Sri Lanka Agriculture Sector Modernisation Project (ASMP)

ENVIRONMENTAL SCREENING REPORT

FOR

CDP № 4 - POLONNARUWA (MAHAWELI AREA) - CHILLI

Prepared for Democratic Socialist Republic of Sri Lanka, Ministry of Agriculture (MoA)

Revised: 18 June 2022

FCG

NEW ZEALAND G2G KNOW-HOW

InfotechsIDEAS

Table of Contents

Tables

Figures

Abbreviations

AEZ ..... Agroecological zone
AQI ..... Air Quality Index
ASMP ..... Agriculture Sector Modernisation Project
ATDP ..... Agriculture Technology Demonstration Parks
BS ..... British Standards
CDP ..... Cluster Development Plan
CEA ..... Central Environmental Authority
DCO ..... Distributary Canal Organisation
DoA ..... Department of Agriculture
DS ..... Divisional Secretary
DWLC ..... Department of Wildlife Conservation
EMS ..... Environmental Method Statement
EPL ..... Environmental Protection License
FO ..... Farmers' organisation
FPO ..... Farmer Producer Organisation
GAP ..... Good Agricultural Practices
GN ..... Grama Niladhari
GSMB ..... Geological Survey and Mines Bureau
IPM ..... Integrated pest management
IPNS ..... Integrated Plant Nutrition System
ISP ..... International Service Provider
LA ..... Local Authority
LCC ..... Leaf Curl Complex
LKR ..... Sri Lankan Rupee
MASL ..... Mahaveli Authority of Sri Lanka
MoA ..... Ministry of Agriculture
MoD ..... Ministry of Defence
MoH ..... Medical Officer of Health
NCB ..... National Competitive Bidding
NCP ..... North Central Province
O&M ..... Operation and maintenance
OFC ..... Other food crops
PCR ..... Physical Cultural Resource
PMP ..... Pest management plan
PMU ..... Project Management Unit
PPMU ..... Provincial Project Management Unit
RDA ..... Roads Development Authority
RPM ..... Resident Project Manager
SMP ..... Social Management Plan
WHO ..... World Health Organisation

ASMP

ENVIRONMENTAL SCREENING REPORT

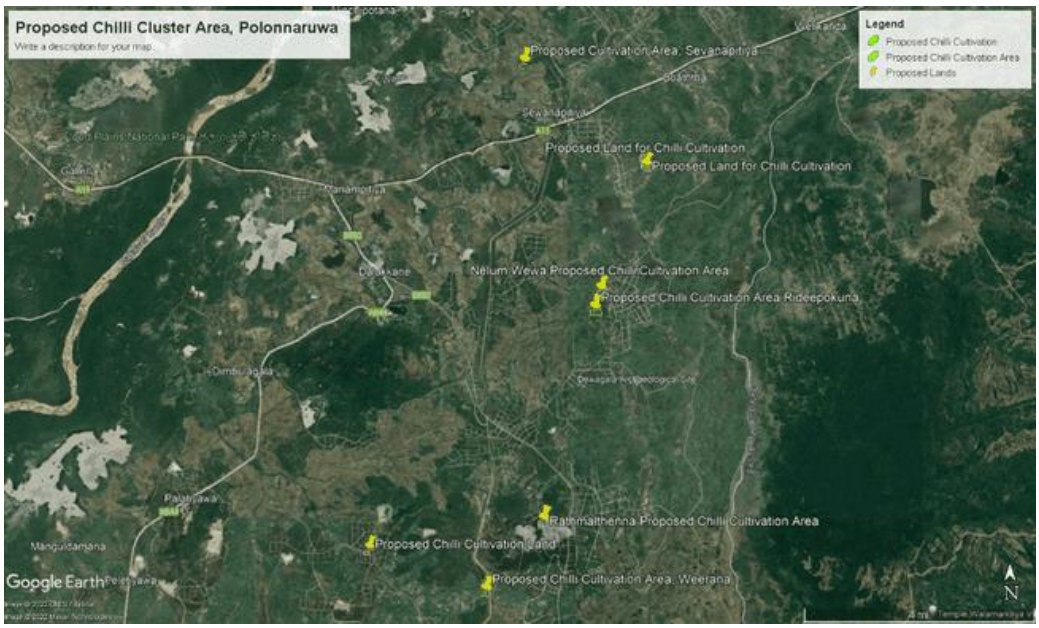
1. PROJECT IDENTIFICATION

Project title	Introduction of improved technologies to enhance the quality and productivity of chilli in Polonnaruwa District (Mahaweli Area) CDP #4: Polonnaruwa Chilli Cluster (Mahaweli Area), or concisely as Polonnaruwa Chilli Cluster
Project proponent	Project Management Unit, ASMP, MoA

2. PROJECT LOCATION

Location *(Relative to the nearest town, highway)*	Project area lies within Dimbulagala and Welikanda Divisional Secretariat Divisions in Polonnaruwa district. Extending about 58,183.7 ha, Dimbulagala Divisional Secretariat Division has 56 Grama Niladhari (GN) Divisions. The project area falls within three GN Divisions: Dalukana, Weerana and Rathmalthenna. These three GN Divisions have the following villages: Dalukana, Maliyadewapura, Namal Pokuna, Weerana, Rathmalthenna, Rathmalthenna, Bamunakotuwa and Dimuthugama. Welikanda DS Division has 29 GN Divisions and 46 villages in an area of about 57,375 ha. Five of the GN Divisions are within the project area: Nelumwewa, Ginidamana, Sevanapitiya, Mahawewa, Karapola, Borawewa and Aluthwewa. Mahaweli Authority of Sri Lanka (MASL) administers three Block Areas within the project area: Sevanapitiya, Dimbulagala and Wijayabapura. • Sevanapitiya Block Area lands can be accessed through A11 Maradankadawala-Habarana-Thirikonamadu Highway. Almost all the lands selected in Sevanapitiya Block area are within 8km from Sevanapitiya Township. • Wijayabapura Block Area lands can be accessed through B502 Manampitiya - Aralaganwila - Maduru Oya road. Wijayabapura lands are located about 3km from Aralaganwila town and 10km from Batticaloa Junction in Manampitiya. • Dimbulagala proposed cultivation lands can be accessed via both AB44 Mahiyangana – Dimbulagala - Dalukkane road and B502 Manampitiya - Aralaganwila - Maduru Oya road. These lands are roughly located 5km from Dimbulagala, and 10km from Aralaganwila and Batticaloa Junction at Manampitiya. Almost all the identified land for chilli cluster does not have gravity irrigation. Furthermore, the type of lands available for chilli cultivation in System B allocated by MASL management by could be classified as the poorer land types. With the size of land parcels varying from 2 to 4 ha, but MASL have allocated 0.2 hectares to each chilli farmer (see Annex 2: Project Area Map – page 65).

Figure 1: Proposed Chilli Cluster Areas in Polonnaruwa



Little ground was taken from allocated irrigation lands, most land being used near adjoining water sources as allocated by MASL for chilli cultivation. No farmers were given any legal permit for using the land for chilli cultivation except when a few farmers applied for temporary seasonal permits. However, in the future MASL would follow steps to ensure permits are available to farmers selected for growing chillies under this project.

Definition of cluster area

(*The geographical area of the project and areas affected during construction)*

Both Dimbulagala and Welikanda DS Divisions are in Polonnaruwa District. Dimbulagala DS Division is bounded to Welikanda, Thamankaduwa DS Divisions and Badulla Districts while, Welikanda DS Division is bounded to Dimbulagala, Thamankaduwa and Lankapura DS Divisions and Ampara and Trincomalee Districts. Both Welikanda and Dimbulagala Divisions are within Mahaweli System B.

This chilli cluster has 325 farmers cultivating 65 hectares in small parcels of land – an area of 0.2 ha being the minimum size (see table below).

Table 1 : Farmer participation in the chilli cluster

Name of Block	№ of farmers	Farmers selected for the cluster	%	Total area	Area under chilli
Sevanapitiya	2,998	220	7%	2,945 ha	44 ha
Dimbulagala	2,338	60	3%	2,326 ha	12 ha
Wijayabapura	2,933	45	2%	2,857 ha	9 ha
	8,269	325	4%	8,128 ha	65 ha

In addition to the proposed cultivation areas, the project will establish 26 common agro wells with solar powered pumping, improvements of rural roads total length of 4.2km and construction of small collection centres including drying facilities in the area itself. The rural roads identified are small gravel roads leading to farmlands. Therefore, either side of the roads will have an impact during improvements.

In addition, electric fence of 3km will be erected at each selected land covering the entire land plot to protect from elephant threats.

Adjacent land and features

Both DSDs are bordered to Eastern Province (Batticaloa and Ampara Districts). Mahaweli System B (in Dimbulagala and Welikanda DS Divisions) encompass about 114 square kilometres and 68% of it comes under DL2B Agro Ecological Zone. The selected areas are

	under MASL System B – Sevanapitiya Block, Wijayabapura Block and Dimbulagala Block of Welikanda Resident Project Managers Area. Welikanda, Kaduwela, Aralaganwila and Dehiattakandiya are towns and cities closer to the selected area. Mainly, the adjoining lands are paddy cultivated areas and Mahaweli settlements. Currently, 20,738 irrigable lots and 1,192 rainfed lots are presently in use for agriculture and livestock activities. Some rainfed lots are being used by farmers for cultivation during Maha (rainy) season under a system of temporary seasonal permits. Cluster area lands belong to Dimbulagala and Welikanda DS Divisions. Both DS Divisions fall under the irrigation commanding area of Mahaweli System B, and each farmer farmers were given 0.81.0 hectare (2.5 acre) of irrigable lowlands and 0.2 hectare (0.5 acre) non-irrigable uplands. All land plots selected for this cluster are uplands dedicated for future developments by the MASL.

3. PROJECT JUSTIFICATION

Need for the project *(What problem is the project going to solve)*	Chilli (*Capsicum annuum L*.) is one of the most important cash crops grown in Sri Lanka. It has become an essential ingredient in Sri Lankan foods. Sri Lankans use it as green pods and dried red chilli. Per capita consumption of chilli is estimated 2.84 kg per annum and the national annual requirement of dry chilli is about 62,480 tonnes. At present chilli extent is about 6,611and annual production of green chilli is 33,838 tonnes (Department of Census and Statistics, 2021). Therefore, a large quantity of dry chilli is imported annually. In general, chilli is cultivated in dry zone mainly for dry chilli production. But part of the crop is harvested as green chillies if green chilli prices are high in the market. There are three townships (Aralaganwila, Welikanda and Manampitiya) in the System B area in Dimbulagala and Welikanda Divisional Secretariats. Each farmer family in the System B is allocated one ha under irrigation except for the Pimburattewa unit in the Wijayabapura block Main reasons considered in promoting chilli cultivation programme in this part of System B: • Interest of farmers and farmer organisations • Experience in chilli cultivation • Contribution to national economy by being a crop that substitutes for imports that is urgently needed in times of limited foreign exchange • Higher income as compared to paddy and other food crops • Almost all the farmers have converted part of their paddy land for highland crops • Possibility to cultivate chilli with low volumes of water • Availability of irrigation water from Irrigation canal system, agro wells and water pumps • Active support from officers attached to MEA and RPM Office The CDP is prepared under ASMP Component 2, which is for productivity enhancement, diversification and demonstration to support smallholder farmers to produce competitive and marketable commodities, improve their ability to respond to market requirements and move towards an increase in commercialisation. Agriculture Technology Demonstration Parks (ATDPs) will support farmers to: (a) develop professional producer associations; (b) achieve economies of scale in production and exports; (c) improve marketing and value addition; and (d) achieve greater efficiency in the provision of technical and other support services. Farmers are expected to directly benefit through improved production capacity and input supply/management, better and more efficient technologies for production and postharvest, improved market

	linkages as well as opportunities for value addition. Furthermore, farmers would benefit from capacity building through farmer business and marketing training.
Purpose of the project *(What is going to be achieved by carrying out the project)*	New and improved technology packages to enhance productivity and quality will only be featured in newly planted plots, strategically located for maximum exposure to large numbers of farmers. These plots will serve as learn-by-doing sites where, at the beginning when technology is first introduced, training of trainers will take place to prepare "change agents" to work in the dissemination and expansion of the new technology packages to large numbers of farmers. The technology package and other management practices will be introduced to the selected group. The project introduces the proposed technologies and infrastructure to both increase production and process it, but also to deliver a quality product that meets the proposed local chilli market's standards. The main objective of the subproject is to develop Agriculture-related livelihood by achieving below objectives: • Introduce new technologies to increase yield • Land preparation • Water conservation/Management • Disease control • Use of weedicides, pesticides • Enhancement of productivity and Quality of chilli • To minimise postharvest losses • To increases sustainable farm income • Create new employment opportunities • Identify international market opportunities The famers who are engaging with farming activities in the project's intervention area will follow the **Good Agricultural Practices** (GAP) introduced by the DoA. ASMP will facilitate to implement GAP by introducing new technologies and enhancing farmers' capacities. Further, A business plan will be formulated with the members at the incorporation of the public unlisted company. Tentative long-term business objectives will cover the following aspects. • Develop and manage a competitive and sustainable agribusiness enterprise to provide benefits to its members and to the FPO at large. • Develop a dynamic and manage a cluster of farmers to introduce modern technology to chilli cultivation in Sri Lanka for the enhancement of productivity. • Develop and manage a modern value chain and use latest technologies along with it. • Introduce superior quality of the product for local market. • Develop sustainable links with agribusiness partners. The cluster will be developed to cater to an import-substitute value chain with the country presently relying upon 90% of its chilli from imports. The produce of the highest quality will be channelled over to the local market at the beginning, through agribusiness partners who have already expressed interest.
Alternatives considered *(Different ways to meet the project need and achieve the project purpose)*	The identified business opportunities with farmers and agribusiness are a stimulus to reviving and increasing the chilli cultivated areas in Welikanda and Dimbulagala DS Divisions by modern technology, techniques and process to help meet potential local market demand. The produce of the highest quality will be channelled over to the local market at the beginning, through agribusiness partners who have already expressed interest.

This cluster area is in the Mahaveli System B that can provide irrigation water to downstream settlements with water from Maduru Oya Reservoir. Mahaweli System B suffers from water shortages, especially during the Yala (Dry) season. Accordingly, farmers tend to use part of their paddy lands for growing other more **drought tolerant crops**. Chilli cultivation was very popular among most of the farmers in North-central province as it was an attractive cash crop and required minimal water inputs during Yala season. However, due to pest outbreaks in the area in 1990s, many farmers moved away from growing chillies. MASL is overall in-charge and is authorised to oversee all administrative and operational matters connected to its agriculture, irrigation, irrigation water issue, seasonal cropping systems, community development and social welfare. Therefore, administering the project activities will be easy. Sewanapitiya, Dimbulagala and Wijayabapura Blocks have well-established farmer organisations already under MASL. There are experienced chilli farmers and most of farmers of these area rely on paddy, chilli and OFC for livelihood. All these lands are allocated for Agriculture development under MASL which are being leased for famers for large scale cultivation. Hence, impact due the destruction of ecosystem will be low.

