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விவசாய நவீனமயமாக்கல் திட்டம்
Agriculture Modernization Project

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Ministry of Agriculture
கமத்தொழில் அமைச்சு

Environmental Screening Report

Supply, Delivery, and Installation of Laboratory Equipment, Accessories, Chemicals and Glassware for Laboratories at HORDI

Project Management Unit
Agriculture Sector Modernization Project
January 2022

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ABBREVIATIONS

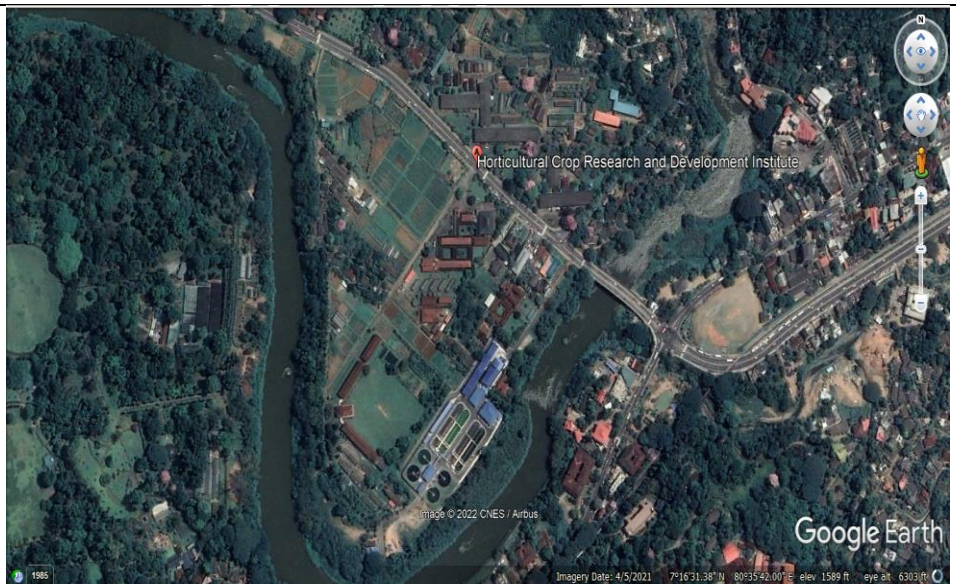
AI	Agriculture Instructor
ASMP	Agriculture Sector Modernization Project
ASC	Agrarian Service Center
ATDP	Agricultural Technology Demonstration Park
CBO	Community-Based Organization
DSD	Divisional Secretary Division
EMF	Environmental Management Framework
EMP	Environmental Management Plan
ESR	Environmental Screening Report
FO	Farmers Organization
FPO	Farmers' Production Organization
GAP	Good Agricultural Practices
GND	Grama Niladhari Division
GoSL	Government of Sri Lanka
IDA	International Development Association
IEE	Initial Environmental Examination
IPM	Integrated Pest Management
LGA	Local Government Authority
MOA	Ministry of Agriculture
MOPI	Ministry of Primary Industries
NIRP	National Involuntary Resettlement Policy
NGO	Non-Governmental Organization
OP	Operational Policy
PAP	Project Affected Persons
PCR	Physical Cultural Resources
PMP	Pest Management Plan
PMU	Project Management Unit
SLRs	Sri Lanka Rupees

ENVIRONMENTAL SCREENING REPORT (ESR)

A. THE PROJECT IDENTIFICATION

Project Title	Supply, Delivery and Installation of Laboratory Equipment, Accessories, Chemicals and Glassware for Laboratories at HORDI
Project Proponent	Agriculture Sector Modernization Project (ASMP)
Purpose and scope of ESR	The purpose of the ESR is to provide viable mitigation measures against all identified environmental impacts during the screening process of the subproject. This ESR includes the basic information of the subproject, justification of the subproject selection, anticipated impacts, and environmental condition of the subproject area, and stakeholder consultations and concerns on subproject identification, designing, and implementation, the implementation plan of the viable mitigation measures against the identified environmental impacts.

B. PROJECT LOCATION

Location	The subproject's activities will be totally implemented in the office premises belong to Horticultural Crops Research and Development Institute (HORDI) at Gannoruwa. The institute is located at Gannoruwa 8 km away from Kandy city in Yatinuwra DS division of Kandy district in the Central Province. Under this subproject, Supply, delivery and installation of laboratory equipment and accessories will be implemented. The location maps are annexed as Annex 1.1.
Location (Google Map) 1. Gannoruwa $7^0$16’25.70” N $80^0$36’08.89” E	 **Figure 1: Location of HORDI @ Gannoruwa**
Definition of Project Area *(The geographical extent of the*	The Horticultural Crop Research and Development Institute (HORDI) is vested with the responsibility of technology development concerning vegetables, root and tuber crops and floriculture. The research program focuses on the development of improved crop varieties, new propagation

project & areas affected during construction)	methods, post-harvest and food processing methods, the use of protected culture and ensuring better plant health with fewer defendants on chemicals. It is situated at Gannoruwa Peradeniya,co-ordinating the network of RARDCS, ARSS and horticultural farms. ***History of HORDI*** The Department of Agriculture was established in 1912 and the Division of Research was one of its important sections that provide scientific information for establishment of major plantation crops, tea, rubber coconut and other plants of economic and ornamental importance. Three separate institutions for tea, rubber and coconut were established and thereafter the Division of Research in the Department of agriculture placed the emphasis on peasant agriculture and established the Central Agricultural Research Institute. The foundation stone for new laboratories of the Central Agricultural Research Institute was laid in Gannoruwa on 21 June 1958 by the Honorable S.W.R.D Bandranayake. Honorable Dudley Senanayaka, late Prime Minister of Ceylon, formally declared the Institute open on 6th August 1967. Apart from the administrative Headquarters housed in the institute, there were Research divisions of Agricultural Botany, Agricultural Chemistry, Plant Pathology, Entomology, Horticulture, Food technology, Minor plantation crops, Tobacco & soil conservation and Statistics. With re-structure of the Department of Agriculture, three national Institutes were formed in 1994 to conduct research and development activities on horticulture, rice & field crops. The Central Agriculture Research Institute at Gannoruwa was renamed as Horticultural Crop Research and Development Institute to carryout efficient and intensive research & development work on horticulture.  **Figure 2: Horticultural Crops Research and Development Institute** There are ten sub units comes under HORDI. Regional wise research activities are carried out at these sub stations with coordination of HORDI.
Adjacent land and features	The HORDI administration complex, laboratories, and cultivation area is located on the land belongs to DOA. The land with an extent about 120ha (300acres) is allocated for the several government institutions comes under DOA in Gannoruwa. The area where HORDI is located belongs to Yatinuwara DS division of the Kandy district in Central Province. The area belongs to the Mid country wet zone.

	The mission of the institute is functioning as the national center for research and development of sustainable and productive technologies for horticultural crops to ensure economic and social development of the farmers, and other stakeholders. The HORDI promotes the Good Agricultural Practices (GAP) program for the quality assurance of agricultural products as healthy products through their research activities. As the development perspective, HORDI transfer new technologies which are developed by the research divisions to the agriculture extension officers, vegetable farmers, students (School, School of Agriculture & University) Entrepreneurs in the private sector. Improve the research extension linkage by coordinating research extension dialogue, technology demonstrations at farmer fields. Coordinating and testing of adaptability on research-proven technologies of HORDI at field level. The administrative complex and the labs are located together bounded to Gannoruwa Kandy road. The cultivation area used for the research activities is bounded by Kandy- Gannoruwa main road and Mahaweli river. There are many government institutions located surrounding area. They are; • Seed Certification and Plant Protection Center • Plant Genetic Resource Center (PGRC) • Gannoruwa Agricultural Complex • Agro Technology Park Unit • Agro Enterprise Development & Information Service • Quality Seeds and Planting Material and Agriculture Publications Sales Center • Inservice Training Center • Plant Protection Service • Fruit Crop Research and Development Station • Food Research Unit • National Agriculture Information and Communication Center • Plant Propagation and Nursery Management Division • Natural Resource Management Center • Vegetable Seed Center • Central seed Testing Laboratory • Veterinary Research Center (VRI) • Sri Lanka Army- Gannoruwa Camp • Provincial Surveyor General's Office • Hadabima Authority of Sri Lanka • Government Staff Quarters and Circuit Bungalows The Department of Agriculture is one of the few departments that has been established out of the capital city Colombo Sri Lanka. Therefore, many institutes affiliated with DOA are centralized in Gannoruwa and Peradeniya area. A part of DOA- owned land is used for the demonstration cultivations, research activities (cultivations), and agriculture park by the relevant

	institutions. Except for the DOA and other government agencies' owned land, there are no agricultural lands in the surrounding area. All the private lands located surrounding areas are residential or commercials. Mahaweli river flows adjoining the DOA-owned land. The opposite side of the Mahaweli River is bounded by the Royal Botanical Garden of Sri Lanka.

