aquatic plants only in three instances during

the period from 2014 to October 2019. It was also observed that action should be taken to continuously train officers locally and internationally in order to discharge the functions of the Plant Protection Act No. 35 of 1999, minimize and control the impact of invasive aquatic plants on Sri Lanka and to control the above situation by applying foreign technology and knowledge locally. The details of the attended foreign training programmes are as follows.

Year	Name and designation of the officer	The place served during training	Name of Scholarship / Training	Training period	Country where the training was conducted	Expenditure of training
2014	M.S.K.K. Perera (Assistant Director of Agriculture)	Plant Protection Sub Unit Bombuwala	Strengthening capacity to control the introduction and spread of alien species in Sri Lanka (Capacity development programme on invasive alien species control)	7 days	Thailand	Expenditure was incurred by the Ministry of Environment.
2018	Miss. Dr. H.T.M.D.R. Perera	Plant Protection Unit Gannoruwa	New invasive species Treat in South and South-East Asia	2 days	Nepal	Expenditure was incurred by the CABI
2018	N.P.H Nilananda	Plant Protection Unit Mahailuppallama	New invasive species Treat in South and South-East Asia	2 days	Nepal	Expenditure was incurred by the CABI

(ii) Although 43 officials from the Department of Agriculture had participated in foreign scholarships, training, courses and sessions on invasive aquatic weeds and plants during the period from 2014 to 2018 and each of these officers was required to perform the functions of the Plant Protection Service, it was observed that 24 of the above officers were not performing duties attaching to the Plant Protection Service. Accordingly, the audit is of the view that attention should be drawn on giving opportunity to the eligible officers to involved in the above mentioned foreign scholarships, trainings and courses and applying the acquired knowledge directly in the field. (Details appear in Annexure 05)

3.2 Spread of alien invasive plants species

3.2.1 Plants migrated overseas

3.2.1.1 Alien invasive plants migrated for researches

(a) Salvinia - *Salvinia Molesta*

Salvinia Molesta is recognized as one of the most dangerous aquatic plants in the world, second only to the Water Hyacinth (*Eichhornia crassipes).* The Salvinia plant was brought to Sri Lanka in 1939 for botanical research at the University of Colombo and these plants first appeared in a reservoir in 1943. Since then, Salvinia has spread rapidly throughout the country, and by 1954, Salvinia had spread across about 9,000 hectares of paddy lands and reservoirs. At present, this invasive aquatic plant has spread over many fresh water reservoirs, irrigation and paddy fields in Sri Lanka and this has turned out to be a major problem. A small insect called Serovagus Salvinia has been introduced to control the Salvinia, and this insect population has been successful in controlling Salvinia in some reservoirs.

Impact of this aquatic plant

i Reduces light and oxygen levels in water.

ii Collects a large amount of silt, while the higher level of transpiration causes severe water damage.

iii Potentiality to change wetland ecosystems and thereby, losing wetland habitats and ultimately, making such areas land habitats.

iv Invasion of Salvinia poses a serious threat to socio-economic activities related to open, flowing and / or hydropower-generating reservoirs and the high water quality reservoirs with fisheries and boat transportation activities.

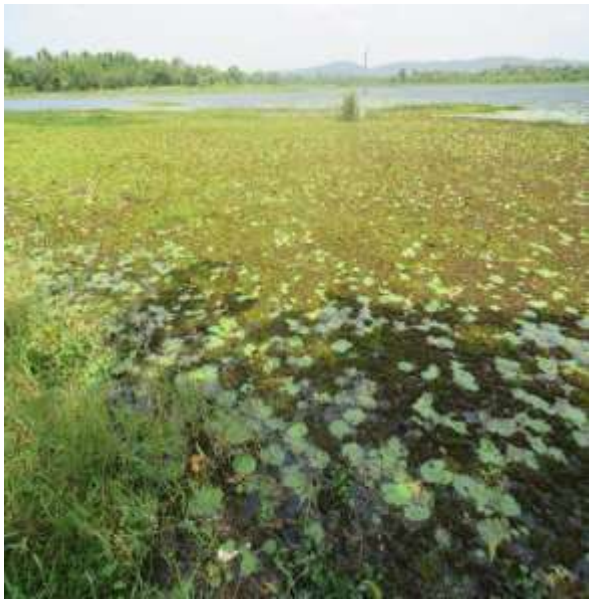
v Adversely affect the abundance and biodiversity of fish and underwater aquatic plants.

vi Interrupts the irrigation and water flow in the paddy fields of Sri Lanka, thus resulting in economic losses to the farmers.

vii Salvinia causes impediments to fish in reservoirs and exerts a health threat providing additional opportunities for mosquito breeding.

In relation to this invasive alien plant in Sri Lanka, Salvinia has spread over an extent of 140.2 hectares in four districts out of the Ratnapura, Kalutara, Kegalle, Gampaha, Badulla, Colombo districts. In addition, Salvinia, Water Hyacinth and Hambapan have spread in reservoirs, tanks and canals in Anuradhapura district and over 67.25 hectares in Puttalam district whilst Water hyacinth and Salvinia have spread over 109.25 hectares in Monaragala and Polonnaruwa districts.

Affected Districts	Extent (Hectares)
Ratnapura	14.2
Kalutara	12
Kegalle	08
Badulla	106



(b) Walanoda - *ANNONA GLABRA*

Walanoda the scientific name of which is "Annona Glabra" has grown invasively in places where water is retained from Chilaw to Matara in the western coast of Sri Lanka. This Walanoda has been introduced to Sri Lanka to be used as host plant for the transplantation of edible fruit called Anoda. This has been imported to Sri Lanka from West Indies islands.

Impact of this aquatic plant

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i This plant invades estuaries and mangroves areas. Spreading as seedlings and overgrowing on the banks, it prevents other plants, shrubs or grasses from germinating and growing. This leads to a reduction of the biodiversity.

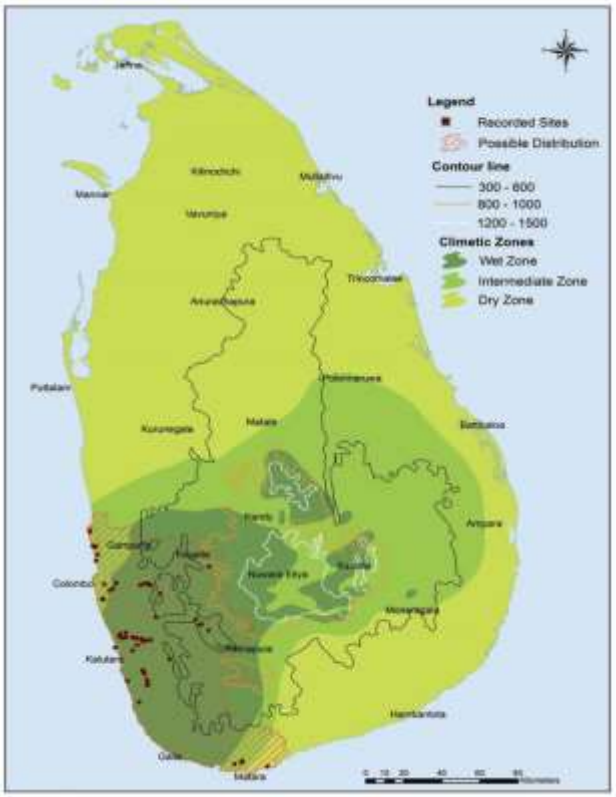
ii This plant, which is adapted to aquatic growth, rapidly produces many seedlings and becomes a large host of plants.

iii This species grows invading endemic and beneficial plants in Sri Lanka.

iv Although the mangrove swamps provide habitats for the growth of other species of plants and animals, and provide an environment that helps foster and breed fish, invertebrates and other wildlife, this species has invaded these ecosystems.

High spread of this species can be witnessed in wet lands especially in the Gampaha and Muthurajawela areas. With regard to the prevalence of invasive alien flora in Sri Lanka, the Walatha has spread over 706 hectares in the two districts of Ratnapura and Kalutara. Details are as follows.

Affected Districts	Extent (Hectares)
Ratnapura	140
Kalutara	566



3.2.1.2 Invasive plants that migrated for beautification

Due to the elegant and attractive appearance of the flower of the Water Hyacinth (*Eichhornia crassipes*), this species has migrated from Hong Kong to Peradeniya Botanical Gardens in 1905 with the knowledge of the English. Subsequently, there was an unexpected spread of this species as an aquatic plant grown for the beauty of reservoirs in Sri Lanka. In 1909, four years after its introduction, the government decided to impose the Water Hyacinth Ordinance to control its expansion. As it was not strictly enforced, this plant spread rapidly in many parts of Sri Lanka. Then, under the Plant Protection Act enacted in 1924, it was named Noxious Weed to be eradicated from the country. Although steps have been taken since pats to remove these plants, which have heavily spread in reservoirs, tanks and irrigation systems in Sri Lanka, due to its aggressive nature, this species can be found most of the reservoirs, tanks and irrigation systems in Sri Lanka even at present. In addition to mechanically suppressing these plants, an insect was introduced in 1980 for its biological control, whereas its spreading was faster than the plants destroyed by the insect. Accordingly, this system has, at present, been a failure. It has been over a century since the invasive plant was identified by Sri Lanka and almost 40 years since an insect was identified to control the plant, but researches have not yet been able to identify biological or other mechanisms to effectively combat such species. At present, the removal of Water Hyacinth (*Eichhornia crassipes*) is carried out, either mechanically or manually incurring an exorbitant cost annually.

Impact of this aquatic plant

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i Blocking waterways and water flows, thus resulting in floods.

ii Causing damages to water quality and disruptions in hydropower generation.

iii Surpasses native plants such as M. vaginalis due to rapid growth.

iv Other aquatic species have to compete for light, nutrients and oxygen.

v Increases the amount of carbon dioxide in the water as that plant reduces the temperature, PH value and oxygen content in water.

vi Dying of fish and water become contaminate and stinky due to lack of ability to destroy waste.

vii Competes for light and nutrients with the paddy cultivation of the paddy fields and reduces the paddy harvest.

viii Provision of habitats for several pathogens.

This invasive alien plant has spread over an extent of 107.15 hectares in 03 districts, out of Ratnapura, Kalutara, Kegalle, Gampaha, Badulla, Nuwara Eliya, Colombo and Kandy districts in Sri Lanka.

Districts Affected	Extent (Hectares)
Ratnapura	102.8
Gampaha	0.1
Nuwaraeliya	4.25
Kandy	Near the river at Polgolla

(b) Gandapana- Baloliya (*Lantana Camara*)

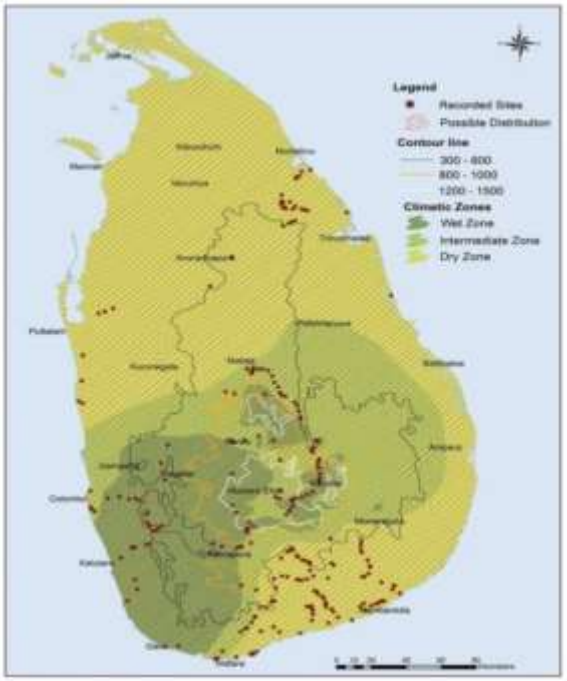
Gandapana, also known as Lantana Camara as its scientific name, was introduced to Sri Lanka in 1926 through the Peradeniya Botanical Gardenby the Lady of then Governor. This plant began to spread throughout the world as a home garden plant owing to its beautiful flower and aroma. Thereafter, it spread gradually invading the environment. While spreading especially in Yala, Wasgamuwa and Udawalawe parks, as well as grasslands, shrubs, forests, home gardens and road sides in Sri Lanka, this species has invaded the ecological system. These foliage is not eaten by cattle and is also harmful to animals. The best cost-effective management methods of preventing the spread of the Gandapana (*Lantana Camara*) plants are crushing and removing the growing plants and uprooting the medium-sized plants. Further, the methods such as cutting these plants using hand tools or machines, uprooting manually and using chains, and burning are also used for this purpose. If the roots are not removed, the recurrence of growing cannot be avoided. Cultivation of other crops or planting of natural plants on the lands cleared from *Lantana Camara*is important in the preventive management. Although chemical control is effective in the short term, it is environmentally harmful and cannot be used in long term basis.

i These Gandapana (*Lantana Camara)* plant had spread over an extent of 5.5 acres in the Mulhal Ela Scheme and the Waduwawala Scheme in the Irrigation Engineering Division of Nuwara Eliya. Details are as follows.