The technology package will cover practices from land preparation to postharvest handling. In other words, from A to Z, including **farm level drainage** technology; the use of drones and other machinery and implements for land preparation, levelling and for making raised beds; new planting patterns with high population densities; new **low pressure drip irrigation** systems that **conserve water** and prevent laminar erosion; **precise application of fertilisers** using the low pressure irrigation systems and based on soil and foliar analyses; **new pests and disease control** technology based on integrated pest management (IPM) practices and using drones for the precise and localised application of pesticides; precision agriculture technology to lower the unit cost of production by improving the overall management of the farm and expand the localised application of agricultural amendments.

The “no-action” alternative would mean that no chilli cluster development undertakes by the ASMP and hence no financial, technical and market support for the existing chilli Cultivators in selected DS Divisions. Therefore, conventional farm practices with flood irrigation which consumes huge volume of water, high use of chemicals, low productivity, low quality and low income will continue to dominate the economy of the farmers and agriculture sector will not be developed in Polonnaruwa.

Legal framework and WB Safeguards Policies

According to the nature of project activities, following local legal framework and WB safeguards policies will be applicable:

#	Permit/Clearance	YES	NO	TBD	Remarks
1	The National Environmental Act. No. 47 of 1980 & its amendments		√		None of the proposed activities are coming under prescribed activities
2	Mahaweli Authority of Sri Lanka Act (Act No.23 of 1979)	√			Interventions proposed to be carried out in and around Mahaweli Development area should obtain consents from Mahaweli Authority of Sri Lanka as per the Act.
3	The Mines and Mineral Act No.33 of 1992	√			Improvements of rural roads and other proposed infrastructure activities may require extraction of soil and rocks. Soil and rocks should be purchased from GSMB permitted borrow pits and quarries.

	4	Local Authorities Acts	√			Improvements of rural roads, waste disposal should be approved by the Rajanganaya Pradeshiya Sabha.
	5	Water Resources Board Act No. 29 of 1964	√			Extraction of ground water should be concented by the WRB
	6	The Fauna & Flora Protection Ordinance Act No. 49 of 1993 & its amendments	√			Any cluster activity or infrastructure development closer to a protected area or outside which hinders wildlife movements' restrictions should be adhered to FFPO measures. Elephant fence should be approved by DWLC
	7	Forest Ordinance including Amendments	√			Any activity within forest reserve or buffer zone or removal of trees required to be carried out should follow regulation stipulated under this legal framework.
	8	Soil Conservation (Amendment)Act No. 24 of 1996	√			Any activity which increases the erosion of soil or potentials for activate erosion potential need to take maximum mitigation measures to control soil erosion and apply soil conservation measures wherever applicable

World Bank safeguards policies triggered by the project

Safeguard Policies Triggered by the Project	**Yes**	**No**
Environmental Assessment (OP/BP/GP 4.01)	[**x**]	[]
Natural Habitats (OP/BP 4.04)	[]	[**x**]
Pest Management (OP 4.09)	[x]	[]
Physical Cultural Resources(OP 4.11)	[]	[**x**]
Involuntary Resettlement (OP/BP 4.12)	[]	[**x**]
Indigenous Peoples (OD 4.20, being revised as OP 4.10)	[]	[x]
Forests(OP/BP 4.36)	[]	[x]
Safety of Dams (OP/BP4.37)	[]	[x]
Projects on International Waterways (OP/BP/GP 7.50)	[]	[x]

4. PROJECT DESCRIPTION

Proposed start date	November 2021
Proposed completion date	December 2023
Estimated total cost	SLR 256,288,780 Table 2: Investment Summary

Subcomponent	Activity	Costs (LKR)	Costs (LKR) with 10% contingency
2.1 Farmer training and capacity building	2.1.1. Individual farmer capacity building	7,785,000	8,563,500
	2.1.2. FPO training and development	9,465,000	10,411,500
	Subtotal	17,250,000	18,975,000
2.2 ATDP	2.2.1. Development of ATDP	164,181,300	180,599,430
	Subtotal	3,825,000	4,207,000
2.3. Production and Market Infrastructure	2.3.1. Cluster irrigation systems	168,006,300	184,806,430
	2.3.2. Market access roads and new farm access tracks	14,300,000	15,730,000
	2.3.3. Cluster postharvest facilities, organic fertiliser production facilities, and others	46,007,500	50,608,250
	Subtotal	172,682,300	189,950,530
	Grand total	232,989,800	256,288,780

Present land ownership

Mainly land ownership is System B, MASL. In addition, there will be few land plots belongs to individual (Swarnaboomi Deeds) farmers from both Sevanapitiya and Dimbulagala Block Areas. Refer Annex 2: Project Area Maps and Survey Plans.

Table 3: Land Ownerships for Selected Lands

Land category	Present situation	Ownership	Identified area	№ of farmers	Remarks
1. Highland parcels (ranging from 1 to 5 ha)	Not divided or allocated to farmers	Mahaweli Authority	About 30 ha could be used for the chilli cluster	146	Lands are to be surveyed and blocked out and allocated 0.2 ha each farmer before next Maha Action has to be taken by MASL
2. Highland parcels for rain fed cultivation (1 to 5 ha)	Not divided or allocated to farmers Presently Issue temporary permits for seasonal crops under rain fed	Mahaweli Authority	About 34 ha could be used for the chilli cluster	118	Lands are to be surveyed and marked out in 0.2 ha blocks to be allocated to each farmer before next Maha season. Action to be taken by MASL
3. Lands allocated to farmers (in 1 ha lots)	Lands allocated to farmers and given as highlands without irrigation water	Individual farmers	16 ha could be used for the chilli cluster	61	There is a possibility to implement in Yala if MASL officials and PPMU launch accelerated programme with partial package
Total			**80 ha**	**325**	

Description of the project

(With supporting material such as

The proposed sub project is mainly focused to introduce the new technology for cultivation activities. The civil works of sub project include:

maps, drawings etc attached as required)

Table 4: Improved technology package

Technology	Description
Hybrid seeds	MICH HY 1 hybrid developed by the Department of Agriculture in 2015
Cocopel seedling production	"Cocopel Grow Pellet is a compressed coir fibre pith disc. The disc comes with added fertiliser and is covered in a bottom sealed biodegradable net with EU certification"
Introduction of water conserving and low-pressure drip irrigation systems	Computer controlled heads for water application scheduling supported by fertility sensors, soil moisture sensors and evapotranspiration measuring devices. Design based on local agri-climatic conditions and soil physical properties
	Precision fertigation with liquid organic compounds based on soil analysis
	Precision application of liquid pesticides in the vicinity of the root zone as required i.e. control of soil borne diseases
	Anti-clogging flushing components
Placement of insect net around crop area	Existing practice that provides a mechanical barrier to prevent insects from infesting crop area. It is placed around the perimeter of the production area
Mechanised and high-tech land preparation using drone technology and advanced implements for tractors	Drone geo-positioning
	Drone land surveys for site selection
	Drone levelling for land preparation and drainage
	Deep ploughing and shallow disking to improve physical soils characteristics
Incorporation of organic material in land preparation practices	Organic material incorporated in ploughing and disking operations to improve placement and facilitate bulk handling of organic materials such as compost
Micro levelling of cropping area	Levelling with laser device mounted on tractor accessory will accelerate water removal from the crop area to avoid drainage problems and facilitate operations such as bed making
Raised beds 0.5 m high with special bed making tractor pulled accessory	Mechanised bed making using implement pulled by tractor. This innovation will significantly reduce labour requirements and will speed up land preparation tasks considerably. Increased bed height will be improved internal drainage and aeration in the root zone
Plastic mulch	Established technology to control weeds and reduce evapotranspiration
Drainage micro works	In addition to levelling, drainage micro works such as small ditches and quick water evacuation works will prevent water accumulation in the soil profile, improving pest prevention conditions and root aeration and health
Planting tools & aids	Practical tools and aids to secure accurate measurements of planting distances to assure desired population densities such as planting templates
High density planting	Beds 1.5 m, 1 Bed = 3 Rows, 1 Row = 333 Plants, High Population Density = 67,000 per ha
Sticky insect traps placed systematically inside the crop at a distance of 5 m	Non-toxic insect control that also allows for the determination of insect population dynamics used in IPM practices to schedule spraying operations
IPM pest control practices	Scheduling of pest control operations using pesticides based on pest population dynamics and their risk assessment thresholds

Drones for localised ultra-low volume spraying	When spraying is necessary, localise ultra-low volume spray on equipment mounted on drones will minimise negative impact of operation
Organic pesticides	Approved organic pesticides found locally in Sri Lanka preferred to imported agrochemicals
Improved postharvest handling	Practices to protect quality and shelf life such as proper harvest and pre-cooling
High efficiency dryers	Use of continuous dryers instead of batch type dryers

Table 5: Summary of farm access road repairs

№	Location	Length
1	Aluthwewa Unit-access Road to farmer land	2.00 km
2	Dalukana Unit 1 - access road to farmer land	0.28 km
3	Dalukana Unit 2 - access road to farmer land	1.41 km
4	Borawewa GN Division-access Road to farmer land	0.50 km
Total		**4.19 m**

Note: No changes to alignment or width of the roads

Table 6 : Summary of Project Interventions in the Cluster

#	Project component	Key Activities	Approx. extent / quantity	Implementation responsibility
1	Cultivation of Chilli (Refer table 3)	Land Preparation Irrigation pipelaying Installation of mini-sprinklers	80ha	ISP PPMU
2	Improvements of Rural Roads (Rehabilitation) (Refer table 5)	Trimming, levelling and compaction of sub grade Supplying and pilling approved gravel Spreading and compaction garvel	4 road sections Total length 4.2km	Contractor LAs Civil Engineer –ISP PPMU Engineer - PMU
3	Construction of Collection centre and installation of drying facilities	Construction of Building facilities Fencing of area Provision of Utility services Landscaping of area Drainage system Provision of equipments including driers	1 Collection Centre	Contractor FO Civil Engineer –ISP PPMU Engineer - PMU
4	Construction of Compost Production Unit	Fencing Constrution of builing Disposal yards Mixing yards Leachat management	1	Contractor FO Civil Engineer –ISP PPMU Engineer - PMU
5	Construction of Agro Wells	Yeild testing Excavation Wall Construction	26	Contractor FO Civil Engineer –ISP

					PPMU Engineer - PMU
	6	Erection of Elephant fence	Installation of poles Erection of cables Electrification Maintanance of fence	3km length 8' height	Contractor FO Civil Engineer –ISP PPMU Engineer - PMU
Project Management Team	A PMU was established under the MOA to implement proposed project activities. Contact Persons Project Director ASMP, MOA 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/ Deputy Project Director – North Central Province National Institute of Postharvest Management Jayanthi Mawatha Anuradhapura Environmental and Social Safeguards Specialist ASMP, MOA 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 However, institutional mechanism for the chilli cluster development has been proposed. Project Management Committee chaired by Resident Project Manager – MASL System B, consisting of all the line agencies (Agriculture, Agrarian Development and Land), and all the chairmen of farmer organisations have extended cooperation for chilli cultivation considering following reasons (see Annex 4): • Great potential to increase Farmer income with less labour and inputs • Ability to save water in Mahaweli canal system for next seasonal cultivation and minimise water crisis during Yala season • Effective mechanism to attract young farmers for commercial agriculture • Almost all the farmers have kept smaller part of their land for paddy crop for domestic consumption • All the farmers are members of farmer organisations or successors which established by the MASL			

5. DESCRIPTION OF THE EXISTING ENVIRONMENT

5.1 Physical features

Topography and terrain

Geologically, the project area belongs to the Wanni Complex of Sri Lanka. Generally, the project site is an undulating terrain with a gentle slope (slope <30%) and the relief is <20m. The elevation of the project site is around 110m -112m AMSL. Chilli growing lands in this area could be generally categorised as undulating or flat lands with poor drainage condition during heavy rain periods.

Table 7: Terrain Types of the Cluster Area

DS Divisions	Land area		Terrain type
	km^2	% of DS area	
Dimbulagala	37	64	Undulating
	20	36	Undulating and Flat
Welikanda	57	100	Undulating and Flat

Source: Punyawardena, 2003

Soil (type and quality)

DL2b AEZ does not shows even like DL1c bimodal rain pattern. Total amount of rainfall is lesser than in DL1c as this area is far long to central hilly area. Entire Welikanda DS Division falls in to this AEZ and dominant soil group known as non-calcic brown soil which is considered as a most unfertile soil group in the country.

Table 8: Soil Types of the Cluster Area

DS Division	AEZ	Soil Types
Dimbulagala	DL1c	RBE, LHG
	DL2b	NCB, RBE, LHG
Welikanda	DL2b	NCB, RBE, LHG

Source: Punyawardena, 2003
RBE - Reddish Brown Earth, NCB-Non-Calcic Brown, LHG-Low Humic Gley

As it had mentioned earlier NCB is the main soil group in the cluster area, its characteristics are as follow. Colour range from dark brown to ash brown. Mostly non-calcic brown soil contains sand. Horizon B has more than 40% of base saturation and a high amount of clay than horizon A. This soil can be found in dry zone. Nitrogen in the top layer of this soil is decomposed. This is a slightly acidic soil and has much of Calcium and Magnesium. Cation exchange capacity is 5-11. Structure is breakable.

Other dominant soil group in DL1c AEZ of Dimbulagala DS Division is the RBE soil type. These soils are reddish to reddish brown in colour and found in the upper and mid-slopes of the landscape in the dry zone. The normal depth is about 1 to 1.2 m and the water holding capacity ranges from 100-140 mm/metre depth of soil. The steady infiltration rate ranges from 1-5 cm/hr. The percolation rates of the wet puddled soils for the first time exceeds 100 mm/d and remains at a higher value of 10-20 mm/d even after 6 years of continuous puddling.

Soils of the lower part of the soil of the catena known as Low Humic Gley soils which is more suitable for paddy cultivation as its drainage conditions are very poor.

The soils are high in exchangeable bases, neutral or moderately acid in reaction rich in potassium and low in phosphorus and nitrogen and low organic matter due to the high temperature and low rainfall (Panabokke, 1996).