C. PROJECT JUSTIFICATION

Need for the project (What problem is the project going to solve	ASMP has launched its activities in nine districts of seven provinces of the country. Project Management Unit (PMU) and Provincial Project Management (PPMUs) directly implement the two kinds of subproject activities that mainly consist with Productivity Enhancement and Diversification Demonstrations and the infrastructure development programs. The Department of Agriculture (DOA) acts as the main project partner agency of Productivity Enhancement and Diversification Demonstrations. DOA's activities consist with designing of subprojects, training farmers, monitoring subprojects' activities and involving the troubleshooting of the program. Strengthening infrastructure and Technological/Technical capacities of the Department of Agriculture is an essential need to ensure provision services and follow up support for the farmer production organization (FPOs) established under the Component 2 of the Agriculture Sector Modernization Project (ASMP). This is further to the basic field facilities established for basic seed production of chili and maize (FIELD CROPS CENTER), vegetables including potato (VEGETABLES CENTER) and the fruit crops (FRUIT Center), which the centers of excellence of the relevant crop categories established at Mahailuppallama (including Kilinochchi and Aralaganiwila), Gannoruwa/ Kundasale/ Dondagolla/ Seetha Eliya Complex, and Horana, respectively. Furthermore, addressing issues related to food safety are pivotal owing to the increased trend of non-communicable diseases in Sri Lanka, thus, prompting people be more health conscious in terms of food they consume. This is true for both processed or packed food as well as fresh produce. Though some of the safety standards and traceability systems are available for processed food, food safety certification for fresh agricultural produce is still a new concept to Sri Lankan consumers. Hence, apart from having basic seed production to support enhanced productivity drive and farmer livelihood development through the component 2 of the ASMP, fulfilling requirement of certified safe food is considered important through the promotion of SL- GAP program, which is in existence Sri Lanka since 2015. Insufficient production, scattered producers, non-continuous supply, poor marketing channels, and low consumer awareness on GAP-certified products have become major issues as at present that required immediate solutions. At present there

	is a gap in market requirement and the supply of GAP-certified products. Hence, expanding the SL-GAP programme among the FPOs under the ASMP would provide quality agriculture produce at a lower price while providing high income for the SL-GAP farmers. Agriculture in Sri Lanka is one of the sectors which has been given a prominent focus for a number of years where paddy cultivation is identified as the most important crop. However, over the years the horticulture sector which includes fruits and vegetables has been gaining significant prominence and is a major contributor to the overall agriculture sector. Sri Lanka's ability to grow a variety of fruits and vegetable crops year-round under different climatic zones has led to a keen interest both locally and internationally to further develop this sector due to the identified high potential. In recent times the potential and interest for the horticulture sector has intensified due to government policy and the Covid pandemic. The present domain of the horticulture industry in Sri Lanka is evolving and includes cultivation, plant propagation, breeding of plants, production of crops, plant physiology as well as biochemistry and genetic engineering. The use of biotechnology is also poised to enter the domain of horticulture in Sri Lanka. Sri Lanka's smallholder farmers are faced with increasing risks related to the impacts of climate factors, socio-economic conditions, technology transfer issues. Risk has always been a factor for farmers, and there are many traditional methods of risk management that have been developed over generations, including cultivation techniques, crop varieties, irrigation systems, soil management, natural insect and pest control, integrated crop-livestock systems, and livelihood diversification. In addition to employing these traditional methods, farmers can benefit from technology and modern knowledge to better manage their risks on different levels, such as agro-meteorological advisory, climate projections, crop insurance schemes, value addition, micro-irrigation, mechanization, or reduction of post-harvest losses. As a holistic approach, enhancing farmer capacities, agricultural input supply, and value chain is a sustainable effort for the industry. Meantime, the enhancement of the DOA's capacity as the main project partner agency of the ASMP is a mandatory requirement that should be accelerated for the better performance of the agriculture sector development. The ultimate effort of the ASMP is to establish good agriculture practices (GAP) in the farming activities by introducing new technologies. Therefore, strengthening of the laboratory facilities of HORDI at Gannoruwa is considered an essential and timely need for quality assurance of agricultural products which can be utilized by other public and private sector agencies to enhance the safe food and good health of the people in Sri Lanka. Strengthening of laboratory facilities of HORDI at Gannoruwa will be a sustainable solution for the continuing of modern technologies that are

	introduced to the farmers by ASMP. Therefore, the launching of the capacity-building program at Gannoruwa to enhance the quality assurance of agricultural products is an essential and mandatory requirement of the agriculture sector modernization.
Purpose of the project (*What is going to be achieved by carrying out the project*)	The project will directly result in enhancements of laboratory facilities at HORDI- Gannoruwa. Ultimately, it gives benefits to the farmers who have engaged in vegetable cultivation in the country. The following purposes will be achieved by implementing the subproject. • Identifying the crop characteristic and introducing crop management specifications • Continuing research and development activities by HORDI staff with the collaboration of local and foreign universities, agriculture schools, private agricultural firms, other academic centers, and stakeholders • Conducting development programs to transfer new technologies which are developed by the research divisions to the agriculture extension officers, vegetable farmers, students (School, School of Agriculture & University) Entrepreneurs in the private sector. • Improve the research extension linkage by coordinating research extension dialogue, technology demonstrations at farmer fields. Coordinating and testing of adaptability on research-proven technologies of HORDI at field level. • Transferring Technologies released by the Food Research Unit and the findings regarding the new disease identification and confirmation through molecular techniques to farmers and other stakeholders • Continuing to diagnose to identify the pest and diseases attacks, nutrient deficiency, and other challenges for the horticultural crop management. Giving recommendations and creating awareness of the stakeholders to overcome the issues. Meantime, conducts the analysis to identify the residual impacts of the agriculture inputs and the management activities. To achieve this objective HORDI carry out soil sample analysis, fertilizer sample analysis, compost analysis, water sample analysis, plant sample analysis, bio-efficacy testing of special fertilizer, training programs, quality analysis laboratory reports, research facilities, advising and consulting, and awareness programs are being conducted • Releasing new crop varieties- Continues research activities to release the high yielding, pest and diseases resistant, drought resistant and high food quality contains crop varieties The ultimate effort of the ASMP is to establish good agriculture practices (GAP) in farming activities by introducing new technologies.
Alternatives considered (*Different ways to meet the project*	We do not have a private-sector program for conducting research and development activities in the country on horticultural crops. HORDI is the mandatory institution responsible for this service.

need and achieve the project purpose)	The existing horticultural crops laboratory services of the government sector are half fulfilled the country's requirement. Even though there is private sector involvement, their services are very narrow and are limited to their own needs only. Hence, there is a gap to be filled and the government sector involvement is essential. The farmers keep trust in the government sector service since there is trustworthy service and DOA has improved human capital to deliver the service. Therefore, ASMP together with DOA have identified the need for a subproject and decided to enhance the laboratory services through the capacity building program. There is no alternative to be considered since there is well established system in the sector.

D. PROJECT DESCRIPTION

Proposed Start Date (Duration)	March 2022 (02 Months)
Proposed completion Date	April 2022
Estimated total cost	SLRs 208.49 Mn
Present Land Ownership	HORDI is located in Gannoruwa on the state land that is under the purview of the DOA.
Description of the Project (*With supporting material such as maps, drawings etc. attached as required*)	This subproject is mainly focusing to Supply, Delivery and Installing of Laboratory Equipment & Accessories at HORDI for following laboratories; 1. Toxicology Laboratory 2. Central Analytical Laboratory 3. Soil and Plant Nutrition Laboratory 4. Bio Control Laboratory 5. Pathology Laboratory
Project Management Team	A Project Management Unit (PMU) has been established under the Ministry of Agriculture to implement the proposed project activities. Contact Persons: **Project Director** Agriculture Sector Modernization Project Ministry of Agriculture No. 123/2 Pannipitiya Road, Battaramulla Tel: +94 112 877 550, Fax: +94 112 877 546 Email: projectdirectorasmp2@hotmail.com Web: https://www.asmp.lk/ **Environmental and Social Safeguards Specialist** Agriculture Sector Modernization Project Ministry of Agriculture No. 123/2 Pannipitiya Road, Battaramulla Tel: +94 112 877 550, Fax: +94 112 877 546

	Email: sanjayadms@hotmail.com Web: https://www.asmp.lk/ **Nature of Consultations and Inputs Received** Consultations with Environmental and Social Safeguard Specialist/ PMU and field visits to the project site.