Scheme	Places of spread	Extent (Acres)
Mulhal Ela Scheme	Riti Ella area	0.5
Waduwawala Scheme	Landupita	5
	Warallawa	

ii In relation to invasive alien plant in Sri Lanka, these invasive plants have spread in three districts out of Ratnapura, Kalutara, Kegalle, Gampaha, Badulla, Colombo and Puttalama and accordingly, the Gandapana (*Lantana Camara)* plant has spread over 265 hectare of land area in Ratnapura and Puttalam districts and in Kegalle district.

Affected Districts	Extent (Hectares)
Ratnapura	164
Puttalam	101



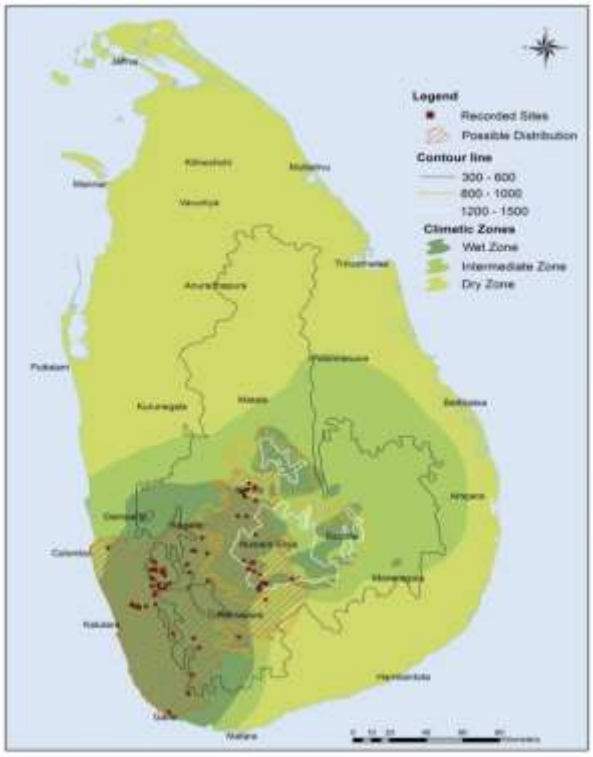
(c) Ludvigia

This invasive alien plant, the scientific name of which is Ludvigia Peruviana, has been introduced to the beauty of the reservoirs of Sri Lanka. This plant grows well in stagnant water or slow-flowing environments and has been widespread in the wet zone of Sri Lanka. This plant grows rapidly from 90 cm. to 360 cm. in height. A rapid spread of this species can be observed and competing with native plants, it inhibits their growth. There are between 1,000 and 3,000 seeds in one capsule of this plant. At present, this plant has invaded almost all of the upland paddy fields and fallow fields in Sri Lanka posing severe impact on agriculture.

(d) Katakalu Bovitiya- (*Clidemia Hirta*)

Katakalu Bovitiya scientifically known as *Clidemia Hirta* was first introduced to Sri Lanka by the Peradeniya Botanical Gardens in 1894. This plant has spread over the tea plantations of the central highlands and in barren lands, crop cultivations and forests of the wet zone in Sri Lanka. A plant that grows well under humid conditions produces about 500 nuts per year. A significant increase in rainfall could be seen in Sri Lanka over the past few years and accordingly, a rapid increase in the *Clidemia* plant could be observed in the wet zone areas. Due to the high cover of the Clademia population, the favorable and endemic species is threatened with disappearance from the environment. Therefore, it is important to identify and remove these invasive plants at their early age.

Out of the districts of Ratnapura, Kalutara, Kegalle, Gampaha, Badulla and Colombo, *Clidemia* plant has spread across 140 hectares in the Ratnapura District and throughout the Kandy district.



(e) Habarala- (Alocasla Macrorrhiza)

Habarala, also known Alocasla Macrorrhiza as its scientific term , should be drawn attention for its rapid spread across the wet zone of Sri Lanka. The spread of this species began as an ornamental plant grown in home gardens. Growth of Habarala (*Alocasla Macrorrhiza*) is rapid in areas where water and nutrients are sufficiently available. Since there is a composition of Calcium Oxalate chemicals in the stem of the Habarala plants, it is harmful to use as a food. It has been recently discovered that the breading of the dengue mosquitoes was taking place in the water collected in the space of the long stem connecting the trunk and leaves of the Habarala plant. Under the conditions such as its growth surpassing the endemic plant species and encouraging the pathogenic mosquito breeding, action should be taken to prevent from spreading this species.

(f) Diyapara - (Dilenia Suffruticosa)

Diyapara (*Dilenia Suffruticosa*) plant with a beautiful flower was introduced to Sri Lanka by the Peradeniya Botanical Garden in 1982 for beautification of home gardens. This perennial evergreen tree can grow up to 7 meters in height. While spreading in areas where the water is stagnating in the wet zone lowlands, near the forests, on the canal banks, the invasive growth of this species prevents the growth and spread of endemic species of Sri Lanka. In relation to invasive alien plants in Sri Lanka, these invasive plants have spread in 03 districts out of Ratnapura, Kalutara, Kegalle, Gampaha, Badulla, and Colombo districts and the Diyapara (*Dilenia Suffruticosa*) plants have spread over 988 hectares of land area in Ratnapura and Kalutara districts and in Kegalle district.

Affected Districts	Extent (Hectares)
Ratnapura	356
Kalutara	632
Kegalle	Spread

3.2.1.3 Alien invasive plants that migrated for other reasons

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(a) Parthenium *(Parthenium Hysterophorus)*

Parthenium also known as *Parthenium Hysterophorus* in its scientific name is a severe threat to agriculture crop cultivation and this has spread across South China, African countries, Taiwan, West Indies, India and Australia (Queensland, South Wales).This plant, which is believed to have come to Sri Lanka through goats brought by the Indian Peace Keeping Force in 1987 was first reported in Vavuniya. Directly growing stem of this plant produces many branches and the leaves are light green. Thin fluff can be found on the leaves. The fluff is noxious for some people. Each plant produces about 2,000-3,000 white flowers. These flowers form a multi-axis inflorescence. It produces about 5

black seeds per flower. Each plant produces an average of 10,000-15,000 seeds. Spread of seeds can be caused by wind, water, people, and animals and mixed with other seeds and vehicles and machinery.

Impact of this plant

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i In addition to competing with the agricultural crop, the noxious chemicals that are present in the plant can adversely affect the health of the human beings and animals.

ii Parthenium is a chemical present in all parts of the *Parthenium Hysterophorus* plant. Therefore, contacting the parts thereof with the human body may result in skin diseases and other infections.

iii It has been warned that if the juice of the Parthenium weed is ingested, even death can occur.

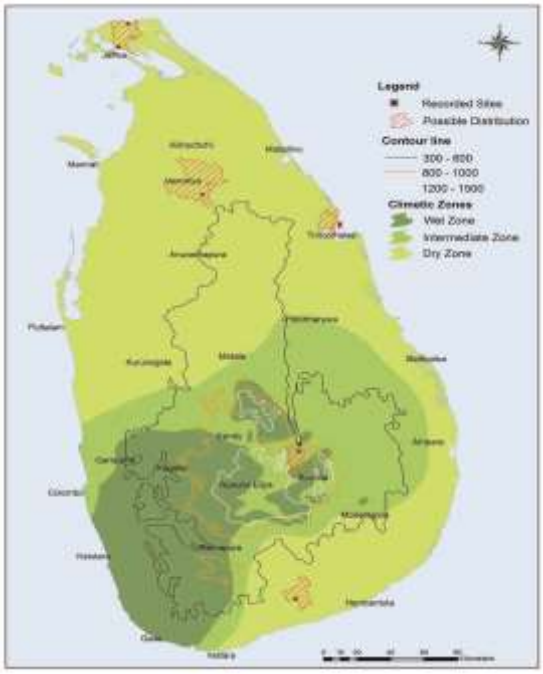
iv Being a major obstacle to biodiversity.

v. Effect of environmental degradation caused by the Parthenium may result in irreversible habitat changes to native grasslands, forests, riverbanks, and streams.

vi Prevalence of Parthenium pollen in the environment inhibits the fruit production of the cultivations such as tomatoes, brinjal and beans.

vii When these foliage is fed with grass, cattle may contact with “Thittakiri Disease”, thus creating problems with animal husbandry.

This species can be found in abundance in the northern dry and arid zone of Sri Lanka.This plant has spread over 19 hectares in Jaffna, Vavuniya, Trincomalee, Badulla and Nuwara Eliya districts.



(b) Alligator (*Alternanthera Philoxeroides*)

The Alligator plant, also scientifically named the *Alternanthera Philoxeroides*, has been first identified in Sri Lanka in 1999. Owing to its resemblance to the Mukunuwenna plant, this plant has been cultivated as green leaves by vegetable farmers. This plant is spreading in Nuwara Eliya, Bogawantalawa and Talawakele areas. Although this is an aquatic plant, it also has the potential to grow on land. The followings are the resulted disadvantages of these invasive plants.

i Blocking of irrigation tanks.

ii Inhibits the growth of beneficial plants (endemic species) in reservoirs.

iii Causing damages to aquatic organism by reducing oxygen level in reservoirs.

iv Invading grasslands and farmlands and thereby, reducing their production.

v. Loss of beauty in reservoirs.

vi Absorption of metals (iron and cadmium etc.) into the plant

Further revelations regarding this plant were as follows.

i According to the physical audit examination conducted on 29 August 2019, the Alligator plants have already spread in two reservoirs of Irrigation Engineering Division in the Nuwara Eliya covering an area of 6.96 hectares. This Alligator plant had overgrown over 95% of the Nuwara Eliya Barrackplane tank. Details are as follows.

Region / Location	Extent of spread (Hectares)
Barrackplane Tank	5.76
Katumana Tank	1.20

ii In relation to invasive alien plant in Sri Lanka, this Alligator plant has spread over 0.8 hectares in 03 districts of out of Ratnapura, Kalutara, Kegalle, Gampaha, Badulla, and Colombo. Details are as follows.

Affected Districts	Extent (Hectares)
Ratnapura	0.1
Kalutara	0.5
Gampaha	0.2

(c) Ginithana (*Panicum Maximum*)

Ginithana, also known by the scientific name Panicum Maximum, has been introduced to tropical countries as an animal feed and can withstand severe droughts. Subsequent to the wild fires, new plants of this grass emerge from its remaining root system. It is an invasive plant of coconut cultivations and is well propagated in the wet, dry and intermediate zones, invading grasslands, forests and agricultural lands. While growing in large quantity of small branches, these plants produce about 9,000 seeds. The seeds are spread by means of birds, water, animals, and the wind. The aggressive character of this Ginithana has caused retardation the growth of native grasses and other favorable plants in Sri Lanka. This plant acts as a disease and pest carrier, resource acquirer, ecosystem modifier, biodiversity suppressor, and a weed suppressant of indigenous plants. This poses a great threat to agricultural crops and is invading the forest boundaries and natural environment of agriculture. The Ginithana has spread over 7,046.1 hectares in 5 districts out of Ratnapura, Kalutara, Kegalle, Gampaha, Badulla and Colombo districts. In addition, *Kalapu Andara* and Ipil *Ipil* plants have spread over 1550 acres of land in Pattalama district and throughout the Kandy district. Details are as follows.

Affected Districts	Extent (Hectares)
Ratnapura	1,234.3
Kalutara	1,244.8
Kegalle	133.0
Gampaha	30.0
Badulla	4,404.0
Polonnaruwa	1 Km.

(d) Yoda Nidikumba (Mimosa Pigra)

Yoda Nidikumba, also known by the scientific name *Mimosa pigra*, was first observed on the Mahaweli river bank on Kundasala Road, Kandy in 1996, but has been growing in Sri Lanka since the 1980s. Introduced to reduce the erosion of the banks of the Mahaweli River, this plant has often spread due to negligence. It was observed that this plant had spread over the other parts of the island including Gampola, Naula and Kundasale in addition to the Kandy.