Climate and Meteorology

Table 9: Rainfall of the Cluster Area

DS Division	Rainfall
Dimbulagala	> 900mm
	> 1000mm
Welikanda	> 1000mm

Source: Punyawardena, 2003

The climatic and weather information of the cluster area is given in Table 69. The monthly rainfall pattern of the DL1c does not show a bimodal pattern like DL1a or DL1b as the first inter-Monsoonal and South-west monsoonal rains (Yala) are not effective. But, as the second inter-monsoon and North-East monsoons of the Maha season are very effective, the rainy period prolongs up to mid-January or February from October. During these months, the AEZ receives about 60% of its annual rainfall. The annual rainfall is around 1500mm but more than 65% of it is experienced during the Maha season, October to February and other 7 months remain as dry months and it is impossible to cultivate any crop without supplementary irrigation. But, as because of the micro irrigation is a main component of technological package of the project for chilli and likewise daily sunshine hours exceeds 7 hours/day during this period, this seven-month period can be used to cultivate chilli to harvest a good yield and sell them at a good price. The average maximum temperature is about 32.10C and the average minimum temperature is about 23.20C.

Surface water

*(*Sources, distance from the site, local uses and quality*)*

Several tanks and streams are located within the project area including: Nalun Wewa, Borawewa, Bogaswewa, and many micro tanks, Mahaweli River flows at the northern boundary of Dimbulagala DS Division. Farmers use water stored tanks and from the Mahaweli River for irrigation, domestic, washing and bathing purposes. Water quality of these surface waterways are moderate[1].

Although the paddy land in cluster area is supplied with irrigation water from Maduro Oya Reservoir delivered via the branch canals of ZD main canal (at no charge to farmers), all the farmers identified for chilli cultivation are expected to irrigate their crop from wells.

Compared to other land use types in the Maduro Oya watershed, paddy farming is associated with significant agrochemical use that contributes to nutrient pollution of water bodies, land and atmosphere causing numerous long-term negative impacts to the environment and the health of all beings. It was evident that water quality level of Maduro Oya Reservoir has decreased while the pollution levels have increased (Kasthuriarachchi et al., 2016).

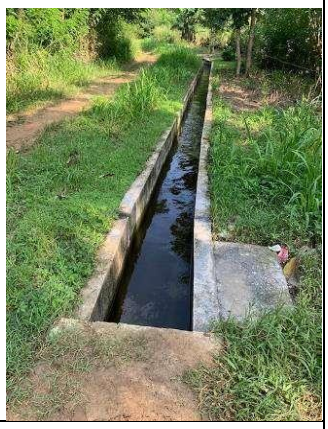
The highest pH, recorded near the dam site of the reservoir, exceeded the WHO standards for drinking water (Kasthuriarachchi et al.,2016). The dissolved salts or salinity content of Maduro Oya Reservoir was 0.161 gl (Silva,2004). The sodium absorption rate, which is the proportion of sodium to calcium plus magnesium in the water, in Maduro Oya (0.916-1.167 meq l^{-l}) was below the threshold value of 6 meq l^{-l} (Silva, 2004). It was reported that total hardness

[1] *Bandara J.M.R.S., Wijewardena H.V.P., Bandara Y.M.A.Y., Jayasooriya R.G.P.T., and Rajapaksha H., Pollution of River Mahaweli and farmlands under irrigation by cadmium from agricultural inputs leading to a chronic renal failure epidemic among farmers in NCP, Sri Lanka, Springer Science+Business Media B.V. 2010, Received: 13 November 2009/Accepted: 7 October 2010.*

ranged from 21 ppm to 68 ppm while dissolved oxygen varied from 3.3 ppm to 9.4 ppm (Kasthuriarachchi et al., 2016). In the nitrogen content, ammoniacal nitrogen varied from 0.001 ppm to 0.652 ppm, nitrite nitrogen from 0.001 ppm to 0.905 ppm while nitrate nitrogen was ranged from 0.001 ppm to 1.131 ppm (Kasthuriarachchi et al., 2016).

The accumulation of nutrients in the Maduru Oya Reservoir has led to the process of eutrophication (caused by the death of aquatic plants and animals and leaching of fertilisers into the water table) that has increased the spread of toxic algal species such as *Microcystis* (Kasthuriarachchi et al., 2016). Several phytoplankton types (*Cyanobacteria, Cosmarium, Pseudanabaena, Microcystic and Pediastrum*) were found in Mahaweli reservoirs including Maduro Oya as a reason of nutrient enrichment (Silva and Wijeyaratne, 1999). Agriculture (crop cultivation and animal rearing) can be suggested as the major reason for nutrient enrichment in Maduro Oya Reservoir.

Figure 2: Existing Surface Water Sources belongs to Mahaweli System B



Ground water

(Sources, distance from the site, local uses and quality)

Farmers extract water from hand dug wells located on upland where the ground water level is available at 4 to 7 m depth. Since the farmers use orthodox irrigation methods, the yield and the capacity of these dug wells are not enough to cater the water requirements of farmers.

Water quality is in moderate condition[2].

Air quality

(Any pollution issues)

Any major air pollution sources in the vicinity of the project site are not recorded. Small scale industries and traffic may cause air pollution within the area. However, measurement from **Error! Hyperlink reference not valid.** shows that the Air Quality Index (AQI) of Borawewa, Nelumwewa and Dimbulagala is 37/500 and PM2.5 is the dominant pollutant found in the area.

5.2 Ecological features – Ecosystem components

Vegetation

(Trees, ground cover, aquatic vegetation)

Following list of flora species observed ithin the project sites selected for cultivation ofchilli during screening:

Table 10: List of Flora Species recorded within cluster lands

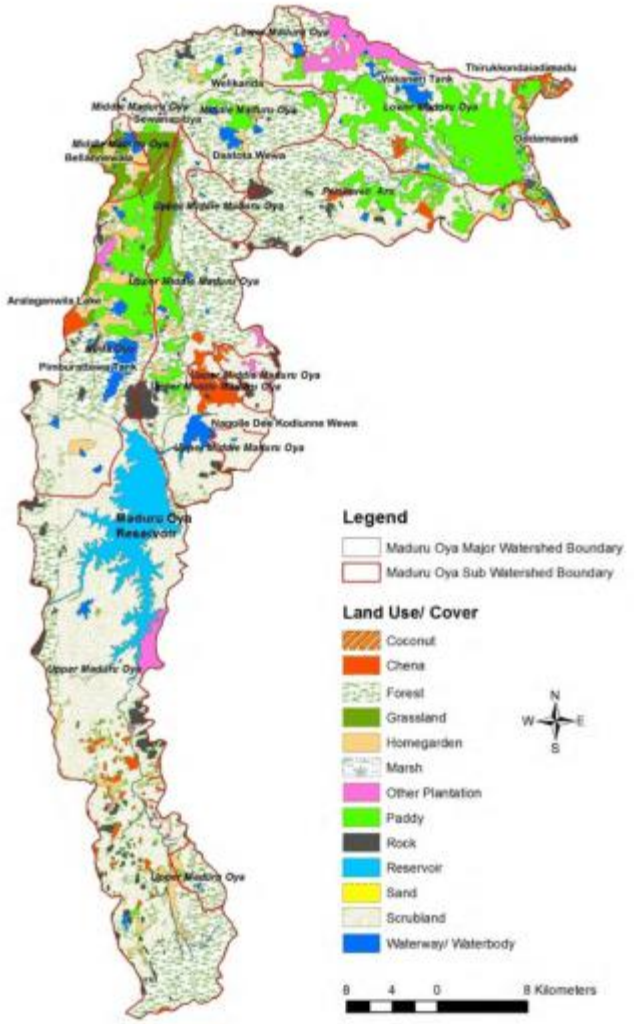
Common Sinhala Name	Scientific Name	Conservation status according to the National red list 2020
1. Hik	*Lannea coromandelica*	LC

[2] www.irrigationmin.gov.lk/water-resources-board/index.html

2. Bora damuna	*Grewia helicterifolia*	-
3. Bulu	*Terminalia bellirica*	LC
4. Yakinaran	*Atalantia ceylanica*	LC
5. Indi	*Phoenix pusilla*	LC
6. Maila	*Piliostigma racemosum*	LC
7. Kon	*Schleichera oleosa*	LC
8. Ipil ipil	*Leucaena leucocephala*	-
9. Kohomba	*Brucea javanica*	LC
10. Lolu	*Cordia dichotoma*	LC
11. Welan	*Pterospermum suberifolium*	LC
12. Ketakala	*Bridelia retusa*	LC
13. Attikka	*Ficus racemosa*	LC
14. Seru	*Aidia gardneri*	NT
15. Kalu-kuratiya	*Psychotria gardneri*	NT
16. Kaila	*Phyllanthus reticulatus*	LC
17. Wa	*Cassia siamea*	LC
18. Eraminiya	*Ziziphus lucida*	CR
19. Turpentine	*Pinus palustris*	-
20. Weera	*Drypetes sepiaria*	-
21. Gliricidia	*Gliricidia sepium*	-
22. Pila	*Tephrosia purpurea*	LC
23. Mana	*Cymbopogon nardus*	LC
24. Welan	*Pterospermum suberifolium*	LC
25. Palu	*Manilkara hexandra*	NT
26. Wal-ehatu	*Ficus heterophylla*	EN
27. Gadumba	*Trema orientale*	LC
28. Heen-karamba	*Carissa spinarum*	LC
29. Wara	*Calotropis gigantea*	LC
30. Katu pila	*Flueggea leucopyrus*	LC
31. Divul	*Limonia acidissima*	LC
32. Kahata	*Careya arborea*	LC
33. Ehela	*Cassia fistula*	LC

LC – Least Concern/ NT – Near Threaten/ EN – Endangered/ CR – Critically Endangered

However, different types of vegetation in the Maduru Oya watershed include forests, grasslands, paddy fields, home gardens, chena and plantation crop fields. Dry mixed evergreen forest is the prominent forest type in the area. The dominant tree species were *Manilkara hexandra, Chloroxylon swietenia, Schleichera oleosa* and *Pleurostylia opposita,* with understorey of

	Pterospermum suberifolium, Drypetes sepiaria and *Dimorphocalyx glabellus* (Gunatilleke et al., 2008). ***Figure 3: Land use pattern of Maduru Oya watershed*** 
Presence of wetlands	There are no wetlands within 5km radius from any selected lands. However, Flood Plain National Park, Mahaweli River and associated wetlands are located more than 6km from the lands selected.
Fish and fish habitats	Fresh water fish is another important living renewable resource in the district. Fish fauna can be found in irrigation tanks, rivers, villus, and in the flooded paddy fields. A wide range of fish species are found in the major river, Mahaweli Ganga. Villus are highly productive fishing grounds, and are excellent spawning and nursery habitats for many fish species. Its common species are tilapia, labeo shark and butter catfish. Paddy fields also serve as large areas of open water where many fish species breed. A considerable number of small sized fish are found in this habitat.
Birds *(*Waterfowl, migratory birds, others*)*	Maduro Oya national park is rich in faunal diversity. The avifaunal diversity of the national park is high as 196 bird species that include nationally threatened (14) and globally threatened (3) species (Gabadage et al., 2015). Agricultural land use in the area was previously described. Villus also provided nesting and feeding grounds for numerous migratory bird species.

Presence of special habitat areas *(*special designations and identified sensitive zones)	The area has not been identified as a special habitat area as per the sensitive areas map of the Central Environmental Authority. However, the Flood Plain National Park lies in about 7 km (either side of the Mahaweli River).
Other features	
Residential/sensitive areas *(*E.g., Hospitals, Schools*)*	All the land areas selected are little interior from townships of Sevanapitiya and Dimbulagala. Welikanda Base Hospital is located about 7km away from the area and Polonnaruwa General Hospital and Kidney Treatment Hospital are also located about 20km away from the area. In the selected areas, there are few schools namely Nelumwewa Maha Vidyalaya, Galthalawa Primary Vidyalaya, Bogaswewa Maha Vidyalaya are located within the area. In addition, Sri Wajiraramaya, Bogaswewa, Borawewa Viharsthanaya and Nidiya Asapuwa at Nelumwewa are observed to be located within the selected area. There are no any other sensitive areas recognized.
Traditional, economic and cultural activities	Dimbulagala Divisional Secretariat Division has an area of 58,184 ha divided into 56 GN Divisions with 99,010 people living within (2019). The project area includes the three GN Divisions of Dalukana, Weerana and Rathmalthenna. These three GN Divisions contain the following settlements: i. Dalukana; ii. Maliyadewapura; iii. Namal Pokuna; iv. Weerana; v. Rathmalthenna; vi. Bamunakotuwa; and, vii. Dimuthugama. Welikanda DS Division has 29 GN Divisions and 46 villages in an area of about 57,375 ha. The project area includes the following GN Divisions of Nelumwewa, Ginidamana, Sevanapitiya, Mahawewa, Kara Pola, Borawewa and Aluthwewa. A breakdown of populations is shown in Table 10 for both DS Divisions. The population of the three project GN Divisions accounts for 3.81% Dimbulagala DS Division. The population of project area in Welikanda DS Division is 9,524 that accounts for 21.25% of total population of 44, 819 within the division. Therefore, the number of project beneficiaries will be about 13,293; about 9.2% of all the population for both Welikanda and Dimbulagala DS Divisions. Majority of households in project area are male headed while majority of agriculture population is also dominated by males. Agriculture population accounts to 21.5 % of total population of both Dimbulagala and Welikanda DS Divisions. As depicted in resource profiles, agriculture is the main livelihood source for most people (44.18%) (Table 10). Under major irrigated schemes, 9,667 ha was cultivated, but no rainfed paddy cultivations were reported for Welikanda DS Division in 2017. During Maha season 2016/2017, 9,667 ha were cultivated and in Yala season in 2017, about 5,226 ha. Major crops grown include: cashew (98.7 ha), mango (114.4 ha), banana (82.3 ha) and papaw (16.7 ha). Poultry (74,024), cattle (11,220), buffaloes (4,968), goats (1,926) and pigs (492) were the major livestock species in Welikanda (Census and Statistics, 2017). The highest cultivated area (22,762.4 ha) of Polonnaruwa District were reported from Dimbulagala while 22, 406 of ha were under major irrigated schemes. Total sown paddy area during 2016/2017 Maha and 2017 Yala seasons were 22,762.4 and 13,887.0 ha respectively. Other than the paddy, few minor export crops such as pepper (44.8 ha), beetle (9.6 ha) and cashew

(63.5 ha) were also cultivated in Dimbulagala DS Division. Mango (224.2 ha), banana (165.7 ha) and orange (94.1 ha) were the prominent fruits in the DS Division. As livestock, a 169,939 number of cock/hens, 13,228 of cattle, 2,354 of buffaloes, 1890 of goats and 229 of pigs were reported. Per capita land consumption is 0.7 ha in Dimbulagala DS Division (Census and Statistics, 2017).