E. DESCRIPTION OF PROPOSED SUBPROJECT ACTIVITIES

Existing Condition of the Facilities	The HORDI is a de-centralized organization. The central administration has been established at the head office in Gannoruwa but island wide research and development activities and the services are delivered by the HORDI in addition to services provided by the regional sub units. There are ten sub units comes under HORDI, 1. Regional Agriculture Research & Development Centre – Bandarawela 2. Agricultural Research Station -Seetha Eliya 3. Agriculture Research and Development Center -Girandurukotte 4. Agriculture Research Station -Kalpitiya 5. Agriculture Research Station -Thelijjawila 6. Adaptive Research Unit – Wagolla 7. Adaptive Research Unit – Wariyapola 8. Adaptive Research Unit – Thibbatumulla 9. Adaptive Research Unit – Thabbowa 10. Food Research Unit – Gannoruwa The HORDI is a prime research and development institute among the agricultural research stations of the country. It consists of all the sections that want to continue the improved research and development activities at a higher standard level. There are Seven Sections that comes under HORDI, 1. Plant Breeding Division 2. Plant Pathology Division 3. Agronomy Division 4. Entomology Division 5. Soil and Plant Nutrition Division 6. Food Contaminant Analytical Division 7. Extension and Communication Division **<u>Plant Breeding Division</u>** Division of plant breeding is employed in developing new vegetable varieties to cope with the market demand, consumer preference, climate change, and biotic & abiotic stresses using conventional and modern breeding tools. In achieving the above goals current research and development activities are being focused on the following area.

	• Germplasm collection, evaluation, and selection for rational utilization of germplasm in crop improvement program of vegetable crops • Development of high-yielding vegetable varieties in cooperated with other preferable quality characters suitable for diverse environments. • Development of climate-smart varieties to mitigate climate change • Development of pest and disease-resistant varieties to reduce the usage of chemicals in vegetable cultivation and ensure sustainable agriculture industry The services delivered by the plant breeding division; • Production of new vegetable varieties • Breeder seed production of new varieties produced • Awareness of farmers • Training Programs (Farmers, Students, Officers) • Contributing to Technology Programs (Radio, Television) • Conducting research on imported seeds and finding out whether they are suitable for cultivation in the country. • Awareness on techniques (Tissue Culture, Mushrooms) • Providing planting material **<u>Plant Pathology Division</u>** The Plant Pathology division is responsible for identification of plant diseases, development of integrated disease management packages, fungicides screening, seed and plant health test, advisory service for disease control. New technologies are disseminated by training classes, plant clinics, leaflets, and research papers. The plant pathology division provide following service to the sector; • Disease Diagnosis and Advisory Service • Providing Teaching and Training Facilities • Participate as Resource Persons Disease identification is one of the major tasks assigned for this division. The plant pathology division of HORDI continues a remarkable duty in prior identification of pest and disease attacks' outbreaks and taking necessary actions to mitigate the vulnerable situations. Currently, the division has been modified to detect and confirm diseases through molecular biology techniques. Using this technique, the following new diseases were traced during the recent period; 1. **Aloe vera** soft rot (Dickya chrysanthemi) 2. Target spot of **tomato** (Corynespora cassiicola) 3. Corynespora blight of **cucurbits** (Corynespora cassiicola) 4. Bacterial wilt of **cucurbits bean and weed** hosts (Ralstonia solanacearum) 5. Fusarium crown and root rot of **tomato** (Fusarium radices-lycopersici)

6. **Moringa** (Drumstick) diseases (Drechelera sp.) and (Lasiodiplodia theohromae)
7. **Tomato** canker disease (Clavibacter michiganensis subsp. Michiganensis)
8. **Watermelon** fruit blotch (Acidovorax avenae)

Agronomy Division

The main activity of the division is conducting agronomic research with the propound objective of increasing the production and productivity of vegetables, ornamentals, and root and tuber crops.

Through the developing agronomic technologies, the division is working to minimize the gap between potential and actual yield and quality of the crops and increase the overall vegetable and root & tuber crops production of the nation.

The division offers a different kinds of agronomy related services to the public, mainly on vegetables, flowers, and root and tuber crop cultivations and home gardening.

Services

- Provision of planting material and seeds of traditional - varieties for farmers that requested.
- Solving farmers problems on vegetables
- Participating for research extension dialogues requested by extension divisions.
- Participating and conducting lectures for pre-seasonal training programs

Entomology Division

The main activity of the division is conducting research and development activities related to the diagnosis and management of pests in vegetables and root crops

Soil and Plant Nutrition Division

Division of Soil and Plant nutrition mainly conducts research on soil fertility, plant nutrient management, organic farming, environmental pollution, food safety, and soil microbiology and soil physics relevant to vegetables. The division promotes farmers for soil test-based fertilizer application in the food crop sector. Further provides analytical services on request for soil, plant, water, and chemical fertilizers, compost, and manures and offers advice on their use of them. The division also undertakes training programs on soil fertility and plant nutrition, correct use of fertilizers, organic farming with special reference to nutrient and soil management, and other related topics for farmers, students, extension officers, and the interested public. Students from universities and other government and private institutions are being trained for the laboratory analytical works of organic farming. The division consists of laboratories for soil, fertilizer, plant, water analysis, and Soil microbiology. These are

	equipped with required instruments to measure essential soil chemical, physical and microbial properties. Soil and fertilizer laboratories are accredited for analyzing pH, EC. Phosphorus, Potassium, Micronutrients (Fe, Cu, Mn, Zn), secondary nutrients (Ca, Mg), total trace metals (As Cd, Cr, Pb, Fe, Cu, Mn, Zn) in soil and total nitrogen, total and water-soluble phosphorous, total potassium, moisture, and heavy metals (Fe, Cu, Mn, Zn, Pb, Cd, Cr, As) in chemical fertilizer. The following services are provided by the division; 1. Soil Sample Analysis 2. Chemical Fertilizer Sample Analysis 3. Compost Analysis 4. Water Sample Analysis 5. Plant Sample Analysis 6. Bio efficacy testing of special fertilizers 7. Undertake university students researches 8. Training Programs (school and University) 9. Training Program (Diploma Students) 10. Training on Organic Farming The main activities that are undertaken by the division are as follows**;** • Improve fertilizer use efficiency by in introducing new technology. • Promoting of organic agriculture • Introduction of compost preparation technology • Promotion of soil and plant test bored fertilizer recommendation • Detection of heavy metals in environmental samples • Testing of micro-nutrient in plant samples • Conducting research on soil fertility and plant nutrient management, soil physics and soil microbiology **<u>Food Contaminant Analytical Division</u>** Main scope of this division is carrying out analysis on food contaminants. Accordingly, residue analysis for pesticide residues and trace elements in food is being continued at the two separate laboratories. In addition, testing for pesticide formulations are also carried out at a separate laboratory division. Considering the capacity of the laboratory, per day nearly forty (40) samples can be analyzed as for pesticide residue analysis or elemental analysis. Nearly seventy pesticides can be analyzed as pesticide residues while 13 elements can be analyzed as trace elements including most toxic elements of Arsenic (As), Mercury (Hg), Cadmium (Cd) and Lead (Pb). Nearly 85 equipment are located at the laboratory including high-end equipment of LC-MS/MS, GC-MS, ICP-MS, HPLC, FTIR and two GCs. The following services are produced by the division • Pesticide residue analysis in food items of fruits, vegetables, rice and water • Elemental analysis in food items of fruits, vegetables, rice and water

- Elemental analysis in pesticides as impurities
- Conducting under graduate/student training and research studies.
- Quality analysis for pesticides.

Extension and Communication Division

Research proven new findings and improved varieties in related to the vegetables and tuber crops are disseminated to different groups of people including students, government and non-government organization, farmers and entrepreneurs to enhance production and productivity of vegetables and tuber crops. Coordinating, the industrial training program for students under Diploma and University. Research extension linkage is developed by organizing and coordinating demonstration on new technologies and conducting and coordinating research extension dialogue. Division is responsible for compilation and preparation of annual research report. The activities performed by the division;

- Timely editing and updating of technical leaflets
- Technology dissemination by telephone calls, radio program, TV Program, paper articles, exhibitions, workshops, training program and demonstration
- Coordinating the research and extension linkage by conducting and coordinating research extension dialogue.
- Coordinating industrial training program for the undergraduates and diploma students.
- Participate for PTWG and DTC with new findings to extension officers at field level and identified the priority issues and problems for research.
- Coordinating exhibitions

The main service of the division is conducting advisory services at farmer premises by visiting and at the office