It grows very densely about 5 to 6 meters in height and has thorns on branches and the stem. It first grows from a single straight stem and subsequently, it grows into large shrubs, producing many branches. A well matured Yoda Nidikumba (Mimosa Pigra) plant produces about 220,000 seeds in one life cycle. Due to its viability, it can last for 20-40 years, and therefore, a special effort has to be made and expenditure has to be incurred to combat this Yoda Nidikumba plant. This plant species has completely invaded the ecosystem of Sri Lanka's wetlands, riverbanks, waterways, irrigation channels and retarded the growth of beneficial and endemic species.

i According to the physical audit inspection carried out on 29 August 2019, the Yoda Nidikumba (*Mimosa pigra)*plant had spread over 1.82 hectares of Mulhala Ela Scheme in the Nuwara Eliya Irrigation Engineering Division and several places along the banks of the Belihul Oya of the Waduwawala Scheme. Details are as follows.

Scheme	Affected Areas (Hectares)
Mulhala Ela Scheme	Over 1.21 hectares of land near the 3+650 Over 0.61 hectares at Thennahenwala
Waduwawala Scheme	Several places along the banks of the Belihul Oya

ii. In relation to the spread of alien invasive plants in Sri Lanka, this Yoda Nidikumba (*Mimosa pigra)* plant has spread over 82.47 hectares in the 05 distrcits, Kalutara, Kegalle, Gampaha, Colombo and Nuwara Eliya.

Affected Districts	Extent (Hectares)
Colombo	22
Gampaha	0.6
Kegalle	0.4
Kalutara	53.3
Nuwaraeliya	6.17
Puttalama	Not indicated the extent

iii This plant has widely spread in the aquatic ecosystems of the Mahaweli Upper Region. Accordingly, this *Mimosa pigra* species has invaded over 41 hectares around the Kotmale reservoir, 11.6 hectares of land from Kotmale to Polgolla turn, 10 hectares near Polgolla Reservoir, nearly 200 hectares around Victoria Reservoir, 2 hectares around Sudu Ganga and 111 hectares around Bowatenna reservoir.

The Yoda Nidikumba (*Mimosa pigra)* plant shows a high prevalence from the upper Mahaweli reservoirs to the lower zones. Therefore, this plant has spread rapidly in the Mahaweli C, B, D and H zones. The Kandy, Nuwara Eliya and Matale districts have also been affected by the Yoda Nidikumba plant. Although the Environment and Forest Conservation Division of the Mahaweli Authority took steps to curb the severe environmental impact of this plant, according to the physical audit inspection carried out on 13 September 2019, the Yoda Nidikumba plants have aggressively spread in those areas. Accordingly, it was observed that temporary solutions had been given to control that situation. It could be seen that the above Division operated through three main systems to suppress this plant.

iv It has been found that under the biological approach, planting the best shade species such as *Mara, Kumbuk, Jam* and bamboo under maximum water capacity can inhibit the growth of the Yoda Nidikumba plant. Accordingly, cover crops and forestation projects are carried out. At present, the countries suchas Brazil, Cuba, Mexico, Venezuela, Costarica and Honduras have identified over 200 species of insects and two species of fungi to control this plant. Researches on the potential use of these alternatives without causing damages to the ecosystems of Sri Lanka should be undertaken. Under the mechanical access, this Yoda Nidikumba plan is uprooted and burned with the use of machines. The third approach is to obtain community contribution in this regard through raising awareness. Although it was reported that the above methods were used to control the plants, it was not observed in the audit that they had been successful in providing solution.

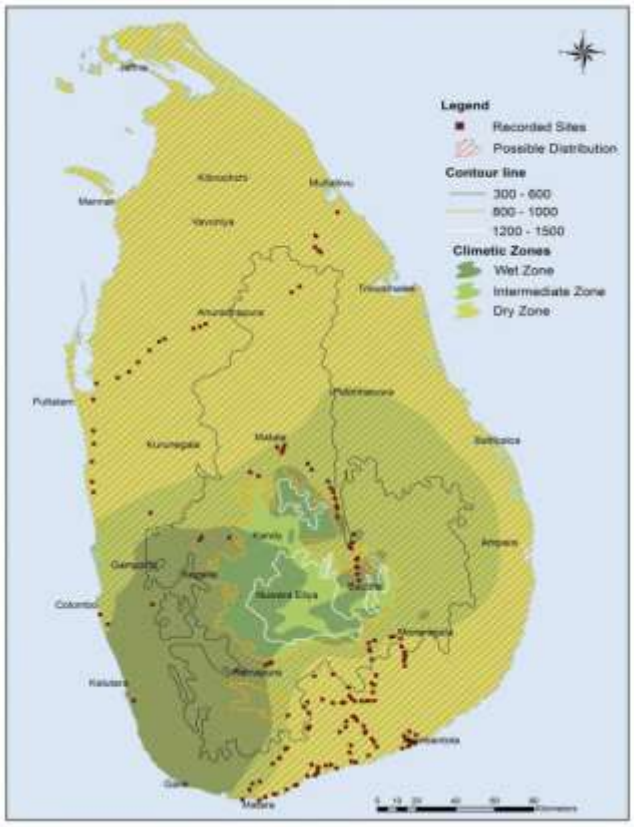
(e) Welalakola *(Colocasia Esculanta*)

Welalakola , also named after the scientific term Colocasia Esculanta, is a fast spreading plant in the lowlands and water retaining areas of Sri Lanka. This shows a rapid growth invading the uncultivated paddy lands. Welalakola *(Colocasia Esculanta*) contains the "oxalic", an acidic chemical in the tubers, stems, leaves and stalks of the plant. This tuber is not used as a food in Sri Lanka. The *Colocasia Esculanta*plants, which are very densely populated, thrive in an ecosystem including barren lands, wetlands, reservoirs and grasslands. This reduces the growth of beneficial and endemic species and impedes the flow of water in Irrigation streams. Further, this creates a favourable environment for breeding different types of mosquitoes. In these situations, it is important to take necessary steps to prevent the spread of this species.

(f) Ipil Ipil- Leucaena Leucocephala

Ipil Ipil, also known by the scientific name *Leucaena leucocephala*, has been introduced to Sri Lanka as an animal food. However, this plant has been designated as an invasive species due to its extensive spread and damage to native biodiversity. Under this condition, the seedlings propagate, and within a short time, a large plant population begins. It impairs the growth of native plant and the growth of this plant occurs invading forest lands, empty lands and agricultural lands. The Department of Agriculture, Mahailuppallama carried out a number of researches in the 1970-1980s on this species as

a plant sued for growing in the canals of Conservation FARMING in Sri Lanka to add leafy manure to the soil. However, after identifying its aggressive features, use of this plant for agricultural purposes was discontinued.



(g) In addition, over 195.85 hectares have been engulfed by the invasive species such as Kambi grass, Agamulanati vel, Arunadevi, Ranabata, Wathupalu and Mayura grass.

Alien Invasive Plants	Affected Districts	Extent (Hectares)
Kambi Grass	Ratnapura	99.7
	Kegalle	78.5
	Bdulla	Have spread
Agamulanethi vel	Ratnapura	0.8
	Kalutara	Have spread

	Kegalle	Have spread
	Kandy	Throughout the district
	Badulla	3.2
Arunadevi	Ratnapura	8
	Kalutara	2
	Kegalle	3
Ranabata	Ratnapura	0.65
Wathupalu	Kandy	Throughout the district
Mayura Grass	Kandy	Throughout the district

Although the project had been implemented by the Biodiversity Secretariat of the Ministry of Environment, at a cost of Rs. 120.55 million in 2016 to control the entry and spread of alien invasive species and thereby prepared policies, strategies and action plans and raised awareness, It was not observed that a significant physical role had been played for the prevention and control of invasive species spread in Sri Lanka. According to the information presented, 17 invasive plant species have spread over an area of 9,858.77 hectares in 12 districts in Sri Lanka. (Annexure 06)

Reference:

(Pictorial guide to identifying invasive alien species in Sri Lanka: Biodiversity Secretariat Ministry of Mahaweli Development and Environment)

(Let us identify invasive plants in Sri Lanka: Dr. Lalith Gunasekera, 2012)

(Invasive Alien Species in Sri Lanka: S.S. Weligama)

(Internet)

3.2.2 Widespread plants in reservoirs and their impact

(a) Plants

There are more than 35 invasive plant species in Sri Lanka of which Alligator, Water Hyacinth, Gona Parandel, Salvinia, Linnocaris, Pistia, Buduras Pasi, Diyahabarala, Girapihatu, ludivija, Hydrilla, Welalakola and Vilkatu plants have spread throughout the island.

(b) Alien invasive plants that affect the agriculture

Each invasive plant poses direct or indirect impact on agriculture. As invasive species that exert impact on the agricultural ecosystem, there are more than 35 species spreading over the island including Nariwaligaya (fox tail), Ginithana, Iluk, Dawaka, Nidikumba, Klanduru, Parthenium, Balunakuta, Hulantala, Singapore Daisy and Uru Kossa.

3.2.3 Alien invasive plants that affect the natural and forest ecosystems

(a) According to the audit test check conducted on alien invasive species, the plants such as Alikan vela, African Tulip Plant, Morning Blooming Flowers, Hawari Nuga, Habarala, Sudda, Walanoda, Thanburgia, Diyapara, Fern, Nattasuriya, Ipil Ipil, Star flowers, Cactus, Yoda Nidikumba, Katakalu Bovitiya, Katugas (Goas), Lantana, Meedummal,Myconia, Katu Andara, Kalapu Andara, Wara, hondala (air potato), Gal Goraka, Kropton weeds, Wild tobacco, Finas Caribbean, Ambulgeta, Niltharu plant, Koral vel, Rathu Endaru, Eththora (Candle Shurb), Popcorn Thora, Kahakona, Balalkan, Giant Thorns, Orange Sestrum, Giant Grass,and Jasmine have widely spread in in Central, North Western, North Central and Mahaweli Zones.

(b) Since each alien invasive species has a direct, indirect impact on agriculture economy, natural and forest ecosystems, and biodiversity and people have to cope with all these conditions, it was observed in the course of the audit that every alien invasive species has a direct or indirect impact on the lives of the people.

3.3 Functions carried out at institutional level

3.3.1 Coordination between institutions

Over 35 species of invasive plants have spread all over Sri Lanka. Therefore, action should be taken to control and suppress those alien invasive species within the premises of government and private institutions. Failure to comply therewith is an offence under the Plant Protection Act No 35 of 1999. The Government institutions such as Department of Irrigation, Department of Wildlife and the Mahaweli Authority of Sri Lanka constantly engage in removing these invasive plants at great expense annually while carrying out their day-to-day tasks. In order to avert this condition to some extent, government institutions had appointed authorized officers, whereas the government institutions such as Mahaweli Authority had not appointed such authorized officers. Similarly, it was not observed a positive correlation between the Plant Protection Service of the Department of Agriculture, the implementing authority of the Plant Protection Act No. 35 of 1999, and the government institutions that had appointed, and had not appointed the authorized officers.

3.3.2 Performance of the Related Organizations

(a) Department of Irrigation

The following matters were observed regarding the spread of alien invasive plant species and their control in the area of authorityof the Department of Irrigation.

(i) The Department of Irrigation has carried out an overview on the distribution of invasive plants in 11 major irrigation zones (excluding Mahaweli area) by its filed officers. Therein, it has been found the prevalence of invasive species such as Water Hyacinth, Salvinia, Hydrilla, Diyahawariya, Humbunpan, Water Grass, Reed species, Well Maruk, Yoda Nidikumba, Gandapana, Alligator, Diyapara, Habarala, Ginithana, Ipil Ipil, Kalapu Andara. Accordingly, the average distribution of invasive plant

species in the entire irrigation system such as tanks, anicuts, canals and irrigation reserves was 45.47% and the prevalence in each irrigation zone ranged from 27 to 66 per cent. Accordingly, this has resulted in numerous problems such as increase in annual maintenance costs, filling of canals and depleting water capacity, increase in water loss caused by evaporative transpiration, invasion of agricultural lands thereby affecting the food production and its quality, causing water pollution, loss of fishing grounds and causing damages to fishing boats and equipment and damages to aesthetic value. Details are as follows.