Table 11: Employments of project area

DS Division	Government	Private	Self employed		Daily wages	Foreign Employment
			Agriculture	Non-agriculture		
Dimbulagala	13.1%	18.1%	44.2%	9.0%	13.4%	2.2%
Welikanda	11.5%	10.0%	52.6%	9.4%	6.6%	6.5%

Source: Resource profile of Dimbulagala DS Division, 2019
Resource Profile of Welikanda DS Division, 2020

Table 12: Population aged 15 years and above by GN Division and their economic activity status

GN Division	Total	Employed	Unemployed	Economically not active
Dimbulagala DS Division				
Dalukana	1038	539	17	482
Weerana	699	438	13	248
Rathmalthenna	1099	494	39	566
Welikanda DS Division				
Nelumwewa	543	225	02	16
Ginidamana	726	371	32	323
Sevanapitiya	836	490	49	297
Maha wewa	1094	586	38	470
Kara Pola	1011	376	64	571
Borawewa	476	223	14	239
Aluthwewa	814	437	31	346

Source: Census of Population and Housing, 2012

The project creates many opportunities for unemployed people to have daily basis employment opportunities and some of them will get opportunity to work as skilled farm labours. Further, there will be employment opportunities at the post harvesting processing centres. Hence, development of agriculture in this area will a good prospect for the youth to have stable income and it prevents local employment migrations. Both youth and female should be encouraged by conducting training and awareness to get active engagement for the agriculture projects. In addition, explore new/innovative areas within the sector would create more employment opportunities or income generating options for youth and women in the area.

As indicated in Resource Profile, majority of households in both Dimbulagala area and Welikanda area receive monthly income of Rs 10,001- 25,000. However, household Income and Expenditure Statistics of Polonnaruwa District in 2019, published by Department of Census & Statistics shows that the mean household monthly income per month of Polonnaruwa District in 2019 is Rs 65,180. In addition, 6,596 families in Dimbulagala DS Division are Samurdhi beneficiaries, which is 24.53% of the total families. About 5,153 families in Welikanda DS Division are also Samurdhi beneficiaries, which is 38.95% of total no. of families.

Though the monthly income levels indicated in resource profiles are comparatively less, it is important to have economically stable agricultural projects to these selected areas. Shifting or converting paddy fields into other

	cultivation started due to low income and implementation of this agricultural project will create positive impacts for the annual income of farmers.
Archaeological resources *(*Recorded or potential to exist)	The proposed subproject will be located on Mahaweli System B lands and few privately owned lands and there is no archaeological or Physical Cultural Resource (PCR) to record or potential to exist. However, Dewagala Archaeological Important location found to be located about 2 km from Nelumwewa and 5 km away from other sites. There are many places in the district which have cultural and historical significance. Polonnaruwa District was the capital of "Rajarata" kingdom. Then it was called "Wijayabapura". Invaders called "Chola" were the first rulers to take Polonnaruwa as the capital. In 1070, King Wijaya bahu the first who repulsed the "Cholas" selected Polonnaruwa as his capital too. According to the ancient chronicles during the small period of "Chola" ruling Polonnaruwa was called as "Jananathamangalam". King Parakramabahu the Great who became king after the King Wijaya bahu the first is the most prominent ruler in Polonnaruwa. Ruling period of King Parakramabahu the Great is the golden era of Polonnaruwa kingdom. Economically and agriculturally, the country reached its peak and got the series of eulogies as the Granary of the East as rice was exported in this period. The great king developed massive irrigation systems in the country and the gigantic reservoir Parakkramasamudraya. Kalinga Maga invasion took place in 1214 and subsequently Polonnaruwa capital was totally destroyed and it was shifted to Dambadeniya.

6. DESCRIPTION OF PROPOSED AGRICULTURAL ACTIVITIES

6.1 CULTIVATION	
Existing condition of the crop	Irrigable lands of Mahaweli System B which is high potential area are more suitable for paddy when compared to other Mahaweli Systems in the country cultivation as more than 80% of the land are fallen into ill drain soil category. In general paddy is grown in both Yala (Dry season) and Maha (Wet season) seasons. Irrigation system developed under Mahaweli project issued water for rice cultivation in Maha season. However, farmers were encouraged to cultivate other food crops (OFC) during Yala in paddy lands because they require less water compared to rice and comparatively higher economic advantages of OFC and vegetables. Other crops are rarely grown in irrigable lands during Yala season but only less than 5%. In the meantime, due to the significant increase of the price of rice in recent times, there is an attractive price for paddy too. Due to this reason, the number of farmers turning towards other crops cultivation in their paddy fields is further declining. Members of this cluster are small and medium scale farmers with one hectares of land of which some lands have fully reserved for paddy and some farmers are keeping 0.2 hectare (half an acre) of land for other food crops. The objective of the chilli hybridisation and selection programme of the DoA targeted to develop new chilli varieties with tolerance/ resistance to LCC, Choanephora blight (*Choanephora spp*.), Anthracnose (*Colletotrichum capsica*), Leaf spot (*Cercospora capsica*) etc. In addition, insect pests are also major

	constraints to the production of chilli in Sri Lanka. It reduces not only the production but also the quality of pods. Important pests reported in chilli are Trips (Scirtothrips dorsalis), Mites (Hemitarsonemous latus), Aphids (*Aphis gossypii, Myzus persicae*), White fly (*Bemisia tabaci*), Pod borer (*Spodopetera litura / Helicoverpa armigera*) etc. Chilli LCC identified as due to damage by thrips (Scirtothrips dorsalis), mites (*Hemitarsonemous latus*) and aphids (*Aphis gossypii, Myzus persicae*) and viruses transmitted by white fly (*Bemisia tabaci*). Therefore, farmers apply various agrochemicals available in the market. In addition, plant resistance is one of the most economical, compatible and environmentally acceptable method of pest management strategies. The DoA released almost 10 different open pollinated chilli varieties such as MI-1, MI-2, KA-2, Arunalu, MI-Hot, MI green, Galkiriyagama selection, MI Varaniya 1, MIPC1 etc. However, all these varieties did not show resistance to major pests of chilli. In this regard, in 2015 hybrid variety MICH HY1 released by the DoA showed moderate resistant to LCC with high yield as 30 - 32 tonnes per hectare of green chilli. However, average potential green chilli yield recorded in previously released open pollinated varieties are almost 10 - 15 tonnes per hectare while national average showed as low as 5.1 tonnes per hectare. Low yields of farmers are associated with mainly LCC, poor adoption of recommended agronomic practices and use of inferior quality seed material. At present farmers prefer to produce green chilli than dry red chilli due to high price, ready market, high return, lack of availability of drying facilities, high labour input for drying etc. For dry chilli production harvesting should be done at proper stage more than 80% red coloured pods and use of tarpaulins when dryers are not available.
Polluting Processes (point source)	
In cultivation some key polluting steps, although limited, takes place; mainly in the cultivating and post harvesting phases.	
Land cultivations	Manual weed control is the best method at preliminary land preparation stage. In general, farmers prepare nursery beds width almost 0.9m (3ft) in well-drained virgin soil. Farmers sterilised soils before sowing by burning the nursery bed with rice husk and rice straw. At present some farmers use seed treatment with fungicides recommended by the DoA or chemical companies. Usually, nursery beds are prepared few days before seeding. Application of compost or any other organic manure is a common practice. In addition, the application of recommended fungicide for controlling of damping off and anthracnose is also practice. After seeding seeds are covered with layer of soil and straw. Thereafter, remove the mulch 7-10 days after sowing before the seedlings over grow through the mulch. To avoid from hot sunlight and heavy rain cover the bed with Cajon leaves or transparent polythene. Then almost one week before transplanting control water application. When the seedlings are ready for transplanting planting will be done with onset of rain. At the beginning in the farmlands, removal of all shrubs and bushes is taking place. Manual weed control is the best method at preliminary land preparation stage. Then, the shading branches of big trees near the field are removed and it will destroy alternative host plants of pest and diseases. Soil preparation follows, doing first ploughing with disc or mould board ploughs and doing second deep ploughing with disc or mould board ploughs perpendicular to the first ploughing. Then the disking or harrowing is taking place by each pass being perpendicular to the previous one. These activities provide benefits such as improvement of soil

	aeration, destroy pest cycles in different stages, destroy harmful bacteria and microorganisms due to aeration is improved and destroy harmful pathogens due to exposing silos to sun light. Adding Compost and mixing with soil will increase beneficial macro and microorganism in the soil and decrease pathogenic microorganism. Water by means of irrigation is applied immediately after transplanting. In general, raised beds are prepared width of 0.9 m (3ft) to facilitate proper drainage due to high clay in paddy soils. Some farmers make farrows without making beds. Majority of farmers make planting holes approximately with the spacing of 50x50cm or 60x50cm. In general, compost and chilli chemical fertiliser mixture are applied in the hole. To address these critical concerns, the ISP will introduce a new and/or improved technology package that will cover practices from land preparation for a new plantation and use of drones for land preparation and levelling, new planting patterns and population densities, basic flood prevention and drainage techniques.
Water requirement	The main source of irrigation for the proposed cluster is Kala Wewa Reservoir. In general, farmers use both flood irrigation and canal irrigation methods in chilli cultivation. Water is applied immediately after transplanting. After planting, they apply different chemical fertilisers every 3-4 weeks. Though flood irrigation is popular among farmers, it has created many problems due to poor drainage of soils in the area. The excess water used in flood irrigation can be considered as the main reason for the increase of diseases and subsequent low yield. Using the proposed low pressure drip and mini sprinkler irrigation systems better distribute water, reduce laminar erosion and apply precisely fertilisers using the low pressure irrigation systems that are based on soil and foliar analysis. Currently, 0.2 hectare is flooded by Field Canal and it takes 1 hour whereas pumping from an agro well takes 6 hours. About 4,000 litres will be required to flood this area. During the initial stage, irrigate every 8 days and after maturity every 5 days. However, drip irrigation requires much less water – about 1,500 litres every 5 days.
Use of fertiliser and pesticides and weedicides	Farmers use chemical fertiliser for chilli cultivation. Urea is used as the nitrogen source, Rock Phosphate and Triple Super Phosphate are used as the phosphate source and Potash as the potassium source. However, proposed project will not provide chemical fertilisers, and also not encouraged to do so. Further, the chemical fertiliser to cultivate 0.5 acer slot will be low and farmers will be used their own space to store if required. Chilli leaf curl complex is prominent especially in Yala season than in Maha season. Therefore, the objective of the chilli hybridisation and selection programme of the DoA targeted to develop new chilli varieties with tolerance/resistance to LCC, Choanephora blight (Choanephora spp.), Anthracnose (Colletotrichum capsica), Leaf spot (Cercospora capsica) etc. In addition, insect pests are also major constraints to the production of chilli in Sri Lanka. It reduces not only the production but also the quality of pods. Therefore, farmers apply various agrochemicals available in the market. Chilli cultivation has always been associated with inappropriate and indiscriminate use of pesticides and high labour input for weed control, both of which have significantly contributed to increasing the cost of cultivation. The continuous and indiscriminate use of pesticides has major drawbacks such as adverse effects on

	human beings and other non-target organisms, development of pest resistance, the outbreak of secondary pests and environmental pollution. The project proposed by the DoA is a selection of quality seeds, use appropriate nursery management techniques, early planting, use of barrier crops, use of recommended fertiliser, use of sticky traps, use of mulches, spraying of water, control weeds, adequate irrigation and use of insect proof net. IPM is encouraged to control the pest and diseases in the crop management as per the pest management plan (PMP) prepared for ASMP and for both pest and diseases the recommended pesticides and the fungicides are applied by the framers. Proposed IPM technologies are given in table 13 should be implemented during the project. These agrochemicals are recommended by the pesticides register of DoA and PMP as well.
Harvesting	At present farmers prefer to produce green chilli than dry red chilli due to high price, ready market, high return, lack of availability of drying facilities, high labour input for drying etc. For dry chilli, production harvesting should be done at the proper stage of more than 80% red coloured pods and the use of tarpaulins when dryers are not available. Green chilli prices in Dambulla Economic Centre range between LKR 100 – 300 per kg. However, in off seasons it may go up to 400 - 600 per kg. Though flood irrigation is popular among farmers it has created many problems due to poor drainage of soils found in the area. Excess water use due to flood irrigation could be considered as the main reason for increase of diseases and subsequent low yield. At present, almost total production is sold in local market. In terms of agricultural development, the ISP will introduce new and improved technologies required to remove technical constraints or fill technical gaps keeping the chilli farmers from progressing to become commercial farmers.
Postharvest storage and transportation	This chilli is mainly used as dry chilli and a quality drying process is important. Therefore, the harvest should be transported to the processing centre after harvesting. Grading, drying, and packing of the dried chilli is an essential part during the postharvest period as it helps to cut down the losses and increase the high quality and value. Therefore grading, drying, packing, and transporting should be undertaken with improved technology. These technology facilities will be available for farmers. Continuous drying process will be established by the project with solar power.
Other factors	
Solid waste	The solid organic waste is generated as crop residuals and at postharvest period and all are biodegradable. However, compost production unit (See Annexure 5: Compost Plant Proposal) will be implemented to produce compost using solid waste generated from post harvesting processing centre and these organic fertilisers will be used at land preparation stage. Screening report and relevant EMP and Social Management Plan (SMP) reports of post harvesting processing centre will be developed separately.
Wastewater	Surface run off will carry the fertilisers and applicable chemicals (pesticides, weedicides etc.) and impact is higher due to flood irrigation system. This will minimise by introducing water conservation techniques. Further, due to application of IPM mechanism, soil and ground/surface water pollution will be minimalised. ASMP will conduct the awareness creation and training

	programmes for both farmers as well as the officers regarding the IPM as per the PMP. Proposed application IPM during cluster given in table 13.