Figure 3: Technical staff in Analytical Lab

Figure 4: Research work

Figure 5: An ongoing cultivation trial

Figure 6: Soil and Plant Nutrient Lab

Figure 7: Proper Usage of PPE

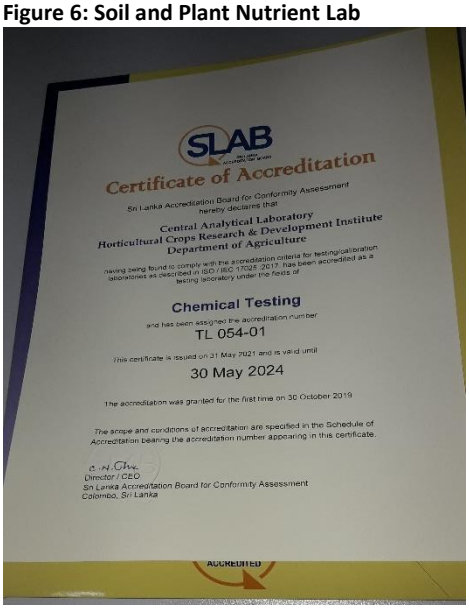


Figure 8: Accreditation Certificates for chemical testing

Figure 9: A shower installed at lab for safety purposes of the technical staff

Figure 10: Safety Instructions displayed in Labs

DOA annually allocates funds for the recurrent expenditures to undertake the services and the research activities undertaken by HORDI but there are low allocations for the capital investment. ASMP and DOA together conduct the consultation sessions with relevant officials and identified to

	need of strengthening the HORDI's services through capacity building component of ASMP
2. Other factors	
Solid waste	The crop residuals and organic waste generated by testing are disinfected using autoclave placed at each lab. After disinfection the organic matter are disposed from the labs. The agrochemical waste, lab chemical waste and used chemical containers are kept in a separate safe store building established in research station. This store premise is arranged to store the chemical wastes of all labs of the institute until properly disposed. This store is being monitored by the DOA's special audit team timely whether there is quantity and process are going properly. This is a special and important process observed during the screening process. There are no residential houses, staff quarters, and sensitive areas (community gathering centers, Tank, waterways, Marshy land, Forest patches...). DOA selects a contractor who has the facilities for the insulation of this waste at higher temperature (through Cement Kiln Co-processing) as approved and appropriate method. Most often, the cement factories have been selected as the qualified contractor for this job. This process is being monitored by the DOA's special audit team timely whether there is quantity and process are going properly  **Figure 11: Chemical waste store**
E-Waste Management Process	The total solution of the e-waste disposal consists of three main pillars. They are E-Waste Collection, E-Waste Logistics, and E-Waste Dismantling. During the e-waste collection, segregation is the most important step that helps to decide the disposal system. The segregation of the waste should be done at the place of origin and research stations will segregate and store their e-waste in the safe storage room. The CEA has introduced the E-Waste disposal system to Sri Lanka when it became a national issue. Simultaneously, they have introduced the Licensed E-Waste collectors to manage the logistics and the dismantling steps of the waste disposal process. The research stations have a responsibility to hand over their e-waste to the licensed waste collector timely. The list of CEA licensed E-Waste collectors is annexed as Annex 5. Based on the type of e-waste, the

	following disposal systems have been identified for the proper management.

SN	Type of waste	Disposal System
1	Printed Circuit Board / Core Waste	Exported for Recycling
2	Plastic Waste	Redirected to Recyclers
3	Wire Waste	Redirected to Recyclers
4	Metal Waste	Redirected to Recyclers
5	Unrecyclable Waste	Disposed of through Cement Kiln Co-processing

E. DESCRIPTION OF THE EXISTING ENVIRONMENT

1. PHYSICAL FEATURES – ECOSYSTEM COMPONENTS	
Topography and terrain	Geologically, the Gannoruwa area belongs to the Highland Complex of Sri Lanka and the elevation is below 600m AMSL. The site of the proposed subproject is located at Gannoruwa East in Yatinuwara Divisional Secretary Divisions in Kandy District. Kandy is surrounded by a triangular mountain range, namely the Hantana and Knuckles Mountain ranges. The elevation of these entrances is approximately 450 m in the North side (A 10 road), 520 m on the Eastern side (A 26 road), 580 m Southern side (B 39 road), and 530 m Western directions (A1 Road) respectively. The proposed project site is located within the wet zone of the country. The topography of the project area is characterized by steep dip slopes towards west and south, and steep hilly terrain towards north and east. The project site falls into Wet Zone Mid Country of Sri Lanka and the features of this area are WM2bAgro-ecological zone.
Climate and Meteorology	Climatically the area belongs to Mid Country Wet Zone and the average temperature varies between 22.1°C and 24.7°C. The zone receives annual rainfall more than 2,500mm and an average of 2,950mm. Relative Humidity varies from 74% during the day to 84% at night.
Soil (*type and quality*)	Riverbanks consist of slightly weathered to fresh bedrock overlying with thick residual and colluviam overburden materials. Intake is planned along the right bank of the river. The geological soil type of the proposed channeling area is a mixture of residual and colluviam soils which has a varying thickness from place to place. Bedrock exposures and a few boulders can be observed at places within the stream. The soil type of the area is reddish-brown latasolic soil with dissected hilly and rolling terrain. The area is identified as a landslide-prone area as per the National Building Research Organization-2004 Sri Lanka.
Surface water (*Sources, distance from the site, local uses and quality*)	The project area lies adjacent to the Mahaweli river and it is the only surface water body located in the vicinity of the project area. **Uses:** The local people use the river water to meet some of their domestic needs, such as washing, bathing, etc. No irrigated lands are noted within the project area and water extraction for irrigation purposes is negligible.

	In the vicinity of the project area, surface water bodies seem not abundant apart from the Mahaweli River and Meda Ela. **Quality**: At present, there is no detailed background information on surface water quality in these water bodies apart from a few studies done in the past by several organizations. The project area lies close to the Mahaweli river and it is only surface water body located in the vicinity of the project area.
Ground water (*Sources, distance from the site, local uses and quality*)	The groundwater table is relatively shallow in areas close to the river. However, due to the sloping terrain, the groundwater table lies fairly deep in hilly areas. Houses located in the valley areas, use shallow well water for domestic consumption; however, use of such wells is not widespread within the project area due to the availability of pipe-borne water. Most of the residents in the area use pipe-borne water for consumption, but their old wells are still in use for purposes such as bathing and washing. The quality of groundwater present in this area is moderate in condition and use for drinking, washing/ bathing, and cultivation activities
Air quality (*Any pollution issues*)	Any major pollution source near the Gannoruwa area is not recorded
Noise	No any noise pollution sources in the vicinity of the station.
2 ECOLOGICAL FEATURES – ECOSYSTEM COMPONENTS	
Vegetation (*Trees, ground cover, aquatic vegetation*)	The proposed project area belongs to the WM2b Agro-ecological Zone map of Sri Lanka. No natural vegetation/habitats exist in and around the proposed project area except the river and its disturbing riverside vegetation. The whole land belongs to HORDI except the built-up area is used for the cultivations and to establish the propagation houses (Polytunnels, glasshouses, net houses, etc.). The HORDI land is surrounded by the government-owned land occupied by the many government agencies and most of these institutions are the DOA affiliated institution. Government institutions have used the land to establish their office premises building, and cultivations (use for research and model farming activities). The balance part of the land is scrublands that are covered with shrubs, grasses, etc. The area used for the different government institutions is surrounded by privately owned land but no agricultural lands are observed. All privately owned lands are residential or commercial. The residential land consists of a house and a home garden. The Kandyan Home Garden (KHG) is prominent vegetation as well as landscaping model observed in the area. KHG model can be observed in Kandy and adjacent districts, such as Badulla, Kegalle, Kurunegala, Matale, Nuwara Eliya, and Rathnapura. This area largely falls in the wet zone of Sri Lanka but occasionally in the intermediate zone, where the climate and environment support the luxurious growth of perennial trees. The area consists of deep soil (i.e., reddish-brown latasolic, immature brown loam, and red-yellow podzolic soils). The rainfall is year-round, sufficient to meet the evaporation demand of the atmosphere, with a distinct dry spell of one to two weeks that triggers the flowering of perennial species. KHGs are considered a result of farmers' conception, investment, and long-term planning. The main components (tree categories) of KHG are ornamental, medicinal, spices, fruits, food, fuel, and timber. Livestock is also an important part of the

	KHG. The common flora species observed in the area are *Mangifera zeylanica*- Atemba, *Durio zibethinus Murr*. - Durian, *Artocapus heterophyllus*- Jackfruit, Artocarpus nobilis- Waldel, Musa spp. L. Kesel, *Psidium guineense*- Cheena pera, *Psidium montane*- Embulpera, Persea americana- Avacardo, Eriobotrya japonica- Japan batu, Nephelium lappaceum L. Rambutan, Citrus spp., *Theobroma cacao* L. Cocoa, *Lantana camara* L.- Gandapana, *Syzygium aromaticum*- Clove, *Myristica fragrans*- Sadikka, *Piper nigrum* - Pepper
Presence of wetlands	No wetlands present in the area adjacent to research station
Fish and fish habitats	Mahaweli river and open water body, Kandy Lake and irrigation canals are water bodies that are ideal for fish habitat and also found with freshwater fish varieties.
Birds (*waterfowl, migratory birds, others*)	The HORDI area is closer to the waterways (Mahaweli river) and agricultural lands and there is a possibility of recording bird species in these habitat types. The most common birds species found in and around the project location are, Orthotomus sutorius (Common Tailorbird), Turdoides affinis (Yellow-billed Babbler), Corvus splendens (House Crow), Acridotheres tristis (Common Myna), Eudynamys scolopacea (Asian Koel), Dicaeum erythrorhynchos (Pale-billed Flowerpecker), Accipiter badius (Shikra), Spilornis cheela (Crested Serpent Eagle), Nectarina lotenia (Loten's Sunbird), Pycnonotus cafer (Red-vented Bulbul), Halcyon smyrnensis (White-throated Kingfisher), Bubulcus ibis (Cattle Egret), Columba livia (Rock Pigeon), Streptopelia chinensis (Spotted Dove), Centropus sinensis (Greater Coucal), Dicrurus caerulescens (White-bellied Drongo), Hirundo daurica (Red-rumped Swallow), Copsychus saularis (Oriental Magpie Robin).
Presence of special habitat areas (*special designations and identified sensitive zones*)	Udawattakele sanctuary and Gannoruwa forest reserve presence as a special habitat area are reported in surrounding area, but not within the 2 km radius of the HORDI premises. According to environment sensitive areas map of CEA, no any environmental sensitive area recorded in the close proximity of the project site
3 OTHER FEATURES	
Residential/Sensitive Areas (*E.g., Hospitals, Schools*)	All labs and farming areas are located separately from the other institutions and they do not impact sensitive areas such as hospitals, schools, etc..
Archaeological resources (*Recorded or potential to exist)*	The HORDI is located on DOA owned lands and there is no archaeological or Physical Cultural Resource (PCR) to record or potential to exist.