Irrigation Zone	Plant species aggressive distribution	Gross percentage (%) within irrigation system (tanks, anicuts, canals and irrigation reserves)
- Ampara	Water Hyacinth, Hydrilla, Salvinia, Diyahawariya, Humbupan, Kukul Tavara, Reed species, Welmaruk, Lotus, Diyahabarala, Moss, Ipil Ipil, Yoda Nidikumba, Ginithana,Beru, Iluk, Moss, Ratathanakola.	43
- Anuradhapura	Vilakatu, Salvinia, Water Hyacinth, Katupenda, Humbupan,, Grass, Moss, Kirindi, Lotus, Nabada, Ginithana, Ipil IpilYoda Nidikumba, Fox Tail, Gandapana,Cactus, Kalanduru, Mana, Iluk	53
- Badulla	Water Hyacinth, Alligator (Yoda Mukunuwenna), a species of Algae, Aquatic moss species, Ginithana, Gras	66
- Colombo	Wel Aththa, Diyapara, Water Hyacinth, Salvinia, Hambupan, Diyagowa, Hydrilla, Moss, Habarala, Kankun, Ginithana, Mana, Iluk	41
- Galle/ Matara	Wel Aththa, Diyapara, Ketala, Ginithana, Water Hyacinth, Habarala, Hydrilla, Diyahawariya,Salvinia, Alligator, Diyagowa, Moss, Grass species, Lotus, Ratathanakola, Beru (Grass), Olu, Vilgahala, Urugoyam. Reed species.	58

-	Kanday	Water Hyacinth, Diyagowa, Salvinia, Hydrilla, Alligator, Kankun,Ginithana, Yodanidikumba, Gandapana, Mana, Reed species, unidentified aquatic plants,Iluk.	36
-	Monaragala	Water Hyacinth, Salvinia, Hambu, Kankun, Ketala species,Nepiyar(Ratathanakola), Hinguru, Wara, Moss species, Ginithana, Yoda Nidikumba, Gandapana, Ipil Ipil.	51
-	Kurunegala	Water Hyacinth, Salvinia, Hambupan, Diyahawariya, Hydrilla, Kankun, Diya Siyambala, Grass species, Ginithana, Ipil Ipil	58.18
-	Polonnaruwa	Water Hyacinth, Hambupan, Salvinia, Hydrilla, Diyahabarala, Yoda Nidikumba, Ginithana, Gandapana, Nariwaligaya, Cacti,Grass species,Ikiriya.	33
-	Hambantota	Yoda Nidikumba, Cacti, Kalapu Andara, Gahala, Gandapana, Alligator, Water Hyacinth,, Salvinia,Kankun, Hydrilla, Diyagowa, Hambupan,Lotus, Kankun, Diya Habarala, Eraminiya, Kabarossa, Walgahala, Moss species, Grass species.	34
-	Puttalama	Water Hyacinth, Hambupan, Salvinia, Hydrilla, Diyahawariya, Kankun, Kalapu Andara, Cacti, Yoda Nidikumba, Akeshia.	27
		Within entire irrigation system	45.47

(ii) In terms of Section 3 of Part I of the Act, 24 officers of the Irrigation Department had been appointed as "Authorized Officers" on 30 March 2017 to assist in the implementation or enforcement of the provisions of the Act and one of those officers had already retired. Although no survey has been done on the distribution of invasive plants in the irrigation system since 2015, it is observed that the spread of the invasive species has increased in comparison to 2015. Accordingly, it was not confirmed in audit whether the expected objectives were adequately met by the Authorized Officers appointed to act in accordance with the provisions of the Act.

(iii) In order to ensure efficient water management of 354 irrigation systems across the country, their annual maintenance is carried out by 52 Regional Irrigation Engineer's Offices island wide. In this annual maintenance of canals, tanks, anicuts and reservoirs carried out to ensure proper water management of irrigation water required for the agriculture, invasive plants are removed. But the cost incurred thereon was not presented to audit. For the removal of invasive aquatic plants, two Amphibious Weed Harvester and Amphibious Weed Cutters had been purchased at a cost of Rs.95 million in the years 2017 and 2018. Accordingly, an enabling environment to protect the efficiency and biodiversity of the irrigation system should be created through constant monitoring and control of such invasive aquatic weeds and plants, thus incurring additional cost. It leads to bring about a positive influence on the agriculture and the livelihood of the people and otherwise, it may pose negative impacts on agriculture and the livelihood due to expansion of the above situations.

(iv) Even though the Plant Protection Service had introduced the bio-control pests for Salvinia and Water Hyacinth in major irrigation zones of the Irrigation Department throughout the country, as stated by that Service, the above method had not been successful in controlling Water Hyacinth. It was observed that the insect, introduced nearly 30 years ago for the Water Hyacinth, was not successful and the Department of Agriculture or other responsible entities had failed to come up with an economically viable and effective strategy to curb the spread of Water Hyacinth by way of research or other methods.

(b) Department of Wildlife

The following matters were observed regarding the spread of the invasive plant and their control in the area of authority of the Department of Wildlife.

(i) The species such as Water Hyacinth, Salvinia, Yoda Nidikumba, Gandapana, Ludvigia etc. have been identified as invasive aquatic herbs and plants existing within the wildlife reserves of the Wildlife Department. Although the audit asked for written information on the average extent of invasive plants spread, no relevant information was made available.

(ii) The Department of Wildlife has spent Rs. 72.88 million for the removal of 05 invasive species during the period from 2015 to 31st August 2019, whereas such invasive species are further spreading over those lands even at present and this resulted in numerous issues such as collapsing biodiversity balance, invading ecosystems and

destroying other plants, shortage of foods for animals in forest parks and meadows due to invasive species such Gandapana and Ginithana, outbreak of forest fire, and causing soil degradation. Accordingly, it was observed in audit that further costs would be incurred for the control and suppression of the spread of these plants

Invasive Species	Year				
	2015	2016	2017	2018	Up to 2019.08.31
Lantana	Rs.Millions	Rs.Millions	Rs.Millions	Rs.Millions	Rs.Millions
Yulex	33.97	20.05	6.45	7.99	4.42
Kalapu					
Andara					
Welaththa					
Cactus					

(iii) It was observed that the Authorized Officers should be appointed for the Department of Wildlife in terms of section 03 of Part 1 of the Plant Protection Act No. 35 of 1999, whereas such appointments had not been made by 11 November 2019.

(c) Mahaweli Authority of Sri Lanka

The following matters were observed regarding the spread of alien invasive plant species and their control in the area of authority of the Mahaweli Authority of Sri Lanka.

(i) Invasive plants such as Yoda Nidikumba, Water Hyacinth, Salvinia, Ginithana, Galgoraka, Katakalu bovatia, Pathan palu, Ginikuru, Parthenium, Wedeliahave spread within the area of authority of the Mahaweli Authority of Sri Lanka and in terms of Section 3 of Part I of the Act, such number of "authorized officers" who may be required to assist in the implementation or enforcement of the Act should be appointed. Nevertheless, no officer of the Mahaweli Authority had been appointed as "Authorized Officers" up to date.

(ii) In terms of the Plant Protection Act No. 35 of 1999, the Plant Protection Service of the Department of Agriculture should act as the implementing authority of the Act. Although the Mahaweli Authority of Sri Lanka was guilty in terms of Section 10 (2) under the Offenses and Penalties of Part V of the Act, no legal action had been taken in this regard. Upon not appointing authorized officers to assist in the implementation or enforcement of the provisions of the Act, it was observed in the audit that it had been an impediment to achieve the expected results of the Act and lead to the inefficiency, as well . Invasive plant distribution in the area of authority of the Mahaweli Authority of Sri Lanka is as follows.

Invasive Species	Extent (Hetares)	Area /Name of the Reservoir or Tank	Region and A.R.O.A. Division
	Not stated	All tanks in Mahaweli Zone - C	Mahaweli Zone -C
Water		All tanks in Mahaweli Zone - B	Mahaweli Zone -B
Hyacinth		Mahaweli Zone -H	Mahaweli Zone -H
		Polgolla Reservoir	Kandy
	Not stated	All tanks in Mahaweli Zone - C	Mahaweli Zone -C
Salvinia		All tanks in Mahaweli Zone - B	Mahaweli Zone -B
		Mahaweli Zone -H	
Parthenium	Not stated	Mayurapura Division	Walawa Zone
Hydrilla	Not stated	ZDCanal	Mahaweli Zone -B
Yoda Nidikumba	300.00	Maduru Oya Reserve	Kandegama)Zone B(
	8.00	Polgolla Reserve	Kandy
	5.00	Mahaweli Zone -C	
	5.00		
	40.80	Kiriibban Tank, Janakapura Kothmale	Zone H
	11.06	Reservoir Reserve.	Nuwaraeliya
	186.40	From Kothmale up to Polgolla Reservoir	Kandy
	2.04	Victoria Reservoir	
	110.50	Suduganga	Kandy
	5.20	Bowathenna Reservoir	Mathale
	8.30	Randenigala Reservoir	Mathale
	35.00	Rantembe Reservoir	Nuwaraeliya
	Not stated	Up to Yatinuwara, Thedeniya, Walapane-	Nuwaraeliya
	Not stated	Hanguranketha Divisional Secretartiat.	KandyNuwaraeliya

		Pallebedda Moragahakanda Zone	RambakenoyaZone
Lantana	300.00	Maduru Oya Reserve	Kandegama (Zone B)

(iii) Even though Yoda Nidikumba has spread over 717.3 hectares of land area and Lantana, Water Hyacinth and Salvinea in 300 hectares of land area of the area of authority of Mhaweli Authority of Sri Lanka, Water Hyacinth in all the tanks within Mahaweli Zones B, C and H, and the Polgolla Reservoir, Parthinium in Walawa Zone of the Mayurapora Division and Hydrilla in the Mahaweli Zone B,the information of the extent of their spread was not furnished to audit.

(iv) A gradual increase was observed in the expenditure incurred by the Environment and Forest Conservation Division of the Sri Lanka Mahaweli Authority for the implementation of various programmes for the control of Yoda Nidikumba from 2015 up to August 2019 and the total expenditure incurred thereon amounted to Rs.1,406,380 by August 2019. Details appear below.

- Expenditure incurred relating to the programmes implemented by the Environment and Forest Conservation Division

Invasive Species	Year					
	2015 Rs.	2016 Rs.	2017 Rs.	2018 Rs.	2019August Rs.	Total Rs.
Yoda Nidikumba	59,479	340,287	7,125	87,469	912,020	1,406,380

(v) Mahaweli Zones had incurred Rs.7,177,350 for the control of invasive plants from the year 2016 to 2019 and it is observed that there was a high spread of these plants in the Mahawli B,C and H Zones. Details appear below.

- Expenditure incurred by the Mahaweli Zones for the control of invasive plants.

Zone	Year and Amount(Rs.)					Value (Rs.)
	2015	2016	2017	2018	2019	
Zone- B	-	-	1,540,000	-	-	1,540,000
Zone- C	-	207,000	997,000	2,345,000	-	3,549,000
Zone- D	-	-	150,000	28,350	-	178,350
Zone- L	-	-	-	-	-	0
Zone- H	-	-	625,000	62,000	-	687,000
Zone- G	-	-		32,000	-	32,000
Rambaken Oya Zone	-	-		201,000	-	201,000
Walawa Zone	-	-	330,000	660,000	-	990,000
Victoria Zone	-	-	-	-	-	-
Huruluwewa Zone	-	-	-	-	-	-
	0	207,000	3,642,000	3,328,350	0	7,177,350

(v) Despite the implementation of various programmes by the Mahaweli zones to control the alien invasive species, it was observed that above aggressive situation remained unchanged even at present. (Annexure 07)

(d) Coconut Cultivation Board

The following matters were observed regarding the distribution of the invasive plants and their control in the area of authority of the Coconut Cultivation Board.

(i) The invasive aquatic species such as Water Hyacinth, Salvinia, Parthenium, Gandapana,Yoda Nidikumba, Ginithana have spread over the area of authority of the Coconut Cultivation Board. Although information regarding the spread of Salvinia and Gandapana over an extent of 22.5 hectares in 03 regional sub-offices had been furnished, the extent of the spread of invasive aquatic herbs and plants in 11 regional sub-offices had not been presented to audit. (Annexure- 08)

(ii) In terms of Sub-section 7 (1) of Section 7 (2) of the Plant Protection Act No.35 of 1999, if any person has proof of the presence of a quarantine pest or pests declared by the Minister under subsection (1), of this section, within any area in Sri Lanka he shall forthwith inform in writing the presence of such pest or pests to the Director-General. Although the spread of invasive aquatic species in the area of authority of the Coconut Cultivation Board was observed as in the Paragraph (i) above, the Coconut Cultivation Board had failed to identify the gross extent of their distribution and to take steps in accordance with the above Section.