Table 13: Application of IPM for the development of for CDP № 4 – Polonnaruwa Chilli Cluster

Stages	IPM practices	Impacts of implementation	Benefit for farmers
Land preparation stage	Removal of all shrubs and bushes. Shading branches of big trees near the field are removed	• Destroying of all alternative host plants of pest and diseases	• Future risk of pest damages is minimised
Land cultivations stage	Undertaking the first ploughing with disk or mould board ploughs	• Soil aeration improved • Different stages of pest cycles are destroyed • Harmful bacteria and microorganisms are destroyed and minimise due to aeration is improved • Harmful pathogens are destroyed also due to exposing soils to sunlight	• Future pest and disease incidences and damages are minimised. Cost pest control reduced. Environmental pollution will be Minimised
	spreading well-rotted organic matter at the rate of 5 tonnes per ha	• Increase beneficial macro and microorganism in the soil and decrease pathogenic microorganism. Development of soil structure	
	Undertaking the second deep ploughing with disk or mould board ploughs perpendicular to first ploughing	• Incorporating organic matter in to the soil	
	Disking or harrowing (two perpendicular passes)	• Improvement of soil aeration. Reduce harmful microorganisms	
	Flood prevention and Drainage improvements. Raised beds are 0.5m in height and 0.9 m wide.	• Less risk of disease spread	
Forming of soil beds	Beds will be arranged in such a way to reception of maximum sunlight	• Sunlight will not be a limitation to the plant to produce maximum yield	• Higher yield and income
Nursery and planting stage	MICH HY variety will be selected	• Moderately resistant for LCC disease It gives a higher yield	• Less risk of LCC disease and has a higher yield
	Seedlings will be produced on "Cocopel" pellets. Cocopel Grow Pellet is a compressed coir fibre pith disc. The disc comes with added fertiliser and is covered in a bottom sealed biodegradable net with EU certification"	• Number of Labours need for nursery management will be reduced • Yield will be about 20% higher than conventional nursery bed method (Sri Lanka research) where uprooted seedlings are planted • Only vigorous seedlings could be selected	• Less labour requirement. Vigorous healthy cultivation is assured • Less risk of pest and diseases
	Seedlings of same height and growth are planted in separate rows	• Easy to manage agronomic practices. Uniform plantation is assured	• A healthy plantation is assured
	Placement of silver and black plastic sheets as mulch over the beds. Planting points will be made by punching the polythene in recommended distances	• Established technology to control weeds and reduce evapotranspiration which lowers irrigation water needs. In addition, reflecting sunlight will improve the solar radiation reception to the chilli plants. Not need chemical weed control	• Less labour needs. Reduce irrigation volume. Optimized photosynthesis

Stages	IPM practices	Impacts of implementation	Benefit for farmers
	Erecting a UV resistant insect proof net around the crop field	• It provides a mechanical barrier to prevent insects from infesting crop area. It is placed around the perimeter of the production area. It will highly reduce the need of pesticide applications	• Reduced cost of pest and diseases control. Less hazards to the environment
Sapling stage	Daily attention to all saplings is assured	• Early identification of pest and diseases incidents	• A healthy plantation is assured. Cost reduced
	weakened plants are replaced by new saplings	• Even plantation is assured	
	No water stress is allowed	• Vigorous growth and Even plantation is assured	
	Only correct dose of nutritionally balanced fertilisers will be applied	• No unwanted canopy development and vigorous growth is assured	
Juvenile, flowering and maturity stages	Daily attention to all seedlings is assured. This procedure is followed in every growth stage of the crop cycle	• A healthy crop field is assured	• A healthy plantation is assured. Cost reduced
	Field sanitation is assured by managing garbage in the field		
	Suspicious plants are marked and will be monitored for pest and diseases. Chemical Treatment will be followed if only identified as economically harmful pest or a disease.		
	Diseases attacked plants are uprooted and immediately destroyed		
	Automated Micro irrigation by using drip tapes	• Volume of water need for the effective root zone is assured • Percolation of irrigated water towards the ground water is minimised • Helped for a vigorous plant growth	• Easy to handle, cost reduced. Less harm to the environment. Minimise the risk of pest attack
	*Fertigation with organic or chemical fertilisers. *Formulation of fertiliser regimes based on complete soil tests and foliar analyses. *It will be continued flowering and maturity stages too	• Correct dose of nutrient to the plant is assured • It minimised adding of excess fertilises to the environment • Vigorous plant growth is assured • Less risk of pest and disease infestation	• Easy to handle. Less problem to the environment
	Required dose of fertiliser will be supplied though fertigation, by soil and leaf analysis	• Balanced plant nutrient requirement for the plant is assured. Plant vigour will be increased. Optimum fruit setting will be occurred	• A healthy plantation is assured. Maximum yield will be assured

Stages	IPM practices	Impacts of implementation	Benefit for farmers
	Automated Micro irrigation by using drip tapes	• Volume of water need for the effective root zone is assured • Percolation of irrigated water towards the ground water is minimised • Helps for a vigorous plant growth	• Easy to handle, cost reduced. Less harm to the environment
	Sticky insect traps placed systematically inside the crop, along the planting beds, at a spacing of 10 m	• Pesticide free, non-toxic insect control that also allows for the determination of insect population dynamics used in IPM practices to schedule spraying operations	• Healthy crop is assured. Environment is protected
	Pest population and pest damage assessment surveys to evaluate pest and disease intensity/quantity factors for damage prevention and to determine pest population threshold status for rational application of pesticides	• IPM practices are combined with modern spray techniques when necessary i.e. ultra-low volume spray using drones if needed. Pesticide application through irrigation system if needed	• Healthy crop is assured
Harvesting stage	harvesting following market quality specifications on size (girth and length) and colour (maturity stage)	• Precision harvesting is a key practice to create and preserve quality and extend shelf life with minimum risk of diseases infestation	• Expected quality production is assured
	Harvest will be collected to plastic creates	• Minimum risk of diseases infestation	
Transport stage	Harvest will be transported to the markets by using creates. Care will be taken to minimum damages to the produce.	• Losses in transportation will be minimum • Disease infestation will be minimum	• Expected quantity of produce is assured. Reasonable price is assured.

7. PUBLIC CONSULTATION

Consultations conducted with potential farmers of the selected areas, Agriculture Officer, Unit Managers and Block Managers of Mahaweli System B, Agriculture Instructors, Social Mobilisers, District and Cluster Coordinators. Community Mapping carried out during the Focus Groups Discussions held with Farmers and Key Informant Interviews carried out with Key Officials. Outcomes of the discussions are summarised below:

Figure 4: Public Consultations with Farmers in the Cluster


- Existing crop related issues

Chilli was intensively grown by farmers in Polonnaruwa District including Mahaweli System B during the decades of 70's and 80's. At that time, Sri Lanka became self-sufficient in chilli. Likewise, subsequent attempts had been taken place by the government to promote chilli in Polonnaruwa District too including Mahaweli System B. In the beginning, it was unsuccessful due to the spread of the disease in chilli known as Leaf Curl Disorder during end 1980s. This had caused a drastic reduction in are cultivated and planted to chilli in both Anuradhapura and Polonnaruwa Districts. In addition, imported dry chilli at low price was allowed, so further reducing the area grown with chilli.

Low yield of chilli and decline of yield over the years due to poor agronomic practices adopted by farmers

1. Threats from Wild animal such as Elephants and destructions by Monkey, Toque Macaque and Peacock
2. Damages from Insects such white flies, *Pelamekka*, *myta*, etc
3. Bacteria impacts during initial stages such as Swelling of leaves, plant dies, yellowish leaves, etc
4. Low quality of products due to small size, shape etc.
5. Low productivity of lands, labour and other inputs
6. Low adoptability of new technologies
7. Excessive flood irrigation creates many problems such as waterlogged conditions, poor crop performances, high disease incidence and waste of water
8. High soil erosion due to prolonged flood irrigation
9. Poor crop management practices and poor sanitation
10. Poor and inefficient land utilisation pattern
11. Fertiliser application is not practised by based on soil and foliar analyses
12. No attention for micronutrient fertilisers
13. Poor primary post- harvest handling and high wastage
14. Low quality standards for marketing
15. No lands from the irrigable lots available for chilli cultivation like in System H area, as all irrigable lands are under paddy in both seasons

- How to obtain continues technical knowhow throughout the cultivation cycle to take products up to suitable quality for export market.

Concerns were raised by farmers that the yield of existing crop is low, size and the shape of the product is low. Hence, whether is it acceptable for the future forecast of the project? However, it was found that this is mainly due to the poor agronomic practices adopted by farmers. Low adoptability of new technologies, low productivity of lands, labour and other inputs, Poor crop management practices and poor sanitation, Fertiliser application is not practice by based on soil and foliar analyses were identified as common reason for above concern and the technology package and other management practices will be introduced to the selected group to overcome the concerns.

- Hygienic conditions that should be maintained during harvesting as well as post harvesting periods.

Caring for harvesting crates, best harvest time, harvest maturity index by age and calliper, discarding poor quality fruit and other waste organic materials in the field to leave as organic fertiliser, avoiding mechanical scarring and bruising quality defects, selecting the best product for packing, cleaning the selected product, properly storing the harvested product before delivery to the packing facility were highlighted during discussions and practical training awareness on basic harvest and postharvest practices are highly needed.

- High Temperature levels and high evaporation

Due to prevailing dry condition through majority of time in the year, watering on regular basis is very important. However, high evaporation due to sandiness of the soil, maintaining the moisture condition required for chilli especially at maturity is also important. Polymulch and drip irrigation system will be able to reduce the level of evaporation and maintain the required moisture levels at the root system.

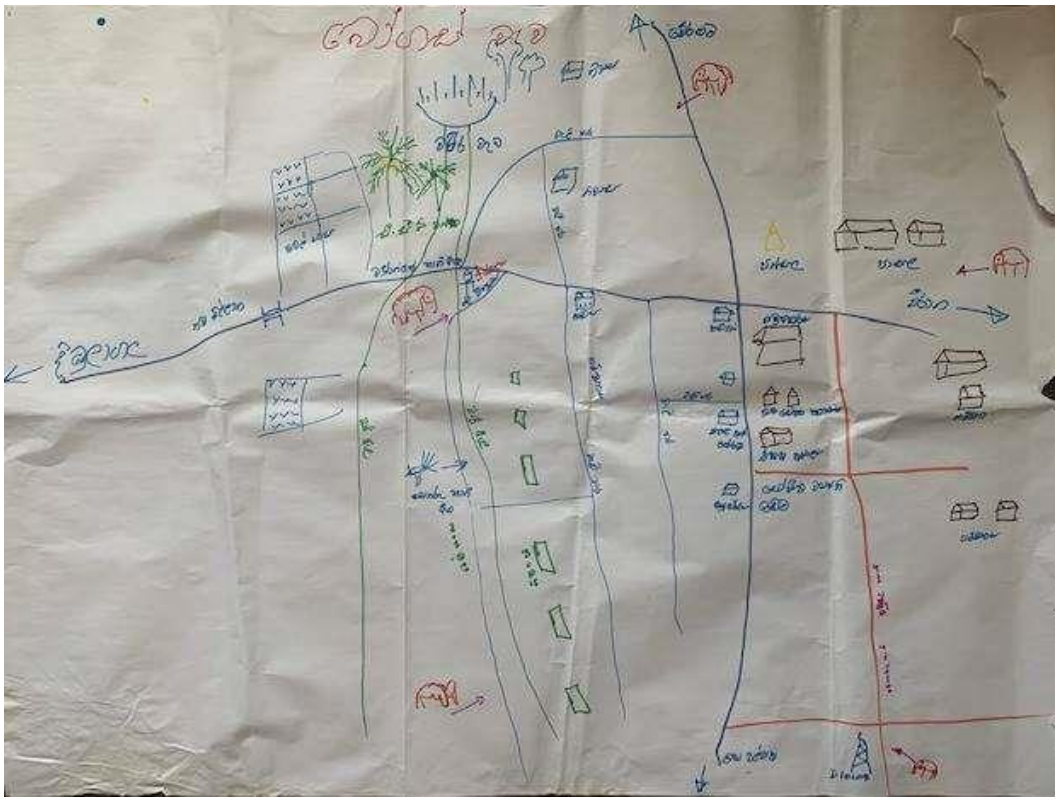
- Infrastructure development

Water and drainage work required to bring water to farmlands. Further, Improvement of access roads and especially postharvest processing and packing centre are highlighted during the discussions. Collection centres would be required to establish for primary collection, drying, sorting and packaging.

Further, there were points highlighted during the discussions such as use of weedicide, poor and inefficient land utilisation pattern, attention for micronutrient fertilisers and knowledge of farmers for IPM mechanism for better crop production.

The majority of the community is willing to support the project activities as they will benefit from the proposed subproject directly. Extensive social screening has been covered under the Social Safeguard component.