G. SOCIO-ECONOMIC ENVIRONMENT

1. Stakeholders and Public consultation

Stakeholders' engagements

The Department of Agriculture is the main project partner agency of this subproject. The staff of the HORDI jointly prepared their capacity needs and submitted them to the ASMP. Several discussions were undergone to finalize the subproject activities between the HORDI staff and the ASMP. For more transparency, the HORDI staff were represented the technical evaluation committee of this subproject.

The ASMP PMU staff conducted site visits, consultations with DOA's officials during subproject identification and designing stages.

Table 1: Responsible Officers in HORDI Project Activities

SN	Name	Designation	Contacts
1	Ms. W.A.P.G.Weeraratna	Director/ HORDI	gethweerarathna@yahoo.com
Plant Breeding Division			
2	Ms.N.L.A.T.S. Nanayakkara	Head of the Division Assistant Director of Agriculture (Research)	subodhinit@gmail.com
3	Ms. H.M.P.S. Kumari	Assistant Director of Agriculture (Research)	pabakumari68@yahoo.com
4	Ms. H.M.V.T.Welegama	Assistant Director of Agriculture (Research)	tharanganiwelegama@gmail.com
5	Ms. R.G.S.Iroshani	Assistant Director of Agriculture (Research)	shyaliiroshani@gmail.com
6	Ms. N.B.U.Dissanayaka	Assistant Director of Agriculture (Research)	bhagyadissanayaka@ymail.com
Pathology Division			
7	Ms. W.A.P.G.Weeraratna	Agriculture Principal Scientist (Plant Pathology)	gethweerarathna@yahoo.com
8	Ms. M.S.W.Fernando	Assistant Director of Agriculture (Research)	sobashinifernando@gmail.com
Agronomy Division			
9	Ms.D.P.Karunananda	Agriculture Principal Scientist (Agronomy)	dayani.karunananda@gmail.com
10	Ms.K.A.D.S.D. Kahadawaarachchi	Assistant Director of Agriculture (Research)	dilrukshi_sandya@ymail.com
11	Ms.K.H.S.T.Deshabandu	Assistant Director of Agriculture (Research)	khstdeshabandu@yahoo.com
12	Ms. H.M.P.T.K.Hettigedara	Assistant Director of Agriculture (Research)	hettigedara64@yahoo.com
Entomology Division			
13	Mr.S.S.Weligamage	Agriculture Principal Scientist (Entomology)	senaniweligamage@gmail.com
14	Mr. K.M.D.W.P. Nishantha	Assistant Director of Agriculture (Research)	wpnishantha@yahoo.com
15	Ms.P.H.Ranaweera	Assistant Director of Agriculture (Research)	ranaweerapra@yahoo.com
Soil and Plant Nutrition Division			
16	Ms. N.R.N. Silva	Principal Agriculture Scientist (Soil Science)	renukasilva@yahoo.com

	17	Mrs. K.K.K. Nawarathne	Assistant Director of Agriculture (Research)	kkknawaratna@yahoo.com
	Food Contaminant Analytical Division			
	18	Ms.C.Magamage	Principal Agriculture Scientist (Analytical Chemistry)	champamgmg@gmail.com
	19	Ms.P.W.Y. Lakshani	Assistant Director of Agriculture (Research)	jayayoshil@yahoo.com
	Extension and Communication Division			
	20	Ms.K.A.S. Thilakarathne	Assistant Director of Agriculture (Development)	arunisriya@gmail.com

Stakeholders' consultation

During the social and environmental screening process, the staff of HORDI- were consulted. Meantime ASMP has taken actions to conduct the stakeholders' consultation starting from the subproject identification stage up to finalizing the subproject's design. It was a good tool to maintain transparency among the stakeholders. Due to the impact of the fruitful consultation process undertaken by the ASMP, the HORDI staff is well aware of the subproject activities and their objectives. Meantime, they have negotiated and decided the real requirements that they want to enhance the service of the institute

Table 2: Consultation outputs

Locations / Sub Units / Fields Visited	Participants with Designations	Matters Discussed
HORDI Gannoruwa-19.01.2022		
Director Office, HORDI	Ms. W.A.P.G.Weeraratna Director/ HORDI	Proposed subproject activities
Analytical Laboratory (Pesticide residuals & Heavy metals)	Ms.P.W.Y.Lakshani, Assistant Director of Agriculture (Research)	• Routine functions of the lab Overall environmental and social risks/impacts • Safety precautions that are implemented • Waste disposal
	Ms. Chamila Vaidyarathne Research Assistant	
Sample Receiving Point	Mr.Asanga Panditharathna Sample receiving Officer	
Plant Pathology Division		
	Ms.Kanchana Dissanayake, Programme Assistant	
	Ms.Shyamali Kohombange Research Assistant	
	Ms. Nishani Research Assistant	
	Ms.Nishadi Samarakoon Research Assistant	
	Ms.N.M.S.Maheshika Technical Assistant	
	Ms.W.Anurudhdhika Technical Assistant	
	Mr.R.W.Weerasekara Technical Assistant	
Soil & Plant Nutrition Division	Ms.Renuka Silva Principal Senior Scientist (Soil Science)	
Microbiology Laboratory	Ms.Kumudu Nawarathna,	

		Assistant Director of Agriculture (Research)	

H. SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS

SN	Screening question	Yes	No	Significance of the effect (Low, moderate, high)	Remarks
1	Are there any asset(s) that would be affected or acquired due to proposed project interventions such as: Land, Physical structure (Dwelling or commercial), Fruit trees/crops, Community Resource Property etc.?		√		No construction work and only supply of laboratory equipment, and accessories
2	Is the sub-project area adjacent to (less than 500m) or goes through any of the following environmentally sensitive areas such as: Cultural heritage site, protected area and/or of its buffer zone, Conservation Forest, reserve or a sanctuary, Mangrove, Estuarine, Wetland, including paddy fields, water bodies, PCRs, Landslide-prone areas etc.?		√		No such sensitive areas are located in the vicinity of the subproject area
3	Will the project activities involve with Encroachment on historical/cultural areas: disfiguration of landscape by road embankments, cuts, fills and quarries?		√		No such impacts will be anticipated from the proposed civil works of the subproject
4	Will the project interventions involve with encroachment on or impact ecologically sensitive or protected areas?		√		No such impacts will be anticipated from the proposed civil works of the subproject
5	Will the project interventions involve with alteration of surface water hydrology of waterways crossed by roads, resulting in increased sediment in streams affected by increased soil erosion at construction site?		√		No such impacts will be anticipated from the proposed civil works of the subproject
6	Will the project interventions involve with deterioration of surface water quality due to silt runoff and sanitary wastes from work-based camps and chemicals used in construction?		√		No such impacts will be anticipated from the proposed civil works of the subproject
7	Will the project intervention involve with Increased local air pollution due to rock crushing, cutting and filling works, and chemicals from asphalt processing?		√		No such activities are included as the subproject's activities
8	Will the project interventions involve with noise and vibration due to blasting and other civil works?	√		Low	No civil works associated
9	Is there any possibility to create poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of		√		No such impacts are anticipated

SN	Screening question	Yes	No	Significance of the effect (Low, moderate, high)	Remarks
	communicable diseases from workers to local populations due project interventions?				
10	Will be possible to creation of temporary breeding habitats for mosquito vectors of disease?		√		No such impacts are anticipated
11	Will there be risk of accidents associated with the increased vehicular traffic due to project interventions?		√		There is no any contact with the outsiders or activities and civil works
12	Will the project activities increase the risk of water pollution from oil, greases and fuel spills, and other materials?		√		No such impacts are anticipated
13	Will the project activities involve with additional waste in water canals that may increase floods and waterlogs?		√		No such impacts are anticipated
14	Will the project activities involve with new/restored public areas/ spaces that can be inundated in case of floods?		√		No such impacts are anticipated
15	Project interventions proposed to include Green infrastructure: Does sub-project include any of the following design aspects such as: Sri Lankan Guidelines of Green and Environmentally Friendly Building for the State Institutions (2016), Low energy materials, Reduced water use options, Energy optimization for lights, A/C etc. , Recycling and waste management, Increased human comfort, Enhanced landscaping, exterior or interior design, Site selection considering conservation of vegetation and wildlife?	√			No such design input included here, But the durability and maintainability of purchasing equipment are considered
16	Will the project interventions increase disaster Risk Management (DRM): such as: Floods, including coastal, Storm surges, Coastal erosion, Landslides, Land subsidence, Soil erosion and sedimentation, Rock falls, Cyclones, Droughts, Earthquakes, Salinization, salinity intrusion into drinking water sources, Forest fires, High winds, tornadoes etc., Epidemic and hazards related to environmental pollution, Vector borne diseases?		√		No such impacts will be resulted by this subproject
17	Will construction and operation of the Project involve actions which will cause physical changes in the locality (topography, land use, changes in water bodies, etc.?)	√		Low	No civil work associated