(iii) Although the Authorized Officers of the Coconut Cultivation Board should be appointed in terms of Section 3 of Part I of the Plant Protection Act No.35 of 1999, the Director General of the Department of Agriculture had failed to appoint any Authorized Officers even by 11 November 2019.

(iv) It was observed in audit that the regional offices of the Coconut Cultivation Board had not taken measures or incurred expenditure to remove those quarantine pests and action had also not been taken in accordance with Section 7(5) of the Plant Protection Act No.35 of 1999.

(e) Agrarian Development Department

The following matters were observed regarding performance of the Agrarian Development Department in respect of spread and control of the invasive plant species in the area of authority of the Central Province.

(i) According to the enquiries made relating to the spread of alien invasive plants within The Central Province, out of 90 Agrarian Development Services Centres situated in Kandy, Matale and Nuwaraeliya districts, 41 centres had not furnished information to audit even by 17 February 2020. Details are as follows.

	Number of Agrarian Development Services Centers	Number of Agrarian Development Services Centers that had not presented the information
Kandy	45	17
Nuwaraeliya	22	22
Matale	23	2
	90	41

(ii) It was observed that the alien invasive plants such as Water Hyacinth, Salvinia, Hydrilla, Yoda Nidikumba,Gandapana, Ludvijiya, Ginithana and Kambiwel had spread over an extent of 3,453.1 acres within the areas of authority of 25 Agrarian Development Cervices Centres in Kandy district. (Annexure 9)

(iii) Spread of Water Hyacinth, Salvinia, Hydrilla, Yoda Nidikumba, Gandapana, Ludvigia, Ginithana, Kahakarabu, Reed, Star Flowers, Sudda and other invasive species was observed in an extent of 1,286.2 acres of lands in 21 of 23 Agrarian Development Cervices Centres in Matale district. (Annexure 10)

(iv) Although the Authorized Officers of the Central Province of the Agrarian Development Department should be appointed in terms of Section 3 of Part I of the Plant Protection Act No.35 of 1999, the Director General of the Department of Agriculture had appointed only 02 Authorized Officers by 17 February 2020. Details are as follows.

	Name	Post	Date of Appointment	Agrarian Cervices Centre
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1.	Pavithra Abeygunarathna	Agriculture Consultant	Not stated	Alawathugoda
2.	P.H.C.Samarakoon	Agriculture Consultant	Not stated	Aludeniya

(v) These alien invasive species invade farmlands, block waterways, and damage ecosystems causing inability to cultivate paddy fields, turning the farmlands into infertility, inability to cultivate under planting crops, compete with the home garden crops and thereby cause damages to such crops, decrease in yield, pose severe impacts on paddy cultivation as it is difficult to control and suppression, and damage cultivations. It is also observed that a colossal amount of cost has to be incurred on controlling and suppressing these invasive plant species and it poses negative impact on agriculture, economy, environment and health.

(f) Situations observed at the combined field inspection

It was observed at the combined field inspection carried out by the National Audit Office and the officers of the Plant Protection Service of the Agriculture Department that these alien invasive plants have spread over the tanks, anicuts, reservoirs, forest parks and the other lands throughout the island. It was further observed at the audit test check that although some control strategies had been put in place to manage certain aquatic plant species, those had not been implemented at the expected level in many places. The situations observed at the combined field inspection appear in Annexure 11.

3.4 Failure to achieve the Sustainable Development Goals and Targets.

Seventeen sustainable development goals have been introduced by the member countries of the United Nations through the declaration- "Transforming our World": the Agenda for Sustainable Development and 169 targets have also been recognized in that respect. Further, 244 criteria have already been identified to evaluate the achievement of those targets and it is expected to give more priority for the sustainable development goals by the agendas of the United Nation's member countries. Even though all the government institutions should take measures to achieve those goals, it was observed that the alien invasive plants poses negative impacts in the achievement of sustainable development goals and targets of the promotion of sustainable agriculture, availability of water for all, biodiversity and ecosystem and ensuring good health and well-being. Details are as follows.

Matter	Relevant Sustainable Development Goals	Applicable Sustainable Development Targets
Ensuring protection of the local agriculture.	Sustainable Development Goals -02 Promotion of Sustainable Agriculture.	Negative impacts of the invasive plants on the targets of increase in the agricultural yield and income of the famers' families engaged in small scale food producers, by 2030, and ensuring protective and equal access to lands.
Crop damages	Promotion of Sustainable Agriculture.	Decrease in the agricultural production capacity of the developing country.
Declining quality of the pastureland / farmland. Receding water resources	Availability of water for all	Negative impact on the target of reducing water pollutants and thereby increase in the water quality.

Decrease in the extent of agricultural lands.	Promotion of Sustainable Agriculture.	Negative impact on the agricultural yield and income, and the protection of lands.
Health and social issues	ensuring good health and well-being	Negative impact on the target of decrease in the deaths and diseases caused by food contamination resulting from the chemical, air, water and soil pollution.
Biodiversity and Ecosystem		Negative impact on the target of preventing the damages caused to the biodiversity.

4. Audit Recommendations

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i Action should be taken to identify the government institutions that should appoint Authorized Officers for the purpose of carrying out or giving effect to the provisions of the Plant Protection Act No.35 of 1999 and to make such appointments. (3.1.2.1 a)

ii Action should be taken to maintain an updated data system relating to the appointed Authorized Officers and to devise a methodology to ensure coordination and follow–up on the Authorized Officers.(3.1.2.1 a)

iii Steps should be taken to implement the provisions included in the Plant Protection Act, No.35 of 1999.(3.1.2.)

iv Action should be taken to initiate legal proceedings against the institutions or people who neglect the provisions relating to the removal and control of pests in terms of Section 07 of Part III of the Plant Protection Act, No.35 of 1999.(3.1.2.3)

v Action should be taken to identify the quarantine pests which shall not be imported into Sri Lanka and notify the relevant regulations in the Gazette in terms of Section 7(1) of the Act. (3.1.2.3 a)

vi Implementation of programmes for raising awareness among the people on the alien invasive plants, their impact and distribution, and the strategies for the suppression and control of such species.(3.1.5.1.a)

vii Implementation of a long term programme with respect to control and suppression of the spread of alien invasive species. (3.1.5.1.a.b)

viii Attention should be drawn on conducting researches to identify the biological or other methods to control the spread of alien invasive plants.(3.1.4)

ix Steps should be taken to obtain adequate provisions for carrying out activities such as identifying and controlling the spread and suppression of alien invasive plants. (3.1.5.1.b viii)

x In order to ensure optimal discharge of the functions of the Plant Protection Service, an adequate staff should be recruited and action should be taken to provide them with a good training and sound knowledge. (3.1.6)

xi Maintenance of an active, continuous and positive correlation among the institutions that involve directly or indirectly in the discharge of functions of the Act and carrying out an effective monitoring process. (3.3.1)

xii Recovery of a considerable fine from the parties convicted under the Act and thereby, establishing encouragement strategies to revive the performance of the duties of the Authorized Officers.(3.1.2.1)

05. Conclusion.

These alien invasive species have been spreading in Sri Lanka over a number of years. Even though an Act has been enacted to control and manage those conditions, and set up responsible institutions and appointed Authorized Officers to deal with the matter, weaknesses in the implementation of the relevant Acts and inefficiency on the part of the officers and the institutions have attributed to that condition. Accordingly, audit concludes that the solutions presented for the control and management of alien invasive plant species are impermanent and provisional.

Sgd./W.P.C. Wickramaratne
Auditor General

W.P.C.Wickramaratne

Auditor General

(a) **Invasive Plants with High Priority** **Annexure-01**

	(Family)	(Species)	(Distribution)	(Affected habitats/ecosystems)
1	Fabaceae	KatuAndara-KalapuAndara (Prosopisjuliflora)	arid zone	In arid dry evergreen forests, seashore
2	Salviniaceae	Salvinia(Salviniamolesta)	island-wide	Reservoirs, ponds, swamps, streams, paddy fields
3	Pontederiaceae	Water Hyacinth (Eichhorniacrassipes)	island-wide	Reservoirs, ponds, swamps, streams,
4	Poaceae	Ginithana (Panicum maximum)	island-wide	Barren lands, arid grasslands, savannahs, agriculture lands
5	Clusiaceae	Gal Goraka (Clusiarosea)	sub-montane zone	Associated with thorny scrub / mountain forest
6	Typhaceae	Hambupan (Typhaangustifolia)	Dry zone	Reservoirs, ponds, swamps, streams
7	Verbenaceae	Lantana(Lantana camara)	island-wide	Forests thorny shrubs, mainly in the dry and intermediate zones
8	Annonaceae	Walanoda (Annonaglabra)	lowland wet zone	In swamps and lagoons in the Wet Zone.
9	Asteraceae	Sudda (Pathanpalu) (Austroeupatoriuminulifolium)	montane zone	Mountain grasslands / forest areas
10	Dilleniaceae	Diyapara (Dilleniasuffructicosa)	low-country wet zone	Wetland forests, open areas with thorny bushes in wet zone
11	Convolvulaceae	Agamulanethiwel (Cuscutacampestris)	island-wide except in upper montane zone	Barren lands Low country agricultural lands.
12	Apocynaceae	HawariNuga (Alstoniamacrophylla)	sub-montane zone	Dry and wet zone forests, associated with lowland forests in the wet zone
13	Fabaceae	IpilIpil (Leucaenaleucocephala)	dry and intermediate zones	Dry mixed evergreen forests

14	Melastomataceae	KatakaluBovitiya (Clidemiahirta)	sub-montane wet zone	Open areas in wet zone Low lands rain forests.
15	Asteraceae	Parthenium (Partheniumhysterophorus)	dry and intermediate zones	Open barren lands in the dry zone and intermediate zone
16	Fabaceae	Yoda Nidikumba (Mimosa pigra)	dry and intermediate zones	River bank, barren fields, irrigation canal
17	Cactaceae	Cactus (Opuntiadillenii)	arid zone	In the thorny dry zone, coastal areas
18	Fabaceae	(Ulexeuropaeus)	montane zone	Mountain grasslands
19	Asteraceae	Star flowers-Wedelia Sphagneticolatrilobata (Wedeliatrilobata)	wet and intermediate zones	Barren lands in wet zone, abandoned paddy fields, both sides of roads.
20	Solanaceae	ThambiliCestrum (Cestrum aurantiacum)	montane zone	Open areas in mountain forests and evergreen forests

(b) Potential Invasive Plant

	(Family)	**(Species)**	**(Common Name)**
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1	Bignoniaceae	MillingtoniaHortensis	Indian cork tree(Pichcha)
2	Euphorbiaceae	ManihotGlaziovil	Sierra Rubber, HevanMaiyokka
3	Fabaceae	Acacia Auriculiformis	Acacia
4	Haloragaceae	MyriophyllumAquaticum	Parrot Feather
5	Mayacaceae	Mayacafluviatilis	Stream Bogmoss
6	Melastomataceae	Tibouchinaurvilleana	Glory bush
7	Muntingiaceae	Muntingiacalabura	Jam
8	Myrtaceae	Psidiumlittorale	Jam Guava
9	Onagraceae	Ludvigiasedoides	False loosestrife, mosaic plant

10	Onagraceae	LudvigiaPeruviana	Water primrose
11	Poaceae	PanicumTrichocladum	Donkey grass, creeping guinea grass
12	Poaceae	SetariaBarbata	Bristly foxtail grass
13	Typhaceae	TyphaAngustifolia	Cat tail
14	Verbenaceae	ClerodendrumQuadriloculare	Philippine fireworks, valentine plant
15	Vitaceae	CissusRotundifolia	Arabian wax cissus

Control of invasive aquatic weeds (From the year 2015) **Annexure - 02**

Plant Protection Service, Gannoruwa, Peradeniya

Serial No.	Informed Date	Name, Institute/Address	Province	Matter	Damaged extent	Steps taken for controlling	Current position
01	2015.05.25	District Engineering Office, Galle	Southern	Obtaining necessary technical consultations and assistance on the use of biological methods for the control of aquatic plants.	Either sides of the irrigation canal	Necessary instructions on the control of Salvinia and Water Hyacinth were given on telephones.	
02	2015.11.23	District Director of Agriculture Office, Hambantota.	Southern	Control of aquatic plants (Salvinia and Water Hyacinth) in Beragama canal at Hambantota.	5m x 5km Canal	Bio control pests for Salvinia and Water Hyacinth were introduced by conducting an awareness programme.	After the introduction of Bio control pests, the Salvinia and Water Hyacinth host has decreased.
03	2016.05.02	H.M.C.K. Jayawardena, Kandy, Akiriyagala, Kegalle.	Sabaragamuwa	Obtaining instructions for the control of Water Hyacinth in the		Instructions on the control of the species were given on 19.05.2019 by the telephone.	

				paddy field.			
04	2016.07.04	Department of Irrigation, 230, PO Box.1138, Bouddhalokamawatha, Colombo 07.	Western	Obtaining information on the pests that can be used for the control of invasive plants.		All necessary technical information was furnished.	
05	2016.07.04	Office of the Director of Irrigation, Kundasale, Kandy.	Central	For the removal of Salvinia from the irrigation reservoirs		Mechanical control methods are being used at present and it has been notified that we will be informed to introduce the bio control pests later.	
06	2016.07.11	Office of the Deputy Director of Agriculture, Mawgama, Ratnapura.	Sabaragamuwa	Bio control of Salvinia, Ratnapura.		Bio control pests for Salvinia were introduced by conducting an awareness programme and a demonstration,	After the introduction of Bio control pests, Salvinia has decreased.
07	2016.04.25	Department of Irrigation, 230, PO Box.1138, Bouddhalokamawatha, Colombo 07.	Western (North Central)	Obtaining provisions for Ambagaswewa Central Scheme and introduction of bio control methods after the mechanical control.	Huruluwewa	Bio control pests were released to the established breading centres.	