Figure 5: Community mapping activities



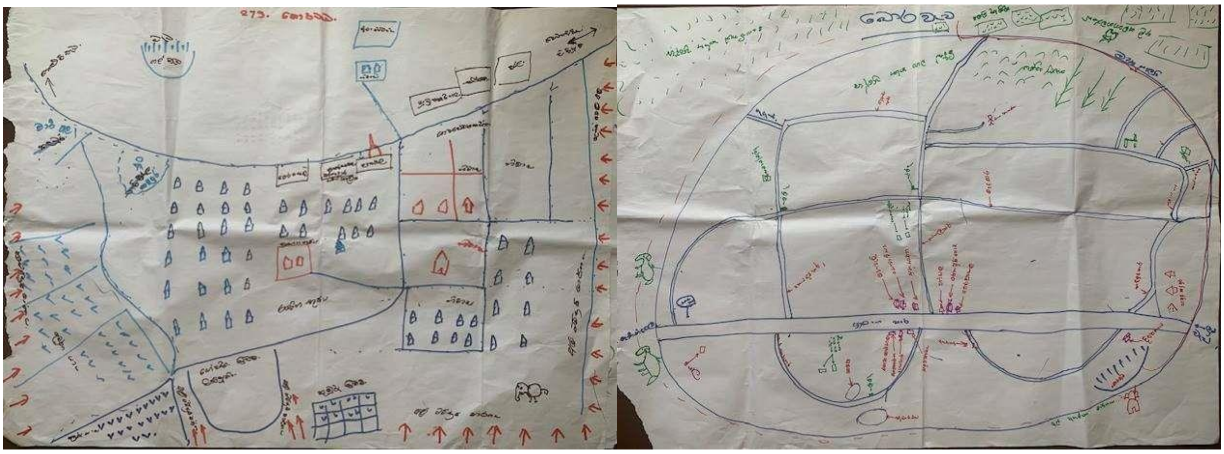
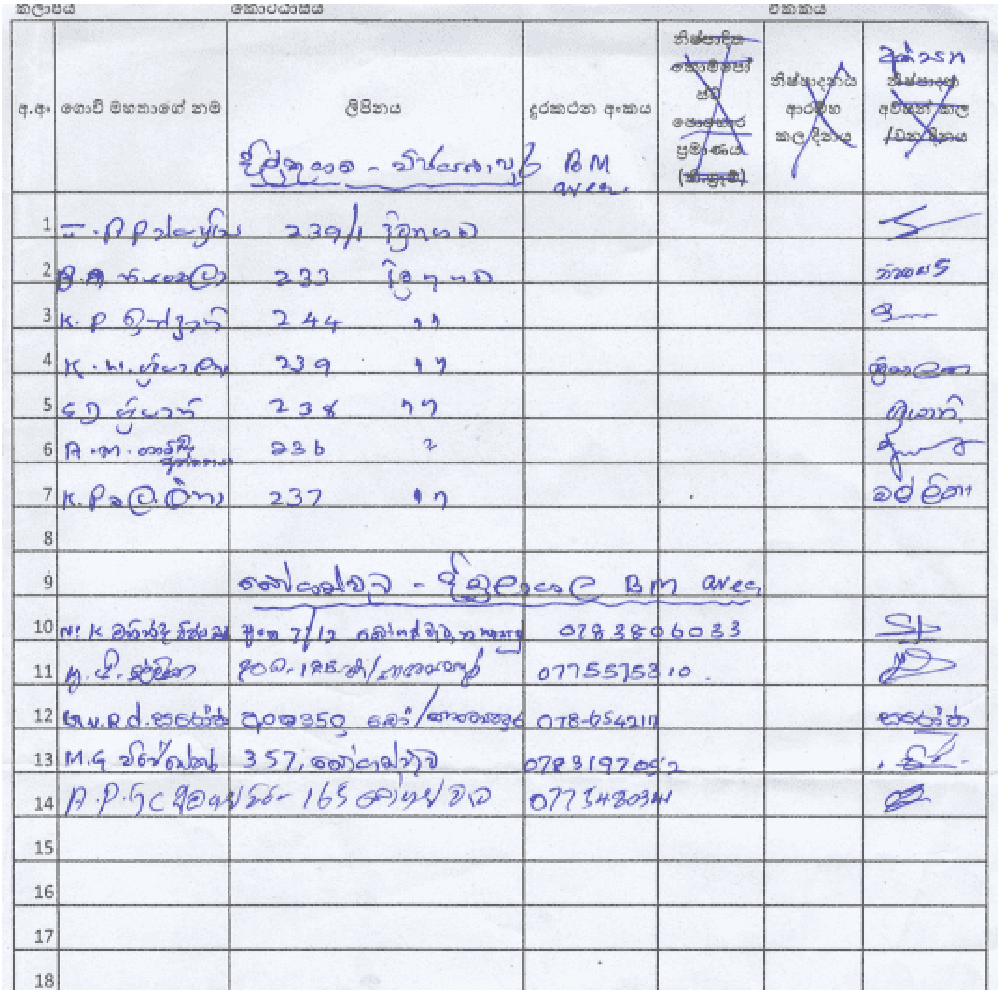
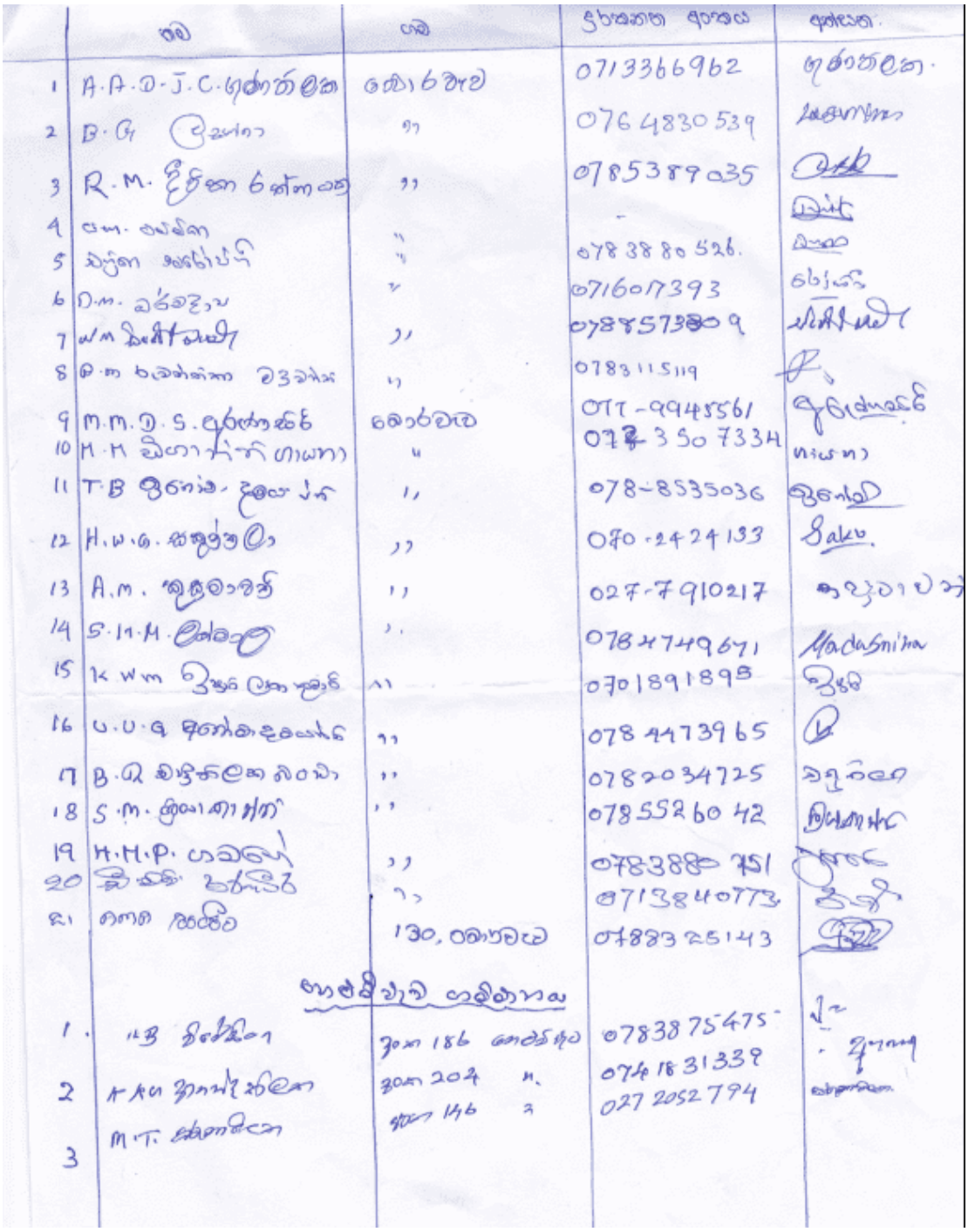


Figure 6: Attendance sheet of community mapping



කලාපය කොට්ඨාසය ඒකකය

අ.අං	ගොවි මහතාගේ නම	ලිපිනය	දුරකථන අංකය		නිෂ්පාදනය ආරම්භ කල දිනය	අත්සන
1	[illegible]	239/1 [illegible]				[illegible]
2	[illegible]	233 [illegible]				[illegible]
3	K. P [illegible]	244				[illegible]
4	K. M. [illegible]	239				[illegible]
5	[illegible]	238				[illegible]
6	[illegible]	236				[illegible]
7	K. P [illegible]	237				[illegible]
8						
9		[illegible] BM area				
10	[illegible]	[illegible]	0783806033			[illegible]
11	[illegible]	[illegible]	0775575810			[illegible]
12	[illegible]	[illegible] 350 [illegible]	078-654211			[illegible]
13	M.G [illegible]	357, [illegible]	0783197082			[illegible]
14	A. P. G. C [illegible]	[illegible] 165 [illegible]	0775482031			[illegible]
15						
16						
17						
18						



- Existing environmental issues

Some farmers were raised their existing issues related to the agricultural activities during the public consultation such as crop losses due to wild animals and onsite waste management issues. It was highlighted that most of the damages are caused by wild elephants, monkeys, toque macaques, and peacock. Use of chemicals including fertilisers is highly applicable during the chilli cultivations and leftovers are dumped on the same land and it causes environmental contamination. Water contamination of leftovers (empty chemical bottles, polyethene, pipes) considered as the main issues. Further, existing crops have an unknown disease and it was confirmed during the onsite visit conducted at the farmlands. This was highlighted as discouraging point of the existing farmers.

Figure 7: Existing Condition of the Selected Land at Borawewa

Figure 8: Existing condition of the selected land at Rathmalthenna

Figure 9: Existing Condition of the selected land at Bogaswewa

8. ENVIRONMENTAL EFFECTS AND MITIGATION MEASURES

8A. SCREENING FOR POTENTIAL ENVIRONMENTAL IMPACTS

Table 14: Checklist for screening for possible environmental impact

№	Screening question	Yes	No	Significance of the effect (Low, moderate, high)	Remarks
1	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-moderate	Existing land preparation and flood irrigation system will be changed. Land preparation techniques will focus on reducing the effects of flood irrigation. Land clearance will be there for the renovation of access roads and separate EMP is attached to minimise the impact. No significant disturbances for any existing land use, or water bodies and no negative impact causes are anticipated
2	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?	√		Moderate	Pesticides, weedicides, fertilisers and some additional chemicals will be used and there is a possibility to have chronic impacts due to the long-term usage. However, proposed techniques will reduce the amount of chemicals and fertilisers use and modern techniques/methods will be introduced to increase the productivity by other means. In terms of public infrastructure development, handling, storage, transportation and use of substances which will be harmful for human health such as cement
3	Will the Project produce solid wastes during construction or operation?	√		Moderate	During the operation solid organic waste will be produced as crop residuals. Crop residual will be used for the compost production unit. However, development of infrastructure will create solid waste during clearing and grubbing, construction, etc which need to handle with care, but quantum would be small
4	Will the Project release pollutants or any hazardous, toxic or noxious substances to air?	√		Moderate	Pesticides, weedicides will be used and released to the air. Possibility to have significant impacts to other flora and fauna. Further, infrastructure development activities will also create emission of dust during clearing and grubbing, construction, etc which need to be mitigated by good engineering practices. However, since small scale infrastructure development, no significant pollution is expected during construction
5	Will the Project cause noise and vibration or release of light, heat energy or electromagnetic radiation?	√		Low	Land preparation, transportation and Construction of collecting centre may create noise and vibration impacts and it can be mitigated through proper implementation of EMP. Similar noise and vibration will create during proposed infrastructure development which will also be mitigated by adhering to EMP
6	Will the Project lead to risks of contamination of land or water from releases of pollutants onto the ground	√		Moderate	All chemicals used to include pesticides and weedicides during cultivation may contaminate land or water. In addition, pollutants during infrastructure

№	Screening question	Yes	No	Significance of the effect (Low, moderate, high)	Remarks
	or into surface waters, groundwater or coastal wasters?				development will have an impact on surface and ground water in surrounding areas if not properly managed
7	Will the project cause localised flooding and poor drainage during construction? Is the project area located in a flooding location?		√		Flooding locations were not identified during the visit and the project will not cause localised flooding
8	Will there be any risks and vulnerabilities to public safety due to physical hazards during construction or operation of the Project?	√		Low	No medium and large scale infrastructure development envisaged and hence, no severe health and safety hazard identified. Better hazard identification and prevention and corrective measures during construction will eliminate the risk associate. Snake bike bites and exposure to chemicals are possible hazards during agriculture activities.
9	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?	√		Low	Chilli transportation from cultivated lands to post harvesting storages and transportation from post harvesting storages to shipments/or any other location will be taken place. No creation of significant environmental problems. However, improvements to existing road network will create some form of traffic during construction which can be reduced or prevented by adhering to proper traffic management plan during construction
10	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 recreational or other facilities will be disturbed
11	Are there any areas or features of high landscape or scenic value on or around the location which could be affected by the project?		√		• There are no areas or features with high landscape or scenic value on or around the location.
12	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?		√		• Important or sensitive areas were not found except reservoir canals and will not be affected.
13	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?		√		

№	Screening question	Yes	No	Significance of the effect (Low, moderate, high)	Remarks
14	Is the project located in a previously undeveloped area where there will be loss of green field land		√		• No new lands will be used for cultivation and only existing Chilli farmers will be engaged. Infrastructure development will not be undertaken newly and only improvements to the existing structures will be undertaken.
15	Will the project cause the removal of trees in the locality?	√		Moderate - High	• Removal of trees will be required in all places selected for cultivation in different scales. However, Nelumwewa land observed to be required to remove significant number of valuable trees during land preparation compared to other lands.
16	Are there any areas or features of historic or cultural importance on or around the location which could be affected by the project?		√		• No features of historic importance have been identified within the study area
17	Are there existing land uses on 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?	√		Low - Moderate	• Existing land use of all the lands selected area agriculture lands belongs to Mahaweli Authority of which Borawewa and some others have cultivated some seasonal crops such as maize by business people. However, Nelumwewa land seems to be not used for any cultivation in the recent past. Hence, the land use will be changed.
18	Are there any areas on or around the location which are densely populated or built up, which could be affected by the project?		√		• Densely populated or built up areas will not be affected by the project.
19	Are there any areas on or around the location which are occupied by sensitive land uses e.g. hospitals, schools, places of worship, community facilities, which could be affected by the project		√		
20	Are there any areas on 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?		√		• Existing agricultural practices will be improved by the subproject activities and no negative impacts are anticipated.
21	Are there any areas on or around the location which are already subject to pollution or environmental damage e.g. where existing legal environmental standards are exceeded, which could be affected by the project?		√		• There are no areas around the location where legal environmental standards have been exceeded or has been environmentally polluted.

Table 15: Contractor's responsibility for mitigating adverse environmental issues raised during agricultural activities

№	Potential environmental impacts and risk level	Key project activities causing the impact	Mitigation measures proposed and action to be implemented by the contractor
1	Public complaints and lack of community support for the project implementation	Information Disclosure among Stakeholders Community Outreach activities including training Institutional development based on farmer organisations	• Strengthen institutional development component and proper awareness and community leadership • Discussions should be conducted with the beneficiary farmers including women, and youth • The beneficiary farmers selection based on the criteria which were developed at stakeholders meeting and identifying of beneficiary farmers were undertaken transparently • Residents in the area will be briefed of the project, purpose and design and outcomes with comprehensive discussion • Communication and training activities focusing women, youth and farmers who are poor in communication • The contractor should take note of all impacts, especially temporary issues and safety hazards that will be of concern to the cropping pattern of the farmers. All possible impacts will be mitigated as stipulated in the EMP to mitigate them • The contractor will maintain a log of any grievances/complains and actions taken to resolve them • A copy of the EMP should be available at all times at the project supervision office on site
2	Lack of knowledge on basic harvest and postharvest practices lead to low quality of product and high amount of waste	Use of harvesting crates Mechanical scarring and bruising quality defects Drying of chillies using driers Sorting and packaging of chillies Storing the harvested product before delivery to the packing facility	• Maintain good hygiene and good housekeeping • Practical training for the selected farmers on basic harvest and postharvest practices to protect the quality of the product and to assure the packing facility receives only clean and viable product • Use of Discarded poor-quality ones and other waste organic materials in the field to leave as organic fertiliser or use for compost production • Avoiding mechanical scarring and bruising quality defects • Provide packaging materials and storage facilities • Establishment of temporary packing facilities
3	Removal of trees	Clearing of lands	1. The farmer shall make every effort to avoid removal and/or destruction of trees, including those of religious, cultural and aesthetic significance. 2. If such action is unavoidable, the Engineer shall be informed in advance to verify and report on the technical justification for the trees that will be required to be removed. • The following steps are to be followed if trees are identified for removal during the renovation • Identify and document the number of trees that will be affected with girth size & species type • Trees shall be removed from the construction sites before commencement of construction with prior permission from the concerned department (LA)