SN	Screening question	Yes	No	Significance of the effect (Low, moderate, high)	Remarks
18	Will the Project involve use, storage, transport, handling or production of substances or materials, which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health?		√		No such substances are involved with this subproject
19	Will the Project produce solid wastes during construction and/ or operation?		√		No civil work associated. But the crop residuals, organic waste, and agrochemicals & other chemical waste will be generated during lab operation period. The crop residuals will be disinfected within laboratories and disposed. The agrochemical other chemical waste will safely store in the separate premises with all precautions until the proper disposal.
20	Will the Project release pollutants or any hazardous, toxic or noxious substances to air?		√		No such emission will be released
21	Will the Project cause noise and vibration or release of light, heat energy or electromagnetic radiation?	√		Low	No such impacts are associated
22	Will the Project lead to risks of contamination of land or water from releases of pollutants onto the ground or into surface waters, groundwater or coastal wasters?		√		No such impacts are anticipated
23	Will the project cause localized flooding and poor drainage during construction Is the project area located in a flooding location?		√		No such impacts are anticipated
24	Will there be any risks and vulnerabilities to public safety due to physical hazards during construction or operation of the Project?		√		No such impacts are anticipated
25	Are there any transport routes on or around the location which are susceptible to congestion or which cause environmental problems, which could be affected by the project?		√		No such impacts are anticipated
26	Are there any routes or facilities on or around the location, which are used by the public for access to recreation or other facilities, which could be affected by the project?		√		No such impacts are anticipated

SN	Screening question	Yes	No	Significance of the effect (Low, moderate, high)	Remarks
27	Are there any areas or features of high landscape or scenic value on or around the location, which could be affected by the project?		√		No such impacts are anticipated
28	Are there any other areas on or around the location, which are important or sensitive for reasons of their ecology e.g., wetlands, watercourses or other water bodies, the coastal zone, mountains, forests, which could be affected by the project?		√		No such impacts are anticipated
29	Are there any areas on or around the location, which are used by protected, important or sensitive species of fauna or flora e.g., for breeding, nesting, foraging, resting, migration, which could be affected by the project?		√		No such impacts are anticipated
30	Is the project located in a previously undeveloped area, where there will be loss of green field land		√		No such impacts are anticipated.
31	Will the project cause the removal of trees in the locality?		√		Tree removal is not required
32	Are there any areas or features of historic or cultural importance on or around the location, which could be affected by the project?		√		No such impacts are anticipated
33	Are there existing land uses in or around the location e.g., home gardens, other private property, industry, commerce, recreation, public open space, community facilities, agriculture, forestry, tourism, mining or quarrying which could be affected by the project?		√		No such impacts are anticipated
34	Are there any areas in or around the location which are densely populated or built-up, which could be affected by the project?		√		No such impacts are anticipated
35	Are there any areas in or around the location, which is occupied by sensitive land uses e.g., hospitals, schools, places of worship, community facilities, which could be affected by the project?		√		No such impacts are anticipated
36	Are there any areas in or around the location, which contain important, high quality or scarce resources e.g., groundwater, surface waters, forestry, agriculture, fisheries, tourism, minerals, which could be affected by the project?		√		No such impacts are anticipated
37	Are there any areas in or around the location, which are already subject to pollution or environmental damage e.g., where existing legal		√		No such impacts are anticipated

SN	Screening question	Yes	No	Significance of the effect (Low, moderate, high)	Remarks
	environmental standards are exceeded, which could be affected by the project?				

I. CONCLUSION AND SCREENING DECISION SUMMARY OF ENVIRONMENTAL EFFECTS:

Assuming that all mitigation measures are implemented as proposed, the following effects can be predicted

Key project activities	Potential Environmental Effects	Significance of environmental effect with mitigation in place NS - Effect not significant, or can be rendered insignificant with mitigation SP - Significant positive effect SN - Significant negative effect U - Outcome unknown or cannot be predicted, even with mitigation
Supply, delivery and installation of laboratory equipment, and accessories	Waste disposal	NS

J. OPERATIONAL ENVIRONMENT MANAGEMENT PLAN

1. The client's (Research Station's Officers) responsibility for preventing/minimizing/mitigating adverse environmental issues raised during the subproject operational stage

SN	Potential Environmental Impacts and Risk Level	Key project activities causing the impact	Preventing/Minimizing/Mitigation Measures proposed and action to be implemented by the Contractor
1	Soil, Water, and Leachate	• Soil and water (surface and ground water) on the onsite is unlikely to be contaminated by the operation of the subproject	• Periodic monitoring of the operation of the wastewater management system of the research station • Ensure the operation of wastewater pits in good condition • Periodic maintenance of the sedimentations, overflow of the waste water pits • Periodic maintenance of the pipelines of the wastewater management system • Timely address the breakdown/blocking of the pipelines and pits • Testing the samples to check the contamination of soil, groundwater table, and the surface water sources of the surrounding area • Avoid surface water stagnation and creating mosquito breeding places • Frequent monitoring of contamination of leachate that is originated in labs with water and soil if any
2	Traffic and Transport Impact	• Unnecessary Traffic (Vehicular and Pedestrians) issues raised by Transport needs of the subproject operation	• No new transport needs is generated by the operation of the subproject • Follow the solid waste transport schedule according to the present routing • Identify the new transport needs created by the subproject operation if avail • Plan the new transport needs minimizing present activities • Display the in and out services routes to aware the staff
3	Air Quality	• Dust, Odour and Greenhouse Gas generated by the Subproject Operation	• Assess the emission (Air Quality Testing) during subproject operation • Assess the potential impacts of dust, suspended particulate matter, odor, and greenhouse gas emissions • Take precautionary actions to minimize the emission

SN	Potential Environmental Impacts and Risk Level	Key project activities causing the impact	Preventing/Minimizing/Mitigation Measures proposed and action to be implemented by the Contractor
4	Noise and Vibration	• Disturbances and inconveniences occurred by Noise and Vibration	• Measure the noise and vibration level of subproject operation • Identify the possible impacts by noise and vibration created by subproject operations • If exceed the acceptable level of noise and vibration, take precautionary actions to minimize • Prepare the specifications of the equipment and machinery with low vibration and noise • Introduce a code of conduct for the staff who engages in subproject operations to minimize the noise and vibration impacts. • Noise emission levels of all critical plant and equipment should be expected to comply with manufacturers' specifications with noise limits appropriate to those items
5	Invasive Species of Flora and Fauna, Weeds, Pests and Diseases	• Invasive Species of Flora and Fauna, Weeds, Pests and Diseases spreading due to subproject's operation	• Always keep hygienic conditions of the labs, cultivation areas. • Disinfect all the soil, plant and pests samples after testing using autoclaves or appropriate technique. • The composting organic material, which may contain insect eggs or larvae, weed seeds and spores, will be subject to temperatures in excess of 55 degrees for at least three days. • Control the weeds, diseases and pests as stipulated in PMP • Select healthy and diseases free planting materials with high purity for the cultivation • Avoid the contaminations of cultivation lands • Avoid the visitors of the labs and cultivation areas • Follow the approved procedures to maintain the hygienic conditions at the labs and cultivation plots • Follow the guidelines for the transport of the movement of solid waste from the research station/ farmlands

SN	Potential Environmental Impacts and Risk Level	Key project activities causing the impact	Preventing/Minimizing/Mitigation Measures proposed and action to be implemented by the Contractor
			• Burnt the crop residuals and the organic waste generated at the locations using safety measures
6	Waste Management	• Crops-related waste, general waste	• Dump the organic waste in the soil pit established at the stations • Use the organic waste for compost preparation after heat treatments/ disinfection • Burnt the crop residuals to maintain hygienic conditions of the field • Implement crop rotation to breakdown of pests/ diseases lifecycles
		• Utensils of agrochemicals, & chemicals, and chemical waste	• Store in the safe store up to proper dispose • Select a suitable contractor who has facilities for Cement Kiln Co-processing for disposing
		• E-Waste	• Segregate the e-waste on its type • Store in the safe store up to proper dispose • Keep records on the accumulated waste • Contact the licensed e-waste collectors (CEA Licensed) • Handing over the e-waste to the licensed e-waste collector for proper disposal that has been approved by the CEA
7	Occupational Health and Safety	• Occupational hazards which can cause during subproject operation	• Develop and implement site-specific Health and Safety (H&S) plan which will include measures such as: (a) excluding the public from the defined labs/cultivation areas; (b) ensuring all workers/staff are provided with and use of personal protective equipment (PPE); (c) provision of H&S training for all personnel; (d) documented procedures to be followed for all construction activities; and (e) documentation of work-related accidents (There is a SOP that has already been implemented in the labs and all activities have been arranged accordingly).