08	2017.04.25	Department of Irrigation, 230, PO Box.1138, Bouddhalokamawatha, Colombo 07.	Western (North Western)	Obtaining pests to establish bio control pests breeding tanks to clean Magalla access canal.		Bio control pests were released to the established breading centres.	
09	2017.05.16	Agrarian Services Centre Wasalakotte	Central	Removal of invasive plants. Control of Water Hyacinth spread over minor and small tanks in 04 Grama Niladharee's Divisions.		Bio control pests were released on 25.05.2017 for the control of Water Hyacinth.	After the introduction of bio control pests, the hosts have decreased.
10	2017.06.06	Provincial Agriculture Department, North Western Province	North Western	Control of Water Hyacinth Thabbowa		It was stated that the Irrigation Department would remove the species.	
11	2017.07.12	R.A.M.I.Ranaweera Agriculture Instructor, Agriculture Instructor Office, Anuradhapura.	North-Central	Seeking assistance for the control of Water Hyacinth	09 Tanks	Bio control pests were released to 05 tanks.	After the introduction of bio control pests, the plant hosts has decreased.

12	2017.08.01	District Secretariat, Kurunegala.	North Western	In connection with the spread of invasive aquatic weeds in Redeebendi ela Magalla Reservoir.	After the introduction of bio control pests for the control of Salvinia and Water Hyacinth, the plant hosts have decreased.	After the introduction of bio control pests, Salvinia has controlled and Water Hyacinth host has decreased.
13	2017.08.06	Regional Engineering Office, Wellawaya.	Uwa	Destroying Water Hyacinth in Karawila Tank at Mailagama, Kataragama.	Bio control pests were released	
14	2017.09.21	Chief Engineering Office, Hambantota.	Southern	Obtaining consultation services on the use of bio control pests for Salvinia and Water Hyacinth- Introduction of bio control pests for the constructed tanks.	Bio control pests were released to tanks.	
15	2017.09.21	Executive Agriculture Unit, Sri Lanka Air Force Camp, Katunayaka.	Western	Obtaining bio control pests for Salvinia and Water Hyacinth	Released	

16	2018.01.05	D.A.Upali Wijethunga, 174/7, Moraketiya, Ambiliputiya.	Uwa	Control of Water Hyacinth in a tank at Maththala.	Could not be connected.	
17	2018.02.17	Dharamaraja Senasuna, Daham Thalawa, Kandaketiya, Badulla.	Uwa	Obtaining assistance for the control of destructive plants.	As discussed via telephone, instructions were given to uproot and remove the plants.	
18	2018.03.05	Office of the Deputy Director of Agriculture, Puttalam.	North Western	Control of Water Hyacinth, Thabbowa.	The Department of Irrigation informed that they would remove the species.	
19	2018.03.12	Agrarian Development Officer, Agrarian Development Centre, Kolonna.	Sabaragamuwa.	Removal of Salvivia in Maduwanwela Tank.	Bio control pests were released on 20.03.2018 to control Salvinia.	After the introduction of bio control pests, Salvinia has controlled
20	2018.03.19	K.K.Abeysiriwardana, Provincial Irrigation Director, Provincial Irrigation Department, Galle.	Southern	Use of pests for the control of aquatic weeds (Salvinia, Water Hyacinth)	Bio control pests were released for the suppression of Salvinia and Water Hyacinth.	After the introduction of bio control pests, Salvinia has controlled and Water Hycinth has decreased.

21	2018.03.21	Head Quarters, 4th Regiment, Sri Lanka Army, Wasawilan, Palali.	Western	Obtaining necessary service for the removal of Salvinia in a tank situated within the Arrmy Settlements, Panagoda.		Bio control pests were released on 18 and 19.04.2018 for the control of Salvinia.	After the introduction of bio control pests, Water Hycinth has controlled.
22	2018.05.23	Moragahakanda Kaluganga Development Project, Moragahakanda, Kongahawela.	Central	Implementation of an awareness programme on invasive plants.		An awareness programme was conducted.	
23	2018.06.14	Department of Wildlife Development, No.811/A, Jayanthipura Road, Battaramulla.	North Central	Introduction of bio control pests. Wilpattu National Park, Anuradhapura Range.		Although the matter was discussed via telephone, they did not take proper steps in that respect.	
24	2018.07.19	Sri Lanka National Aquatic Farm Development Institute, District Aquatic Farm Development Distribution Office, Hambantota.	Southern	Release of bio control pests for the reservoirs in Hambantota District.	23 Tanks	It was tried to contact on 20.07.2018, but in vain.	
25	2018.08.01	M.C. Millawithanarachchi,	Southern	Obtaining bio control pests for salvinia.		Once the relevant samples were received by the	

		Assistant Director of Agriculture, Paddy Research Institute, Labuduwa.				institute, they were obtained.	
26	2019.01.19	United Farm Organization, Walgameliya, Aluthgoda, Tangalle.	Southern	Taking steps to prevent the growing of Water Hyacinth.	05 Hectares	Bio control pests were released to the tank for controlling Water Hyacinth.	Observations are due to be received.
27	2019.02.20	Sri Lanka Mahaweli Authority, Special Area of Authority, Walawa .	Sabaragamuwa.	Implementation of a training programme on the control of invasive plants.		Although several attempts were made to contact via relevant telephone numbers, no response was received.	
28	2019.03.04	Secretary, Rural Freshwater Fisheries Organization, Kandegama, Damminna.	Eastern	Obtaining bio control pests for the control of Water Hyacinth.	590 Hectares.	Bio control pests were released to the tank for the control of Water Hyacinth.	Observations are due to be received.
29	2019.05.02	Deputy Director of Agriculture, Office of the Deputy Director of Agriculture, Matale.	Central	Control of weeds which were invasively spreading over the Dambulla Zone at Mathale.	05 small tanks.	Bio control pests were released to the tank for the control of Salvinia and Water Hyacinth	Salvinia plants were dying after turning in to brown colour.

30	2019.07.04	Mrs.M.P.Thisera , 511, Kapuwatta, Jaela.	North Western	Obtaining bio control pests to the tank situated at Saliyawewa, Halmillagollawatta.	40 Acres	Bio control pests were released to the tank	Adequate period of time has not passed to receive observations.

	Activity	Sub-activity	2014			2015			2016			2017			2018			2019		
			Targets	Progress	Not reaching (%)	Targets	Progress	Not reaching (%)	Targets	Progress	Not reaching (%)	Targets	Progress	Not reaching (%)	Targets	Progress	Not reaching (%)	Targets	Progress	Not reaching (%)
1	Implementation of Plant Protection Act.	Appointment and training of new Authorized Officers.	60	0	100	-	-	-	100	71	29	100	119	-	100	207	-	-	-	-
		Appointment of new Authorized Officers for the control of Pathenium.	-	-	-	50	13	74	-	-	-	-	-	-	-	-	-	-	-	-
		Training	-	-	-	50	95	-	50	30	40	02	02	-						
		Training programme on the legal steps taken against the person who contravene the provisions relating to the eradication of Pathenium										As Requested	100	-						
2	Biological control of the invasive aquatic weeds.	Construction of bio control pest tanks for the control of Salvinia and Water Hyacinth.	02	02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Establishment of Zonal Farm units.	02	02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Conduct of training/ awareness	300	12	96	-	-	-	100	45	55	-	-	-	-	-	-	-	-	-

		programmes for the officers or farmers.																		
		Introduction of bio agents for affected water sources.	-	35	-	25	11	56	25	13	48	-	-	-	25	15	40	-	-	-
3	Control of alien invasive weeds in agricultural habitats.	Conducting a survey on the current position on the Pathenium infection.	01	0	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Organization of Sramadana programmes and applying weedicides from time to time.	03	0	100		-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Conducting training programmes on the management of alien invasive plants. (Officers/Farmers)	-	-	-	-	-	-	250	370	-	-	-	-	-	-	-	-	-	-
			-	-	-	-	-		100	78	22	-	-	-	-	-	-	-	-	-
		Collecting data on the invasive plants control programme. (Farmers)	-	-	-	-	-		As Requested	30	-	-	-	-	-	-	-	-	-	-
4	Identification and management of alien invasive species	Training programmes.	-	-	-	-	-	-	-	-	-	-	-	-	200	168	16			

Annexure 04

Plant Protection Service - Gannoruwa

Post ---	Approved Cadre ---	Actual Cadre ---	No.of Vacancies ---	Excesses ---
Additional Director of Agriculture	01	01	-	-
Deputy Director of Agriculture	09	-	09	-
Assistant Director of Agriculture (Research)	02	-	02	-
Assistant Director of Agriculture (Development)	11	01	10	-
Assistant Director of Agriculture (Contract)	-	01	-	01
Development Officer	01	02	-	01
Agriculture Instructor	05	04	01	-
Government Management Assistant	03	04	-	01
Driver	05	05	-	-
Lorry Cleaner	01	-	01	-
Karyala Karya Sahayaka	01	-	01	-
Watcher	02	02	-	-
Labourer	07	03	04	-
Contract Labourer	02	02	-	-
Total	50	25	28	03

Plant Protection Service - Mahailuppallama

Post	Approved Cadre	Actual Cadre	No.of Vacancies
Assistant Director of Agriculture (Development)	01	01	-
Agriculture Instructor	03	02	01
Driver	01	-	01
Labourer	01	-	01
Total	06	03	03

Plant Protection Service - Bombuwala (Kalutara)

Post	Approved Cadre	Actual Cadre	Vacancies
Assistant Director of Agriculture (Development)	01	-	01
Assistant Director of Agriculture (Research)	01	-	01
Agriculture Instructor	02	-	02
Labourer	01	-	01
Total	05	-	05

Annexure 05

Details on the Training Courses

	Name -----	Station ----------	Training Course ----------	Duration ----------	Country ----------	Awarding Country ----------	Present Station ----------	Date of arrival to the present station ----------
1.	P.N.Deniyegedara	Mahailuppallama	SEMINAR FOR JOINT PREVENTION AND CONTROL ON MAJOR EPIDEMIC AND PORT HEALTH QUARANTINE OFFICIALS FROM DEVELOPING COUNTRIES 2018	2018.10.10 2018.10.30	China	Republic of China	Mahailuppallama	2012.08.02
2.	M.P.T.S.Karunasena	Katunayaka	SEMINAR FOR JOINT PREVENTION AND CONTROL ON MAJOR EPIDEMIC AND PORT HEALTH QUARANTINE OFFICIALS FROM DEVELOPING COUNTRIES 2018	2018.10.10 2018.10.30	China	Republic of China	Horana	2019.02.01
3.	K.K.Abeyrathna		SEMINAR FOR FRUIT INSPECTION QUARANTINE SUPERVISION OFFICIALS FROM THE COUNTRIES ALONG MARTINE	2017.08.09 2017.08.29	China	India	Peradeniya	2018.10.29