№	Potential environmental impacts and risk level	Key project activities causing the impact	Mitigation measures proposed and action to be implemented by the contractor
			• Compensatory plantation by way of Re-plantation of at least twice the number of trees cut should be carried out in the project area • The contractor shall adhere to the guidelines and recommendations made by the CEA, if any with regard to felling of trees and removal of vegetation • Removed trees of economic value must be handed over to the State Timber Corporation
4	Activities related to installation of drip irrigation systems	Installation of drip irrigation systems Fixing water pumps and electricity supply Plumbing works	• Carry out installation works during off cultivation seasons • Solid waste generation during installation should be minimised and disposed generated waste with care • Potential damages to pipe system should be minimised by burying or covering the pipe distribution
5	Exposing and damaging of physical cultural resources (PCR)	Site preparatory work	• Upon discovery of physical cultural material during project implementation work, the following should be carried out: • Immediately stop construction activities • With the approval of the resident engineer delineate the discovered site area • Secure the site to prevent any damage or loss of removable objects. In case of removable antiquities or sensitive remains, a night guard should be present until the responsible authority takes over • Through the Resident Engineer, notify the responsible authorities, the Department of Archaeology and local authorities within 24 hours • Submit a brief chance find report, within a specified time period, with date and time of discovery, location of discovery, description of finding, estimated weight and dimension of PCR and temporary protection implemented • Responsible authorities would be in charge of protecting and preserving the site before deciding on the proper procedures to be carried out • An evaluation of the finding will be performed by the Department of Archaeology who may decide to either remove the PCR deemed to be of significance, further excavate within a specified distance of the discovery point and conserve onsite, and/or extend/reduce the areas demarcated by the contractor etc. This should ideally take place within about 7 days • Construction work could resume only when permission is given from the Department of Archaeology after the decision concerning the safeguard of the heritage is fully executed
6	Spreading of Invasive Alien Species	Vegetation clearing Planting of chilli	• Provide DoA certified chilli seed variety only to farmers for nurseries • Good housekeeping • Manual and integrated weed control • Prevent weed spreading via organic manure (Compost) by periodic inspection and manual removal after application

№	Potential environmental impacts and risk level	Key project activities causing the impact	Mitigation measures proposed and action to be implemented by the contractor
7	Contamination of water, land and air during usage of chemicals (pesticides, weedicides.)	Land preparation Vegetation clearing Use of fertilisers Use of chemicals for specific requirements Soil erosion	• Adherence to IPM standards of the WB, IPM action plan of ASMP and standards • Introduce technological methods to reduce dosage amounts • Awareness on usage time, handling and storage • Guidance on suitable time for the usage of chemicals • Promote organic fertilisers • Formulation of fertiliser regimes based on complete soil tests and foliar analysis • Introduction of proper drainage system including catch-pits and silt-traps to avoid silt and other particles been carried by the drainage water out of the site
8	Impaired water quality	Cultivation of chilli	• Excess water extraction is to be cut down to preserve ground water table • Proper introduction of drip irrigation practices instead of flood irrigation to preserve water and use of modern techniques as discussed in the CDP for reduce water consumption
9	Solid Waste Disposal	Discarding poor quality organic materials in the field Waste from weed control activities Polythene from Poly mulches Plastics from Drip irrigation left-overs	• Burnt to maintain the farmlands' hygienic condition • Use postharvest waste for compost production • Implement waste minimisation as proposed in pilot activity for reducing waste generation, and providing income generation and empowerment • Plastic and Polythene should be collected, segregated and disposed via approved agents at approved locations preferably thorugh LAs
10	Spread of crop related diseases among other flora species	Throughout the cultivation period	• Use of drone technology to conduct disease surveys using infra-red photography • Provide technical guidance on application of chemicals including dosage, suitable time and frequency • Use of chemicals using drone technology • Pest and disease control based on IPM practices and modern spray techniques • Pest population and pest damage surveys to assess pest threshold status for application of pesticides
11	Spreading COVID 19 virus	All activities	• The Farmers must ensure that all workers are well trained on COVID 19 safety precautions published by health ministry • Make required precautionary measures at the site level to take care of Covid-19 infected person
12	Health hazard	Use of agrochemicals (fertilisers, pesticides, weedicides etc.) Snake Bite Exposure to Chemicals	• Carry out proper hazardous identification and risk assessment of all proposed activities • Training and awareness on safe chemical handling • Use drone technology to spray chemicals • Availability of First-aid kits • Training on first-aid and carry out mocks • Implement proper health and safety protocols by elimination, substitution, engineering controls, administrative control and provide Personal Protective Equipment (PPE). Provide necessary PPE (*basics should include gloves, googles, masks and protective clothing*)

№	Potential environmental impacts and risk level	Key project activities causing the impact	Mitigation measures proposed and action to be implemented by the contractor
			• A safety inspection checklist should be prepared taking into consideration what the workers are supposed to be wearing and monitored • Pest and disease control according to the international standard including IPM frame work of the world bank and pest management action plan prepared by ASMP • Formulation of fertiliser regimes based on complete soil tests and foliar analysis • Pest population and pest damage surveys to assess pest threshold status for application of pesticides

Table 16: Environmental management plan for agro well construction activities which should be included in the tender documents

№	Potential environmental impacts and risk level	Key project activities causing the impact	Mitigation measures proposed and action to be implemented by the contractor

1	Public complaints and lack of community support for the project implementation	• Information Disclosure among Stakeholders	• Obtain yield test from WRB and make it available at the site
			• Discussions should be conducted with the users.
			• Residents in the area have to be briefed of the project, purpose and design and outcomes via a documented community consultation session ***-This should be done immediately once the contractor is mobilised.***
			  • The contractor should take note of all impacts, especially access issues and safety hazards that will be of concern to the residents and take necessary measures as stipulated in the EMP to mitigate them.
			  • The contractor will maintain a log of any grievances/complains and actions taken to resolve them.
			  • A copy of the EMP should be available at all times at the project supervision office on site

2	Exposing and damaging of physical cultural resources	• Site preparatory work • Excavations	Upon discovery of physical cultural material during project implementation work, the following should be carried out; • Immediately stop construction activities. • With the approval of the resident engineer delineate the discovered site area. • Secure the site to prevent any damage or loss of removable objects. In case of removable antiquities or sensitive remains, a night guard should be present until the responsible authority takes over. • Through the Resident Engineer, notify the responsible authorities, the Department of Archaeology and local authorities within 24 hours. • Submit a brief chance find report, within a specified time period, with date and time of discovery, location of discovery, description of finding, estimated weight and dimension of PCR and temporary protection implemented. • Responsible authorities would be in charge of protecting and preserving the site before deciding on the proper procedures to be carried out.

№	Potential environmental impacts and risk level	Key project activities causing the impact	Mitigation measures proposed and action to be implemented by the contractor
			• An evaluation of the finding will be performed by the Department of Archaeology who may decide to either remove the PCR deemed to be of significance, further excavate within a specified distance of the discovery point and conserve on site, and/or extend/reduce the areas demarcated by the contractor etc. This should ideally take place within about 7 days. • Construction work could resume only when permission is given from the Department of Archaeology after the decision concerning the safeguard of the heritage is fully executed.
3	Air Pollution including dust generation that can affect nearby vegetation and households	• Excavation • Excavated material stockpiles • Transport of construction material and storage on site •	• In the **construction method statement**, the contractor should clearly designate areas for maintaining material stockpiles, waste stockpiles, etc. These dust emitting sources should be located away from human activity and natural drainage paths as much as possible • All heavy equipment and machinery shall be fitted in full compliance with the national and local regulations • Stockpiled shall be covered properly, particularly in windy conditions • The site should be wetted at least 2/3 times a day during dry weather to keep dust levels low • Vehicles transporting soil, sand and other construction materials shall be covered. Limitations to speeds of such vehicles necessary. Transport through densely populated area should be avoided • Regular and proper maintenance of construction vehicles and machinery to avoid air emissions • There should be no burning of wastes on site • Until removal to arranged disposal sites, waste from demolition shall be held stockpiled in a place with minimal interference with local drainage paths and obstruction to traffic, local residents
4	High Noise & Vibration levels that can affect nearby structures, wildlife and human settlements	• Excavations • Transport of construction material and storage on site	• Working time for noise/vibration generation activities should be restricted and carried out only from 6.00 am to 6.00 pm • All equipment and machinery should be operated of noise not to exceed 75 dB (during construction) as practical as possible. Regularly maintenance of all construction vehicles and machinery to meet noise control regulations stipulated by the CEA in 1996 (Gazette Extra Ordinary, No 924/12). If the construction activities happen during the night time, it is necessary to maintain the noise level at below 50 dB • Use of mechanically driven saw blades for tree felling will make the noise levels restrict to only a short period of time • Construction equipment and machinery should be maintained in good condition. The contractor will submit the list of high noise/vibration generating **machinery and equipment** to the project engineer (PE) for approval
5	Blocking of surface drainage paths leading to localised flooding and ponding of water	• Site preparation • Exacavation • Stockpiles	• Until transported out to arranged disposal sites, debris and waste from site preparation work and desilting shall be stockpiled in a place with minimal interference with local drainage paths and obstruction to traffic and local residents. The contractor shall identify areas for stockpiling material and waste. • The stockpiles should be suitably covered to minimise wash-offs to nearby waterways. • If impacts to surface drainage cannot be avoided leading to ponding of rain water and

№	Potential environmental impacts and risk level	Key project activities causing the impact	Mitigation measures proposed and action to be implemented by the contractor
			inconvenience to people, the contractor must provide an adequate surface drainage system to safely remove water from the site to canal to avoid on site ponding or flooding. • Proper planning to avoid construction during rainy season. • Preventing total blockage of streams/ providing alternative drainage path during construction
6	Soil erosion, sedimentation of nearby waterbodies and low lying areas	• Site preparation • Excavation • Stockpiles	• Soil stockpiles and other construction material should not be placed within the bed or banks of the tanks or canal. • Installing and maintaining permanent erosion and sediment control measures such as silt traps to avoid sediment runoff into tank and nearby waterways
7	Damage to wildlife Specially impacts to elephants roaming in the area	• Vegetation clearing • Exacation • Machinery movements	Department of Wildlife and Forest Department consents and recommendations should be obtained and incorporated construction before start work. • Excavated areas should be properly fenced or covered to avoid falling elephants and other wild animals • Speed limits and operating times for the construction vehicles should be imposed. • Due consideration should be given to carefully clearing of vegetation avoiding destruction of habitats of fauna. • The desilted matter shall immediately be disposed of to pre-decided disposal sites. • The contractor will take reasonable precaution to prevent workmen or any other persons from removing and damaging any flora (plant/vegetation) and fauna (animal) including fishing in any water body and hunting of any animal. • If any wild animal is found near the construction site at any point of time, the contractor will immediately upon discovery thereof acquaint the Engineer and carry out the Engineer's instructions for dealing with the same. • The Engineer will report to the nearby Forest Department /Department of Wild Life Conservation (range office or divisional office) and will take appropriate steps/ measures, if required in consultation with the forest officials. • It is recommended to do the project work day time only. • The contractor should ensure elephant access to water is not blocked during activities.
8	Impaired water quality	• Site Preparation • Excavation • Excavated material stockpiles	• Avoid stockpiling of earth fill especially during the monsoon season unless covered by tarpaulins or plastic sheets • Prioritize reuse of excess spoils and materials in the construction works • Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies; • Place storage areas for fuels and lubricants away from any drainage leading to water bodies; • Dispose any wastes generated by construction activities in designated sites • Irrigation works must be planned to be carried out during times of lowest flow

№	Potential environmental impacts and risk level	Key project activities causing the impact	Mitigation measures proposed and action to be implemented by the contractor
9	Solid Waste Disposal	• Site clearing • Exacation	• The contractor shall make a list of all types of waste resulting from the construction activity, and obtain direction from the LA on possible disposal sites for each waste type including excavated soil (unsuitable) • Any hazardous type of waste shall be dealt with special care and instructions from the LA. • The contractor shall document all types and quantities of waste generated and removed from the site and the disposal locations. • The contractor shall remove waste from the site each day and dispose of the waste in the LA approved site/s
10	Public/occupational safety hazard	• Site clearing, storage of equipment, material etc • Noise and vibration of construction machinery • Exacation	**Training** • The contractor must ensure that all workers, including managers are trained on occupational health and public safety risks and mitigation measures for the site, prior to commencement of construction. **Personal Protective Equipment** • All workers will be provided with necessary PPEs (basic should include safety helmet, protective footwear and high visibility jackets). • Gloves, ear muffs, goggles, dust masks, safety harness and any other equipment considered necessary should be maintained in stock at the site office. • A safety inspection checklist should be prepared taking into consideration what the workers are supposed to be wearing and monitored. **Site Delineation and Warning Signs** • The entire construction site should be delineated using devices such as cones, lights, tubular markers, orange and white strips and barricades to inform oncoming vehicular traffic and pedestrians in the area about work zones. • Dangerous warning signs should be raised to inform public of particular dangers and to keep the public away from such hazards. • Overloading of vehicles with materials should be controlled • Construction wastes should be removed as much as possible within 24 hours from the site to ensure public safety. • The safety inspection checklist must look to see that the delineation devices are used, whether they are appropriately positioned, if they are easily identifiable and whether they are reflective. **Equipment safety** • Work zone workers use tools, equipment and machinery that could be dangerous if used incorrectly or if the equipment malfunctions. Inspections must be carried out to test the equipment before it is used, so that worker safety can be secured. Inspections should look for evidence of wear and tear, frays, missing parts and mechanical or electrical problems.