SN	Potential Environmental Impacts and Risk Level	Key project activities causing the impact	Preventing/Minimizing/Mitigation Measures proposed and action to be implemented by the Contractor
			• Provide H&S training to all new workers/staff to ensure that they are appraised of the basic rules of work at the labs, personal protective protection, and preventing injuries to fellow workers/staff • Ensure that a first-aid station, eye washers, bathing location are provided within easy access to all and that trained first-aid personnel are made available to attend to first-aid needs and keep ready the vehicle to a government hospital in emergency case. • Provide medical insurance coverage for all workers/ staff • Ensure that all labs/ cultivation areas are barricaded to prevent unauthorized person entry • Provide a source of potable water and a clean eating place for workers, at a location not exposed to hazardous or noxious substances. • Provide visitors with necessary safety gear if visitors to the labs/cultivation areas are allowed access to areas where incubators, crop/disease samples, culturing activities, hazardous conditions, or substances may be present. • Ensure that visitor/s do not enter hazard areas unescorted by relevant authorized parties in attendance. • Provide signboards to mark, hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal of hazardous substances. • Such signage shall be in accordance with international standards and be well known and easily understood by workers, visitors, and the general public

2. Cost of mitigation

The cost incurred with implementation of O-EMP will be allocated through the research station's budget

K. EMP IMPLEMENTATION RESPONSIBILITIES AND COST

The overall responsibility of ensuring compliance with safeguard requirements rests with the PMU. The PMU is directly responsible for reviewing the proposed activities is aligned with environmental safeguards compliances. The overall supervision will be carried out by the in-house staff of the PMU supported by the staff in research centers. Any consequent modification or amendments of the subproject will be negotiated prior to implementation with ASMP and DOA staff with notification to the WB's office.

Environmental & Social monitoring will be carried out largely through visual observations and compliance monitoring using the checklist provided in the EMF & RPF by the Safeguard Specialist of the PMU and the DOA jointly. The Environmental and Social Safeguards Specialist will need to visit the site quarterly and report on issues and performance on ESMP implementation to the PMU.

L. DETAILS OF PERSON RESPONSIBLE FOR THE ENVIRONMENTAL SCREENING

This project does not require environmental clearance under national environmental regulations. No other approval is required due to the spread and magnitude of the project. The project will have negligible environmental impacts, mostly limited to the operation period and there is a set of activities which needs to manage the negative impacts while enhancing positive impact to the environment. The impacts on the physical and biological environment are virtually none.

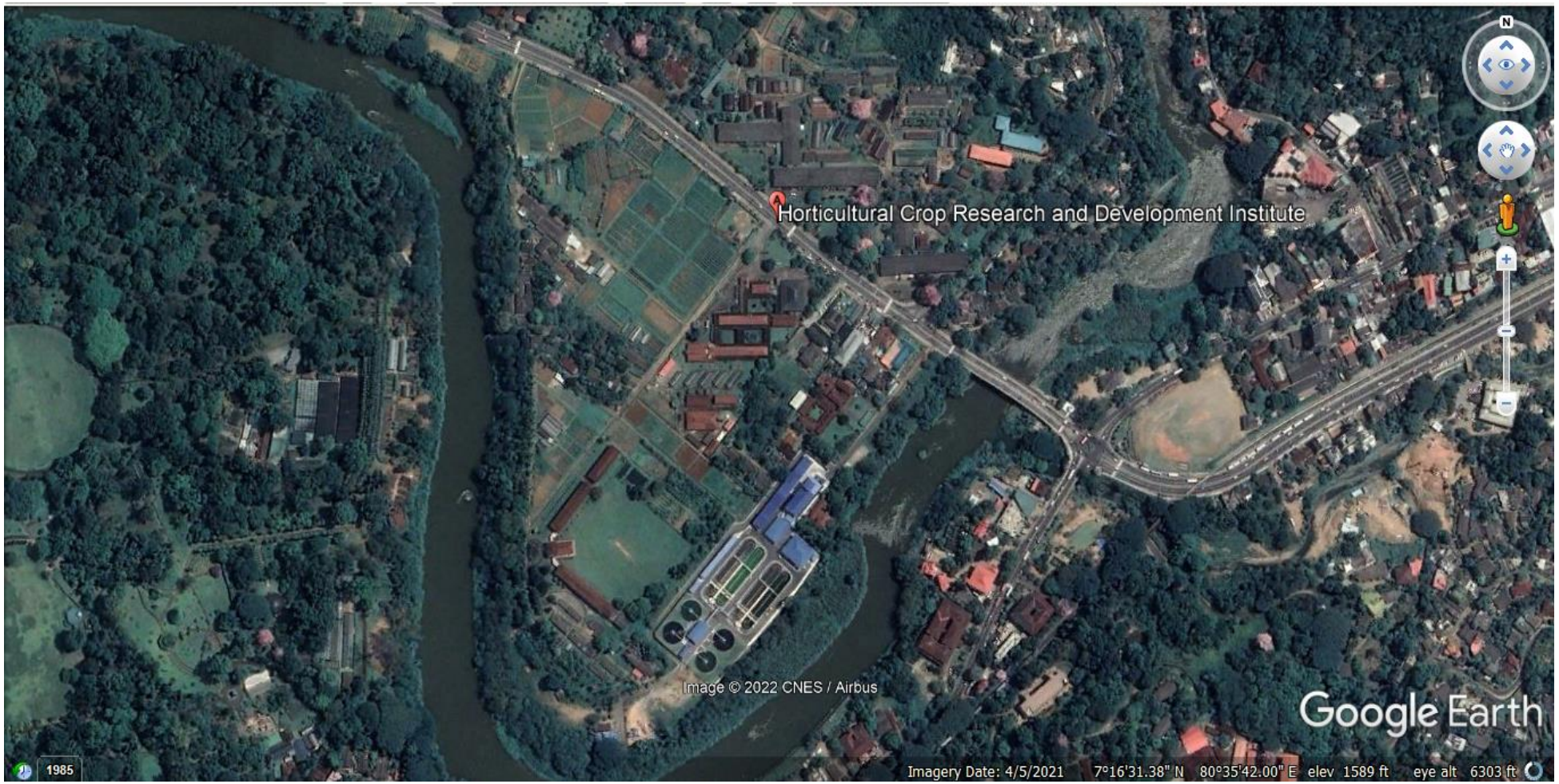
M. DETAILS OF PERSONS RESPONSIBLE FOR THE ENVIRONMENTAL SCREENING

Screening conducted and reviewed **D.M. Sanjaya Bandara** Environment and Social Safeguard Specialist Agriculture Sector Modernization Project ***Name/Designation/Contact information***	**Date** January 2022 ***Signature***
Screening report approved by **Dr. Rohan Wijekoon** Project Director Agriculture Sector Modernization Project ***Name/Designation/Contact information***	**Date** January 2022 ***Signature***