			SILK ROAD					
4.	Mrs.P.D.D.Perera		SEMINAR FOR FRUIT INSPECTION QUARANTINE SUPERVISION OFFICIALS FROM THE COUNTRIES ALONG MARTINE SILK ROAD	2017.08.09 2017.08.29	China	India	Peradeniya	2018.10.26
5.	U.A.K.Dawalagala	Ampara	TRANING COURSE ON IMPORT & EXPORT OF AGRICULTURAL PRODUCTS INSPECTION QUARANTINE TECHNOLOGY FOR DEVOLOPING COUNTRIES	2016.04.09 2016.05.06	China	India	District Secretariat, Ampara	2014.06.15
6.	E.M.R.N.R.Senevirathna	Gannoruwa	DO	2016.04.09 2016.05.06	China	India	Gannoruwa	2016.10.28
7.	K.G.C.W.K.Somarathna	Anuradhapura	DO	2016.04.09 2016.05.06	China	India	Anuradhapura	2010.02.12
8.	W.A.P.Madusanka		DO	2016.04.09 2016.05.06	China	India	Peradeniya	2018.01
9.	Mr.M.M.M.Jamil		SEMINAR FOR ENTRY & EXIT HEALTH QUARANTINE OFFICIALS OF DEVELOPING COUNTRIES OF 2016	2016.04.09 2016.05.06	China	India	Inter Provincial Ampara	2001.04.02
10.	ආර්.එම්.බී.එච්. අසිටවීර		DO	2016.04.09	China	India	Inter Provincial	2014.10.15

	R.M.B.H.Jayaweera			2016.05.06			Ampara	
11.	R.M.U.D.Rathnayaka		DO	2016.04.09 2016.05.06	China	India	Peradeniya	2013.01.15
12.	L.D.S.Perera		TRANING COURSE ON IMPORT & EXPORT OF AGRICULTURAL PRODUCTS INSPECTION AND QUARANTINE TECHNICIANS OF THE COUNTRIES ALONG 21 ST CENTURY MARTINE SILK ROAD	2016.11.01 2016.11.28	China	India	Colombo	2019.02.01
13.	G.T.S.Perera		2015 QUARANTINE REGULATORS MEETING	2015.05.18 2015.05.22	Thailand	Australia	Colombo	2019.02.01
14.	D.S.Ranamuka		SEMINAR FOR ENTRY & EXIT ANIMAL AND PLANT QUARANTINE OFFICIALS OF DEVELOPING COUNTRIES	2015.07.01 2015.07.21	China	Australia	Colombo	2019.02.01
15.	M.L.J.L.Pinto		DO	2015.07.01 2015.07.21	China	Australia	Government Seed Farm	2019.02.01
16.	T.K.K.Samarasingha		TRANING PROGGRAMME ON INTERGRATED PEST MANAGEMENT(IPM) IN SARRC MEMBER STATES	2018.05.28 2018.05.31	Bangladesh	SAARC Agriculture Centre		2014.05.02

17.	R.Rathika	Ampara	DO	2018.05.28 2018.05.31	Bangladesh	SAARC Agriculture Centre	Ampara	2010.10.08
18.	ජී.ඒ.ආර්. සෝමසිරි	Bandarawela	TRANING COURSE ON BIO CONTROL OF CROP PESTS AND DISEASES FOR DEVELOPING COUNTRIES	2017.05.17 2017.05.31	China	SAARC Agriculture Centre	Bandarawela	2010.07.08
19.	A.W.T.U.Dharmathilaka	Gannoruwa	TRANING COURSE ON BIO CONTROL OF CROP PESTS AND DISEASES FOR DEVELOPING COUNTRIES	2017.05.17 2017.05.31	China	SAARC Agriculture Centre	Food Research Unit, Gannoruwa	2018.03.12
20.	S.M.G.D.Devid		DO	2017.05.17 2017.05.31	China	SAARC Agriculture Centre	Horana	2005.05.02
21.	M.M.U. De Silva	Angunukolapelassa	DO	2017.05.17 2017.05.31	China	SAARC Agriculture Centre	Angunukolapelassa	2012.09.07
22.	K.R.S.N.Bandara		DO	2017.05.17 2017.05.31	China	SAARC Agriculture Centre		2016.10.24
23.	Mr. M.C.I. Silva	Gannoruwa	DO	2017.05.17 2017.05.31	China	SAARC Agriculture Centre	Gannoruwa	2011.10.04

Spread of Alien Invasive Plants

Annexure 06

Alien Invasive Plant	Affected District	Extent (Hectares)
Kambi Grass	Ratnapura	99.7
	Kegalle	78.5
	Badulla	spread
	Kandy	Throughout the district
Ginithana	Ratnapura	1,234.3
	Kalutara	1,244.8
	Kegalle	133
	Gampaha	30
	Badulla	4,404
	Polonnaruwa	01 K.m.
	Kandy	Throughout the district
Salvinia	Ratnapura	14.2
	Kalutara	12
	Kegalle	08
	Badulla	106
Water Hyacinth	Ratnapura	102.8
	Nuwaraeliya	4.25
	Kandy	Near the Polgolla river
Salvinia, Water Hyacinth , Hambupan	Anuradhapura	In reservoirs, tanks, canals all over the district
	Puttalam	67.5
	Monaragala	9.25
	Polonnaruwa	100
	Gampaha	0.1
Hambupan	Ratnapura	0.66
	Puttalama	8.09
Yoda Nidikumba	Colombo	22
	Gampaha	0.6
	Kegalle	0.4
	Kalutara	53.3
	Nuwaraeliya	6.17
	Puttalam	Not stated the extent

Agamulnethiwel	Ratnapura	1.12
	Kalutara	Spread
	Kegalle	Spread
	Badulla	3.2
	Kandy	Throughout the district
Alligator	Ratnapura	0.1
	Kalutara	0.5
	Gampaha	0.2
	Nuwaraeliya	1.01
Lantana	Ratnapura	164
	Kegalle	Spread
	Puttalam	101.17
Arunadevi	Ratnapura	8
	Kalutara	2
	Kegalle	3
Welatha	Ratnapura	140
	Kalutara	566
Katakalu Bovitiya	Ratnapura	140
	Kandy	Throughout the district
Para	Ratnapura	356
	Kalutara	632
	Kegalle	Spread
Pathenium	Nuwareliya	0.20
Wathupalu	Kandy	Throughout the district
Mayurathana	Kandy	Throughout the district
Ranabata	Ratnapura	0.65
		-------- 9,858.77 ======

Annexure 07

Details on the programmes implemented by the Mahaweli Zones for the control of alien invasive plants

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Serial No.	Name of the Invasive Palnt	Name and the Address of the responsible party	Measures taken	Other remarks
1	Water Hyacinth, Salvinia	Residential Business Manager, Mahaweli Zone B	Wter Hyacinth and Salvinia were removed in Sinhapura tank, Bora wewa, Sevanapitiya tank, Ibbanna tank and Siyambala tank.	This has been done in the years 2016 and 2017.
2	Raising awareness among the people on invasive plants	Residential Business Manager, Mahaweli Zone B	Fifteen awareness programmes were conducted for farmers.	Year 2017
3	Water Hyacinth, Salvinia	Residential Business Manager, Mahaweli Zone B	Water Hyacinth and Salvinia were removed in Dalukana tank, Sinhapura tank, Knadakaduwa tank, Pimburethhawa tank, Hadama tank, Tract 04 tank, Peletiyawa tank, Maguldamana tank, Punchibanda tank, Ginimana tank, and Magulpokuna tank,	This has been done in the year 2018.
4	Water Hyacinth, Salvinia	Residential Business Manager, Mahaweli Zone B	Aquatic invasive plants were removed in Kiriibban tank, Dimbulagala tank, Dalukana tank and NDK tank.	This has been done in the year 2019

5	Water Hyacinth, Salvinia	Residential Business Manager, Mahaweli Zone H	Aquatic invasive plants were removed in Eliyadiwul tank	This has been done in the years 2014, 2016 and 2017
6	Water Hyacinth, Salvinia	Residential Business Manager, Mahaweli Zone H	Wter Hyacinth and Salvinia species were removed in Eliyadiwul tank, Eppawala tank,, Kudameegas wewa, Mahailuppallama Ihalasinharagama tank,and the tank in Nochchiyagama Division.	This has been done in the years 2016 and 2017
7	Raising awareness among the people on invasive plants	Residential Business Manager, Mahaweli Zone C	Conduct of public awareness programmes.	This has been done in the year 2019
8	Yoda Nidikumba,	Residential Business Manager, Mahaweli Zone C	Dolukanda tank	In theyear 2016
9	Water Hyacinth, Salvinia		Maldeniya tank	
10	Invasive aquatic plants	Residential Business Manager, Mahaweli Zone C	Makulugolla tank, Dematan wewa, Dolukanda tank, Mahawanawela tank and Wijayapura tank.	In the year 2017
11	Invasive aquatic plants	Residential Business Manager, Mahaweli Zone C	Kasan tank, Pussalawwanna tank, Rathmalkandura tank and Dolukanda tank.	In the year 2019

12	Invasive aquatic plantsWater Hyacinth and others	Residential Business Manager, Mahaweli Huruluwewa Zone	Two programmes were conducted for the removal of aquatic invasive plants in association with the tanks in the Zone	In the year 2014
13	Yoda Nidikumba	Residential Business Manager, Mahaweli Huruluwewa Zone	Removal of Yoda Nidikumba in 03 acres on both sides of the canal fed by the Huruluwewa.	In the year 2016
14	Water Hyacinth, Salvinia	Residential Business Manager, Mahaweli Zone D	Removal of Water Hyacinth and Salvinia in 06 tanks of the Zone.	In the year 2016
15	Invasive aquatic plants		Halmal Oya Suriyapura tank.	In the year 2019
16	Pathenium	Residential Business Manager, Mahaweli Walawa Zone	Namadagaswewa unit in Mayurapura Division.	In the year 2016
17	Yoda Nidikumba	Residential Business Manager, Mahaweli Rambaken Oya Zone	Three hectares in Pollebedda Division	In the year 2016
18	Yoda Nidikumba, Salvinia			In the year 2018
19	Raising awareness among the people on invasive plants	Residential Business Manager, Mahaweli Victoria Zone	Conduct of 04 community awareness programmes	In the year 2016
20	Raising awareness among the people on invasive plants		Rambukwella Ferry, Galambalama Ferry.	In the year 2017

21	Raising awareness among the people on invasive plants	Residential Business Manager, Mahaweli Zone L	Four programmes have been conducted..	In the year 2018
22	Raising awareness among the people on invasive plants	Residential Business Manager, Moragahakanda Zone	An awareness programme has been conducted in Attanakadawala.	In the year 2018

Annexure- 08

	Regional Offices	Distributed		Authorized Officers have been appointed/ Not appointed	For the removal	
		Invasive aquatic weeds and plants	Extent (Acres)		Steps have been taken/ not taken	Expenditure incurred (Rs.)
01	Hambantota	Water Hyacinth, Salvinia, Lantana, Others	Not known (Not stated)	Not appointed	Steps have not been taken	Not stated
02	Rathnapura	Water Hyacinth, Salvinia, Lantana, Yoda Nidikumba	Not stated	Not appointed	Steps have not been taken	Not
03	Head Office, Battaramulla	Water Hyacinth, Salvinia, Lantana, Yoda Nidikumba	Not stated	-	Steps have not been taken	Not stated
04	Head Office, Battaramulla	Lantana, Yoda Nidikumba	10 -	Not appointed	Steps have not been taken	Not

05	Kegalle	Ginithana	Not stated	Not known	Steps have not been taken	Not stated
06	Dankotuwa	Water Hyacinth, Salvinia,	Not stated	Not appointed	Steps have not been taken	Not
07	Ampara	Water Hyacinth, Salvinia, Lantana, Yoda Nidikumba, Pathenium	Not stated	Not appointed	Steps have not been taken	Not
08	Kurunegala	Water Hyacinth, Salvinia, Lantana	Not stated	Not appointed	Steps have not been taken	Not
09	Trincomalee	Water Hyacinth, Yoda Nidikumba	Not stated	Not appointed	Water Hyacinth have been mechanically removed	Not

10	Batticaloa	Salvinia,, Yoda Nidikumba	10 -	Not appointed	Steps have been taken	Not
11	Kuliyapitiya	Water Hyacinth, Salvinia	Not stated	Not appointed	Steps have been taken	Not
12	Lunuwala	Lantana, Yoda Nidikumba	Not stated	Not appointed	Steps have not been taken	Not
13	Monaragala	Salvinia, Yoda Nidikumba	Not stated	Not appointed	Not known	Not
14	Jaffna	Salvinia	2.5	Not appointed	Steps have been taken	Not

Annexure - 09

Serial No.	Name of the Agrarian Services Centre	Name of the alien invasive plant	Extent of distribution (Acres)
1	Alawathugoda	Water Hyacinth	0.1
		Salvinia	0.1
		Hydrilla	0.2
		Yoda Nidikumba	0.4
2	Kalunthenna	Yoda Nidikumba	31.5
		Lantana	45.0
		Others	285.0
3	Batugoda	Yoda Nidikumba	2.0
4	Imbuldeniya	Yoda Nidikumba	1.0
		Others	8.5
5	Edanduwawa	Yoda Nidikumba	2.0
6	Morayaya	Yoda Nidikumba	200.0
		Kambiwel	2,500.0
7	Menikdiwela	Water Hyacinth	1.0
		Salvinia	6.0
8	Pethiyagoda	Water Hyacinth	0.3
		Hydrilla	3.5
		Yoda Nidikumba	4.6
		Lantana	4.0
		Others	9.8
9	Waththegama	Yoda Nidikumba	17.7
10	Wavinna	Water Hyacinth	1.0
		Yoda Nidikumba	0.3
		Lantana	0.9
		Others	7.8
11	Dambagahapitiya	Yoda Nidikumba	2.0
		Ethana (Ginithana)	50.0
		Kambiwel	3.0

12	Alapalawala	Yoda Nidikumba	5.0
		Diya Siyambala	15.5
13	Galagedara	Yoda Nidikumba	4.0
14	Digana	Yoda Nidikumba	57.1
		Others	4.0
		Yellow coloured flowering plants	3.0
		Kambiwel	3.0
15	Nugethenna	Yoda Nidikumba	10.0
16	Aludeniya	Water Hyacinth	7.0
		Salvinia	42.0
		Others	4.0
17	Ketawala, Lewella	Water Hyacinth	5.5
		Yoda Nidikumba	20.5
18	Gunnepana	Water Hyacinth	0.5
		Salvinia	0.3
		Yoda Nidikumba	7.4
		Lantana	2.0
		Others- Kambi grass	1.5
19	Theldeniya	Yoda Nidikumba	28.6
20	Medapitiya	Yoda Nidikumba	3.6
		Lantana	0.5
21	Menikhinna	Yoda Nidikumba	2.5
		Lantana	0.5
		Kambiwel	6.0
22	Rambukpitiya	Yoda Nidikumba	14.5
		Lantana	2.0
		others	0.5
23	Marassana	Yoda Nidikumba	0.1
24	Medawela, Harispaththuwa	Yoda Nidikumba	12.5
			3,451.1

Annexure - 10

Serial No.	Name of the Agrarian Services Centre	Name of the alien invasive plant	Distributed extent Acres
1	Palapathwala	Yoda Nidikumba	10.00
		Reed	0.25
2	Yatawatta	Water Hyacinth	0.10
		Salviniya	0.85
		Lantana	1.30
		Yoda Nidikumba	3.05
		Other	6.00
3	Walawela	Yoda Nidikumba	1.50
		Lantana	2.00
		Kahakarabu	2.00
		Star Flowers	1.15
4	Ukuwela	Yoda Nidikumba	9.50
		Sudda	10.00
		Star Flowers	2.00
5	Raththota	Salvinia	10.00
		Hydrilla	6.00
		Yoda Nidikumba	25.00
		Lantana	2.00
		Others	200.00
6	Elkaduwa	Yoda Nidikumba	10.50
		Iluk. Mna, Ratathankola	38.50
7	Bandarapola	Yoda Nidikumba	5.00
		Lantana	9.00
		Star Flowers	3.00
8	Alagolla	Yoda Nidikumba	8.50
		Moss	1.50
9	Hettipola	Water Hyacinth	40.00
		Salvinia	15.00
		Yoda Nidikumba	0.75

10	Handungamuwa	Water Hyacinth	8.00
11	Kimbissa	Salvinia	400.00
		Yoda Nidikumba	30.00
		Wilkatu	50.00
12	Dambulla	Water Hyacinth	58.00
		Salvinia	55.50
		Pathenium	10.50
		Hydrilla	17.50
		Yoda Nidikumba	37.00
		Reed	48.00
		Mana	5.00
13	Pallepola	Salvinia	5.00
		Yoda Nidikumba	50.00
14	Wasalakottage	Water Hyacinth	9.50
		Hydrilla	0.25
		Yoda Nidikumba	4.20
		Others	2.00
15	Galewela	Salvinia	19.00
		Water Hyacinth	28.50
		Yoda Nidikumba	6.00
16	Dewahuwa	Water Hyacinth	6.00
		Salvinia	1.05
17	Thenna	Yoda Nidikumba	7.00
		Star Flowers	1.00
18	Weragama	Yoda Nidikumba	1.00
19	Kongahawela	Yoda Nidikumba	1.00
20	Haththota Amuna	Yoda Nidikumba	0.75
			1286.20

Positions observed at the combined field inspection **Annexure 11**

Serial No.	Name of the Location/Tank	Area	Extent (Approximate)	Observed alien invasive plants	Observed other plants	Other observations
	Observations on the field inspection of Kundasale Theldeniya.					
01	Dambarawa Hureekaduwa tank	Kandy, Hureekaduwa	About 03-04 Hectares	Hambupan, Fistiya, Yodanidikumba, Ginithana	Brukeriya, Diyahabarala	The tank has entirely filled. Yoda Nidikumba can be seen bout 2/4 area of the circumference of the tank. Likely, Hambupan has spread over 4 acres area of the tank.
02	Nawayalathenna close to the Mahaweli river.	Katugasthota	About 02 Hectares	Water Hyacinth, Salvinia, Fistiya, Welalakola	Ludvigia species	There is a densely grown Water Hyacinth cover over an extent of 75 per cent and Welalakola can be observed over 10 per cent of the area. In addition, small quantity of Salvinia and Fistiya species has spread over the area.
03	Walala tank, Undugoda Bandara Ela extension	Menikhinna	About 06 Hectares (About 17 acres)	Yoda Nidikumba		The water level of the tank has greatly decreased and Yoda Nidikumba in different grown stages has spread over an extent of 60 per cent.

04	Both sides of the Mahaweli river Kurunegala Galewela ----------	From Thennekumbura to Mailapitiya		Yodanidikumba		Yoda Nidikumba in different stages of their grown has covered the river banks of the both side of the observed locations along the Mahaweli river.
05	Kottakapola tank	Maewathagama	17 Acres	Salvinia, Lantana (Bank of the tank)	Atawara, Thunhiriya and Foxtail	The extent of the tank which stood at 17 acres has decreased up to 12 acres. Bio control pests were introduced 06 years ago for the control of Salvinia and certain extent of control could be observed at that time. Nevertheless, Salvinia has spread again over an extent of 1-2 acres. In the observation of those plants they had become black in colour and the destructions caused to those species by the bio control pests could be clearly observed. Atawara plants have covered over 75 per cent area of the tank and Thunhiriya have spread on certain locations. A part of the tank have dug 03 years ago spending Rs.11 lakhs. (Chairman of the Farmers' Association)
06	Saragama tank Maspotha	Kurunegala	10-12 Hectares	Salvinia Water Hyacinth	Lotus, Brucaria grass	Lotus has spread over 75 per cent area of the tank and Salvinia plants have spread over 1-2 hectares. Water Hyacinth can be found on certain places. Brucaria grass has

						spread over an extent of 01 hectares on the other side of the tank.
07	Thalagaswewa	Near the Kurunegala - Dambulla main road.	02 Hectares		Diyasiyambala	The tank has completely filled. Grass and wide leaves species have spread over the tank. Diyasiyambala have densely grown about 1 hectare in the middle of the tank.
08	Wawewa (Moragolla tank)	Moragolla, Galewela	10 Hectares	Salvinia		Bio control pests were introduced to this tank on 20.06.2019 to control Salvinia and all the Salvinia plants spread over an extent of 30 per cent of the tank had died and dried.
09	Kongolla tank	Kongolla	10 Hectares	Salvinia, Water Hyacinth	Lotus	Bio control pests were introduced to this tank on 20.06.2019 to control Salvinia and Water Hyacinth and due to the existing draught, 90 per cent of the tank has dried. All the Salvinia plants and a certain quantity of Water Hyacinth had died and dried.
10	Waklas wewa (Epita wewa)	Galewela	08 Hectares	Salvinia, Lantana (on the bank)	Lotus, Budures Pasi, Olu	Bio control pests were introduced to this tank on 20.06.2019 to control Salvinia and Water Hyacinth and due to the existing draught; water level has decreased to a certain extent. The spread of bio control pests on the Salvinia plants has commenced.
11	Waklas wewa (Village tank)	Galewela	08-10 Hectares		Lotus	Lotus plant has spread over 90 per cent area of the tank.

12	Bannekgama	Galewela	03-04 Hectares	Salvinia Hambupan	Thunhiriya	Bio control pests were introduced to this tank on 20.06.2019 to control Salvinia and Water Hyacinth and due to the existing draught; water level has decreased to a certain extent. The spread of bio control pests on the Salvinia plants has commenced. .(Damaged plants can be observed.)

Observations on the field inspection of Kothmale/ Nuwaraeliya

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13	Forest and Environment Division, Sri Lanka Mahaweli Authority, Reverside, Mawathura.	Mahaweli Upper watershed area from Randenigala.	3118 Hectares	Yoda Nidikumba	Having been completely mapped the Mahaweli Upper watershed area; spread of Yoda Nidikumba has been marked with the use of GPS technology. In addition, Yoda Nidikumba controlling programmes have been implemented in selected areas.
14	Berukplane tank	Nuwaraeliya	5.8 Hectares (at upper spill level)	Alligator, Salvinia and Water Hyacinth	Although chemical and mechanical control methods have been adopted hereinbefore, 95 per cent of the tank has been covered with Alligator species at present. Cost estimates have been prepared for the removal of Aligator plants.

15	Bomburuella Reservoir	Department of Irrigation, Badulla.	16 Hectares	Alligator, Salvinia and Water Hyacinth		Alligator plants have spread about 50 per cent of the reservoir fed by the Berukplane tank. Similarly, Water Hyacinth too has spread over 3-4 acres of the reservoir.

Observations on the field inspection of Hasalaka, Wasgamuwa, Moragahakanda and Bowathenna.

16	Minipe Left bank water fall.	From Hasalaka via Ulpathgama Wilgamuwa via Walasgamuwa .		Salvinia, Water Hyacinth, Welalakola	Brucaria Thunhiriya species.	Salvinia has spread in certain places along the irrigation canal up to Wasgamuwa from 57 Canal about 5Km distance. Gamunu Oya.
17	Thunhiriya tank	Wasgamuwa	5-6 Hectares	Salvinia, Water Hyacinth	Reeds (Thunhiriya	Ninety percent of the tank has dried. Salvinia and Water Hyacinth have spread in some places. Reeds (Thunhiriya) grown in association with the water have spread over 50 per cent area of the tank.

18	Wasgamuwa National Park	Wasgamuwa	39532 Hectares	Lantana, Salvinia, Water Hyacinth	Maila Podosinnomaran	Although lantana has grown on both sides of the roads within the Park, they are not at the invasive level. Similarly, Maila and Podisinnomaran plants have aggressively spread.
19	Kandurupitiya		About 2 Hectares	Salvinia	Hydrilla	The water level in the catchment reservoirs within the forest park remained at lower level. Water Hyacint have spread over 20 per cent area of the Kandurupitiya tank while Hydrilla species can be seen in the area filled with wate
20	Walpitiya tank		About 5-6 Hectares	Ludvigia species		Ludvigia plants have spread over 50 per cent area of the tank.
21	Sansthapitiya tank		About 3 hectares	Water Hyacinth		Salvinia and Water Hyacinth have spread over some places in the tank.
22	Yaka Kadlla tank	Laggala	2 Hectares	Yoda Nidikumba		Yoda Nidikumba have spread over the bank of the tank
23	Moragahakanda Reservoir, Ambangaga	Moragahakanda		Yoda Nidikumba		Invasive plants are not observed in upper parts of the Moragahakanda Reservoir and Yoda Nidikumba have spread over 6 K.m area on both sides of the Abanganga at the lower part of the dam.

24	Bowathenna Reservoir	Navula	Yoda Nidikumba	Yoda Nidikumba species have spread over an area of 25 K.m. of the circumference of the reservoir. Yoda Nidikumba has removed from 10 acres on two places of the bank and shady plants (Karanda, Kumbuk and Bamboo) have been grown over an extent of 4 acres.