N. ANNEXES

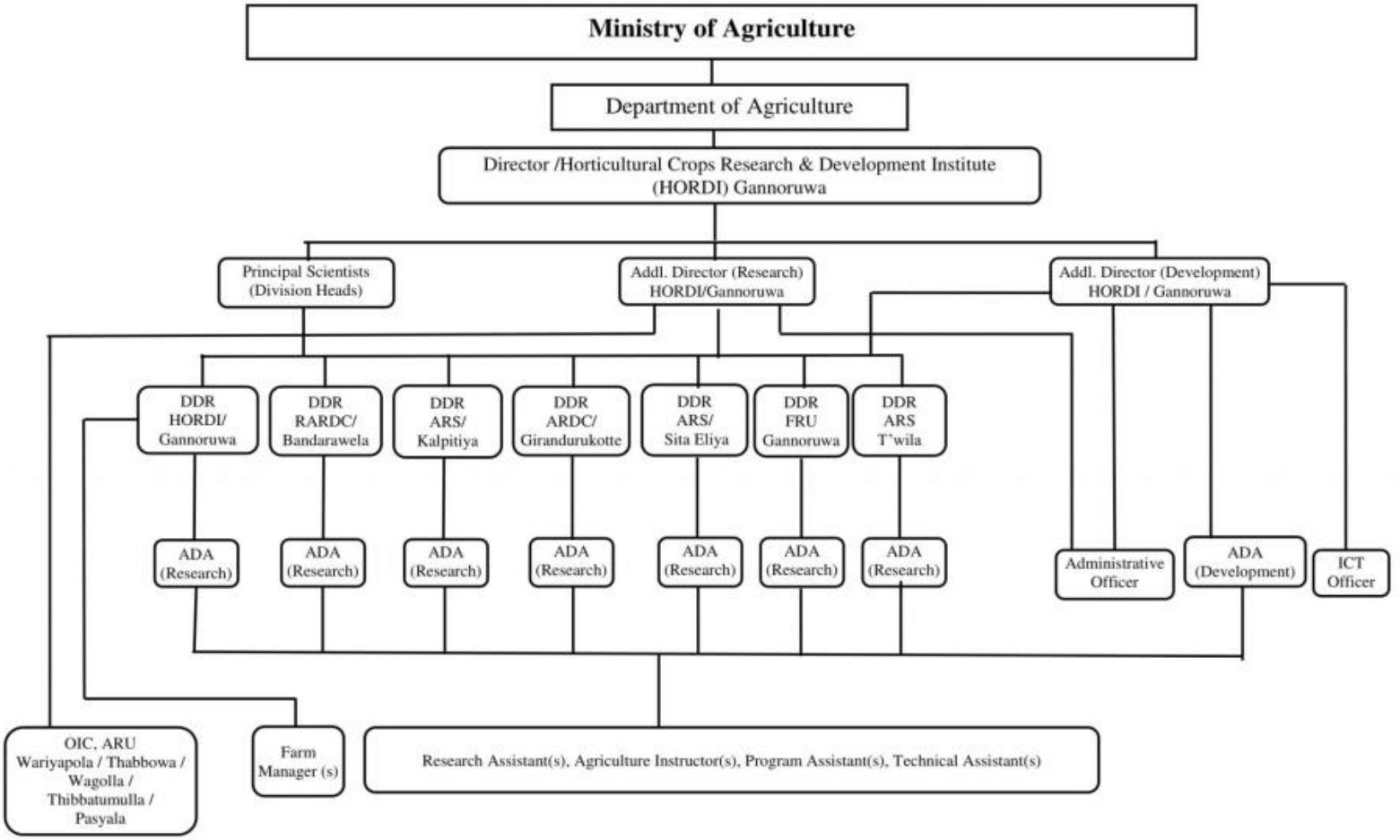
Annex 1: Google Map/ Location Map

1. Horticultural Crops Research and Development Institute at Gannoruwa



Source: Google Map

Annex 2: Organizational Structure of HORDI



Source: HORDI Home page – Department of Agriculture Sri lanka (doa.gov.lk)

Annex 3: CEA- Licensed e-waste Collectors in Sri Lanka

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மத்திய சுற்றாடல் அதிகாரசபை
Central Environmental Authority

Licensed E-Waste Collectors in Sri Lanka

No	Address of the Industry	Contact	Types of E-waste	Date of Expiry
1	**British Ceylon Produce Export Co.(Pvt) Ltd** *Operational Address:* No.573, Sudharma Mawatha, Wanawasala, Kelaniya.	Mr. Hisham Abbas Mobile: 077 7958247 Office : 0114 717360 Mail: hafeel.abbas@yahoo.com teacom@sltnet.lk	E-Waste Excluding CFL Bulbs, Fluorescent Bulbs & CRT Monitors	27.09.2022
2	**Ceylon Waste Management (Pvt) Ltd** *Operational Address:* 61/1/F2, Kelanimulla, Kelaniya.	Ms. Sewwandi Ranasinghe Director Mobile: 0777 999247 Ms. Asanga Oputha Tel : 0114 336336 Mail :info@ewaste.lk	E-Waste Including CFL Bulbs Fluorescent Bulbs & CRT Monitors/TV	19.08.2022
3	**Cleantech (Pvt) Ltd** *Operational Address:* No.281/1, Devamiththa Place, Heiyanthuduwa, Sapugaskanda.	Mr. Kasun Karunanayake Manager Mobile : 071 5260624 Office : 0112 368768 Mail : kasun.karunanayake@cleantech.lk	E-Waste excluding CFL Bulbs, Fluorescent Bulbs & CRT Monitors	07.08.2022
4	**Eco - Biz World (Pvt) Ltd** *Operational Address:* 621/3, Wekanda Road, Walgama, Malwana.	Mr. A.G.S. Rukmal Mobile: 077 9129100 Office : 0112 476078 Mail: ebw@ecobizworld.com	E-Waste excluding CFL Bulbs, Fluorescent Bulbs & CRT Monitors	12.08.2022
5	**Ecogate Lanka Engineering Services** *Operational Address:* No.65/06, WelegodaraRoad, Molligoda, Wadduwa.	Mr. Evton Isaac Mobile: 076-9268879 Office : 0113-675688 Mail: ecogatelanka@gmail.com	E-Waste Excluding CFL Bulbs, Fluorescent bulbs, & CRT monitors	*Processing*
6	**Evergreen Trading and Marketing (Pvt) Ltd** *Operational Address:* No.45, Muthuraja Mawatha, Mabola, Wattala	Mr. K.Ashwin Director Mobile: 0704373243 Office : 0758918919	E-Waste Excluding CFL Bulbs, Fluorescent bulbs, & CRT monitors	16.12.2022
7	**Hiru Eco Waste Company** *Operational Address:* No.213, Bolabotuwa, Bandaragama	Mr. M.L.V.I. Perera Mobile: 0762918554 0704429245 Mail: ecowastehiru@gmail.com	E-Waste Excluding CFL Bulbs, Fluorescent bulbs, & CRT monitors	03.10.2022

8	**Infinity Green International (Pvt) Ltd** ***Office Address:*** 454, Kandy Road, Kelaniya. ***Operational Address:*** No. 368, New Hunupitiya Road, Dalugama, Kelaniya.	Mr. Sanka Samudaya Mobile: 077 3433183 Office: 0115 923443 Mail: sanka@infinity.zone.lk	E-Waste Excluding CFL Bulbs, Fluorescent Bulbs & CRT Monitors	*Processing*
9	**Inova Environmental Services (Pvt) Ltd** ***Operational Address:*** No. Galaboda Road, Wewalpanawa, Padukka.	Mr. Ayal Piyathilake Mobile : 0773815989 Office: 0117072323 Mail : ayal.piyathilaka@inovaen.com	E-Waste Excluding CFL Bulbs, Fluorescent bulbs, & CRT monitors	*Processing*
10	**Insee Eco Cycle Lanka (Pvt) Ltd** ***Office Address:*** 413, R A De Mel Mawatha, Colombo 03. ***Operational Address:*** Preprocessing Facility, PO Box 01, Palavi, Puttalam.	Mr. Sanjeewa Chulakumara Director Office: 0117 800800 Fax : 0112 555434	E-Waste Excluding CFL Bulbs, Fluorescent bulbs, & CRT monitors	10.05.2022
11	**J F Supplier** ***Operational Address:*** No. 276, Kottawaththa, Mawnella.	Mr. M.S.M. Jawfer Mobile : 077 7789496 Office : 035 2248133 Mail : jfsuppliers@gmail.com Web: www.jfsuppliers.webs.com	E-Waste Excluding CFL Bulbs Fluorescent Bulbs & CRT Monitors	04.05.2022
12	**Moksh Worldwide (Pvt) Ltd** ***Operational Address:*** 93/2, Gothami Mawatha, Welewatte, Wellampitiya.	Mr. Sandeep Chathurvedi Mobile : 077 7733100 075 2550000 Mail: findsandy@live.com	E-Waste Excluding CFL Bulbs, Fluorescent Bulbs & CRT Monitors	29.12.2021
13	**N.S.Green Links Lanka (Pvt) Ltd** ***Operational Address:*** No. 259, Wewagedara, Divulapitiya.	Mr. Nalin Gunaratne - 071 4066455 Mr. Oshada Weerasinghe - 071 6305184 Telephone: 0112 236366/0115 660300 Email: nalin@greenlink.lk oshada@greenlink.lk	E-Waste Excluding CFL Bulbs, Fluorescent Bulbs & CRT Monitors	03.04.2022
14	**Recotel Lanka (Pvt) Ltd** ***Operational Address:*** 260, Sri Ramanathan Mawatha, Colombo 15.	Mr. Susantha Muhandiram Mobile : 0770090067 Mail: susantha@recotellanka.com	E-Waste Excluding CFL Bulbs Fluorescent Bulbs & CRT Monitors	23.08.2022
15	**SCT Holdings (Pvt) Ltd** ***Operational Address:*** 203/02, Horana Road, Kottawa.	Mr. Priyantha Basnayaka Mobile : 077 3274682 Office: 0112844228 Mail: sctholdings@gmail.com	E-Waste Excluding CFL Bulbs, Fluorescent bulbs & CRT monitors	20.03.2022
16	**Think Green (Pvt) Ltd** ***Operational Address:*** No.57/33, Muthuwella Mawatha, Colombo 15.	Mr. Shivahar Muthuramalingam Mobile : 0773 733301, 0777323885 Office: 0112 522 111 Fax: 0112 520 015	E-Waste Excluding CFL Bulbs, Fluorescent bulbs, & CRT monitors	*Processing*
17	**Waymarque(Pvt) Ltd** ***Operational Address:*** No.264/A/2, Patiyawala, Uswattakeiyawa.	Mr. J. Gabriel Mobile: 077 7221112	E-Waste Excluding CFL Bulbs, Fluorescent bulbs, & CRT monitors	12.12.2022