№	Potential environmental impacts and risk level	Key project activities causing the impact	Mitigation measures proposed and action to be implemented by the contractor
			Emergency Procedures • An emergency aid service must be in place in the work site. • During health and safety training, site staff should be properly briefed as to what to do in the event of an emergency, such as who to notify and where to assemble in an emergency. This information must be conveyed to employees by the site manager on the first occasion a worker visits the site. **Information management** • Develop and establish contractor's own procedure for receiving, documenting and addressing complaints from the affected public and nearby communities. • Provide advance notice to local communities by way of information boards or leaflet, during village committees about the schedule of construction activities, interruption to services and access etc.
11	Spreading COVID 19 virus	• All activities	• take all necessary precautions to maintain the health and safety of all Staffs including labourers • The contractor must ensure that all workers, including managers, are well trained on COVID 19 safety precautions published by the health ministry. • appoint a health and safety officer at site, who will have the authority to issue directives for the purpose of maintaining the health and safety of all personnel authorized to enter and or work on the site and to take protective measures to prevent accidents • ensure suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics • Follow all necessary guidance stipulated under Interim Guidance on COVID-19 Version 1- April 2020 (see Annex 6)
	Post construction phase		
12	Clearing/ closure of construction site		• Contractor to prepare site restoration plans for approval by the engineer. The plan is to be implemented by the contractor prior to demobilization. This includes burrow sites and storage yards as well • On completion of the works, all temporary structures will be cleared away, all rubbish cleared, excreta or other disposal pits or trenches filled in and effectively sealed off and the site left clean and tidy, at the contractor's expenses, to the entire satisfaction of the engineer
13	Environmental enhancement/ Landscaping		• Landscape plantation, including turfing shall be taken up as per either detailed design or typical design guidelines given as part of the bid documents • The contactor also shall remove all debris, piles of unwanted earth, spoil material, away from the site and disposed at locations designated or acceptable to the Engineer or as per the stipulated waste management criteria of this EMP

Table 17: Environmental management plan for improvements of rural roads which should be included in the tender documents

	Potential Environmental Impacts and Risk Level	Key project activities causing the impact	Mitigation Measures proposed and action to be implemented by the Contractor
1	Public complaints and lack of community support for the project implementation	Information Disclosure among Stakeholders	1. Discussions should be conducted with the project affected persons. 2. Residents in the area have to be briefed of the project, purpose and design and outcomes via a documented community consultation session ***-This should be done immediately once the contractor is mobilized.*** 3. The contractor should take note of all impacts, especially access issues and safety hazards that will be of concern to the residents and take necessary measures as stipulated in the EMP to mitigate them. 4. The contractor will maintain a log of any grievances/complains and actions taken to resolve them. 5. A copy of the EMP should be available at all times at the project supervision office on site.
2	Exposing and damaging of physical cultural resources	▪ Site preparatory work	Upon discovery of physical cultural material during project implementation work, the following should be carried out; 1. Immediately stop construction activities. 2. With the approval of the resident engineer delineate the discovered site area. 3. Secure the site to prevent any damage or loss of removable objects. In case of removable antiquities or sensitive remains, a night guard should be present until the responsible authority takes over. 4. Through the Resident Engineer, notify the responsible authorities, the Department of Archaeology and local authorities within 24 hours. 5. Submit a brief chance find report, within a specified time period, with date and time of discovery, location of discovery, description of finding, estimated weight and dimension of PCR and temporary protection implemented. 6. Responsible authorities would be in charge of protecting and preserving the site before deciding on the proper procedures to be carried out. 7. An evaluation of the finding will be performed by the Department of Archaeology who may decide to either remove the PCR deemed to be of significance, further excavate within a specified distance of the discovery point and conserve on site, and/or extend/reduce the areas demarcated by the contractor etc. This should ideally take place within about 7 days. 8. Construction work could resume only when permission is given from the Department of Archaeology after the decision concerning the safeguard of the heritage is fully executed.
3	Over extraction of natural resources	▪ Material Sourcing	1. The contractor is required to ensure that sand, aggregates and other quarry material is sourced from licensed sources. The contractor is required to maintain the necessary licenses and environmental clearances for all burrow

	Potential Environmental Impacts and Risk Level	Key project activities causing the impact	Mitigation Measures proposed and action to be implemented by the Contractor
			and quarry material they are sourcing including soil, fine aggregate and coarse aggregate. 2. Sourcing of any material from protected areas and/or designated natural areas, including tank beds, are strictly prohibited. 3. If the contractor uses a non-commercial burrow/quarry sites, the sites should be remediated accordingly once material sourcing has been completed. 4. The contractor should submit in writing all the relevant numbers and relevant details of all pre-requisite licenses etc. and report of their status accordingly.
4	Impact on habitats of fauna and flora	▪ Vehicle and machinery movements ▪ Site preparation including tree removal (if any)	3. The contractor shall make every effort to avoid removal and/or destruction of trees, including those of religious, cultural and aesthetic significance. 4. If such action is unavoidable, the Engineer shall be informed in advance to verify and report on the technical justification for the trees that will be required to be removed. • The following steps are to be followed if trees are identified for removal during the renovation. • Identify and document the number of trees that will be affected with girth size and species type. • Trees shall be removed from the construction sites before commencement of construction with prior permission from the concerned department (LA). • Compensatory plantation by way of Re-plantation of at least twice the number of trees cut should be carried out in the project area. • The contractor shall adhere to the guidelines and recommendations made by the Central Environmental Authority (CEA), if any with regard to felling of trees and removal of vegetation. • Removed trees of economic value must be handed over to the State Timber Corporation.
5	Air Pollution including dust generation that can affect nearby vegetation	▪ Site Preparation activities, setting up of material storage yards and removal of vegetation ▪ Transport of construction material and storage on site	1. In the construction method statement, the contractor should clearly designate areas for maintaining material stock piles, waste stock piles, labour camps and vehicle maintenance yards. These dust emitting sources should be located away from human activity and natural drainage paths as much as possible. 2. Stock piles should be suitably covered to minimise washing off. 3. The site should be wetted at least 2/3 times a day during dry weather to keep dust levels low. 4. Transporting out debris to be carried out with minimal use of heavy transport vehicles and taking due care to avoid unwanted damages to existing structures.

	Potential Environmental Impacts and Risk Level	Key project activities causing the impact	Mitigation Measures proposed and action to be implemented by the Contractor
			5. Until removal to arranged disposal sites, waste shall be held stockpiled in a place with minimal interference with local drainage paths and obstruction to local traffic, local residents. 6. There should be no burning of wastes on site.
6	Noise Pollution & Vibration that can affect nearby structures and settlements	▪ Operation of construction equipment and machinery. ▪ Material storage and transport.	1. Working time for noise/vibration generation activities should be restricted and carried out only from 6.00 am to 6.00 pm. 2. All equipment and machinery should be operated of noise not to exceed 75 dB (during construction) as practical as possible. Regularly maintenance of all construction vehicles and machinery to meet noise control regulations stipulated by the CEA in 1996 (Gazette Extra Ordinary, No 924/12). 3. If the construction activities happen during the night time, it is necessary to maintain the noise level at below 50 dB. 4. Use of mechanically driven saw blades for tree felling will make the noise levels restrict to only a short period of time. 5. Construction equipment and machinery should be maintained in good condition. Contractor shall submit the list of high noise/vibration generating machinery & equipment to the PMU for approval. 6. Material procurement should be carried out only from places where environmental clearance or environmental protection license is obtained.
7	Traffic Congestion and public inconvenience	▪ Increased construction vehicle traffic causing congestion on Access Roads and impact on the transport.	1. Speed limits and operating times for the construction vehicles should be imposed. 2. Travel route for construction vehicles should be designed to avoid areas of congestion. 3. All roads and access sites must be restored to their original state as soon as possible 4. If project works occur after dark, a lighting system should be maintained such that vehicles and pedestrians can clearly see the construction area. 5. Public should informed properly on the inconvenience made during construction. 6. During construction, proper safety measures and barricade systems should be introduced for traffic management.
8	Blocking of surface drainage paths leading to localised flooding and ponding of water Siltation of adjacent canals/drains	▪ Site Preparation including provision of access roads, material/waste piles ▪ Embankment construction	1. Until transported out to arranged disposal sites, debris and waste from site preparation work shall be stockpiled in a place with minimal interference with local drainage paths and obstruction to traffic and local residents. The contractor shall identify areas for stockpiling material and waste. 2. The stockpiles should be suitably covered to minimise wash-offs to nearby waterways/ drains.

	Potential Environmental Impacts and Risk Level	Key project activities causing the impact	Mitigation Measures proposed and action to be implemented by the Contractor
			3. If impacts to surface drainage cannot be avoided leading to ponding of rain water and inconvenience to people, the contractor must provide an adequate surface drainage system to safely remove water from the site to roadside drains to avoid on site ponding or flooding. 4. Preventive measures such as sil-traps for siltation of adjoining canal should be taken 5. Regular cleaning of canals and drains should be done
9	Solid Waste Disposal	▪ Site clearing ▪ Waste generated for labour camps ▪ Construction debris	1. The contractor shall make a list of all types of waste resulting from the construction activity, and obtain direction from the LA on possible disposal sites for each waste type. 2. Any hazardous type of waste shall be dealt with special care and instructions from the LA. 3. The contractor shall document all types and quantities of waste generated and removed from the site and the disposal locations. 4. The contractor shall remove waste from the site each day and dispose of the waste in the LA approved site/s.
10	Public/occupational safety hazard	▪ Site clearing, storage of equipment, material etc ▪ Increased traffic of heavy vehicles for material transportation ▪ Noise and vibration of construction machinery	**Training** 1. The contractor must ensure that all workers, including managers are trained on occupational health and public safety risks and mitigation measures for the site, prior to commencement of construction. **Personal Protective Equipment** 2. All workers will be provided with necessary PPEs (basic should include safety helmet, protective footwear and high visibility jackets). 3. In addition, the contractor shall maintained in stock at the site office, gloves, ear muffs, goggles, dust masks, safety harness and any other equipment considered necessary. 4. A safety inspection checklist should be prepared taking into consideration what the workers are supposed to be wearing and monitored. **Site Delineation and Warning Signs** 5. The entire construction site should be delineated using devices such as cones, lights, tubular markers, orange and white strips and barricades to inform oncoming vehicular traffic and pedestrians in the area about work zones. 6. Dangerous warning signs should be raised to inform public of particular dangers and to keep the public away from such hazards.

	Potential Environmental Impacts and Risk Level	Key project activities causing the impact	Mitigation Measures proposed and action to be implemented by the Contractor
			7. Overloading of vehicles with materials should be controlled 8. Construction wastes should be removed as much as possible within 24 hours from the site to ensure public safety. 9. The safety inspection checklist must look to see that the delineation devices are used, whether they are appropriately positioned, if they are easily identifiable and whether they are reflective. **Equipment safety** **10.** Work zone workers use tools, equipment and machinery that could be dangerous if used incorrectly or if the equipment malfunctions. Inspections must be carried out to test the equipment before it is used, so that worker safety can be secured. Inspections should look for evidence of wear and tear, frays, missing parts and mechanical or electrical problems. **Emergency Procedures** 11. An emergency aid service must be in place in the work site. 12. During health and safety training, site staff should be properly briefed as to what to do in the event of an emergency, such as who to notify and where to assemble in an emergency. This information must be conveyed to employees by the site manager on the first occasion a worker visits the site. **Construction camps** 13. Construction camps should have adequate sanitation facilities for construction workers to control transmission of infectious diseases. 14. Avoid housing workers in camps and provide socio-economic benefits locally by employing local people. If there is no alternative to employing workers from elsewhere, locate accommodation camps away from communities on land acquired from willing sellers. Provide labour camps with adequate sanitation, waste disposal and health facilities according to labour laws. Clear work camp sites after use and reinstate vegetation. Conduct programs to raise worker awareness of HIV/AIDS. **Information management** 15. Develop and establish contractor's own procedure for receiving, documenting and addressing complaints from the affected public and nearby communities.

	Potential Environmental Impacts and Risk Level	Key project activities causing the impact	Mitigation Measures proposed and action to be implemented by the Contractor
			16. Provide advance notice to local communities by way of information boards or leaflet about the schedule of construction activities, interruption to services and access etc.
11	Access restrictions and public inconvenience	▪ Site Preparation activities ▪ Vehicle and machinery movements	1. Prior consultation and consent should be taken from relevant authorities and should conduct work with a minimum disturbance to public. 2. Provision of access during designated times of day or where possible provides temporary access paths for users/ staff within the premises. 3. Make alternative routes for users and made them aware
12	Spreading COVID 19 virus	▪ All activities	• take all necessary precautions to maintain the health and safety of all Staffs including labourers • The contractor must ensure that all workers, including managers, are well trained on COVID 19 safety precautions published by the health ministry. • appoint a health and safety officer at site, who will have the authority to issue directives for the purpose of maintaining the health and safety of all personnel authorized to enter and or work on the site and to take protective measures to prevent accidents • ensure suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics • Follow all necessary guidance stipulated under Interim Guidance on COVID-19 Version 1- April 2020 (see Annex 6)
	Post construction phase		
13	Clearing/closure of construction site/labour camps		1. Contractor to prepare site restoration plans for approval by the engineer. The plan is to be implemented by the contractor prior to demobilization. This includes burrow sites and storage yards as well. 2. On completion of the works, all temporary structures will be cleared away, all rubbish cleared, excreta or other disposal pits or trenches filled in and effectively sealed off and the site left clean and tidy, at the contractor's expenses, to the entire satisfaction of the engineer.
14	Environmental enhancement/ landscaping		1. Landscape plantation, including turfing shall be taken up as per either detailed design or typical design guidelines given as part of the Bid Documents. 2. The contactor also shall remove all debris, piles of unwanted earth, spoil material, away from the site and disposed at locations designated or acceptable to the Engineer or as per the stipulated waste management criteria of this EMP.

Table 18: Environmental management plan for establishment of elephant fence which should be included in the tender documents

№	Potential Environmental Impacts and Risk Level	Key project activities causing the impact	Mitigation Measures proposed and action to be implemented by the Contractor
1	Public/occupational safety hazard	▪ Installation of elephant fence	**Training** 1. The contractor must ensure that all workers, including managers are trained on occupational health and public safety risks and mitigation measures for the site, prior to commencement of construction. **Personal Protective Equipment** 2. All workers will be provided with necessary PPEs (basic should include safety helmet, protective footwear and high visibility jackets). 3. In addition, the contractor shall maintained in stock at the site office, gloves, ear muffs, goggles, dust masks, safety harness and any other equipment considered necessary. 4. A safety inspection checklist should be prepared taking into consideration what the workers are supposed to be wearing and monitored. **Site Delineation and Warning Signs** 5. Precautions for electrocution 6. Dangerous warning signs should be raised to inform public of particular dangers and to keep the public away from such hazards. 7. Overloading of vehicles with materials should be controlled 8. Construction wastes should be removed as much as possible within 24 hours from the site to ensure public safety. 9. The safety inspection checklist must look to see that the delineation devices are used, whether they are appropriately positioned, if they are easily identifiable and whether they are reflective. **Equipment safety** 10. Work zone workers use tools, equipment and machinery that could be dangerous if used incorrectly or if the equipment malfunctions. Inspections must be carried out to test the equipment before it is used, so that worker safety can be secured. Inspections should look for evidence of wear and tear, frays, missing parts and mechanical or electrical problems. **Emergency Procedures** 11. An emergency aid service must be in place in the work site. 12. During health and safety training, site staff should be properly briefed as to what to do in the event of an emergency, such as who to notify and where

№	Potential Environmental Impacts and Risk Level	Key project activities causing the impact	Mitigation Measures proposed and action to be implemented by the Contractor
			to assemble in an emergency. This information must be conveyed to employees by the site manager on the first occasion a worker visits the site. **Information management** 13. Develop and establish contractor's own procedure for receiving, documenting and addressing complaints from the affected public and nearby communities. 14. Provide advance notice to local communities by way of information boards or leaflet about the schedule of construction activities, interruption to services and access etc.
2	Access restrictions and public inconvenience	▪ Site Preparation activities ▪ Vehicle and machinery movements ▪ Noise, vibration, dust and waste piling	Prior consultation and consent should be taken from relevant authorities and should conduct work with a minimum disturbance to public.
	Post construction phase		
3	Routine Maintanance		• Routine clearance/maintenance of electrical fence corridor • Maintanance of energizing system (solar system)
4	Environmental Enhancement/ Landscaping		• Landscape plantation, including turfing shall be taken up as per either detailed design or typical design guidelines given as part of the Bid Documents. • The contactor also shall remove all debris, piles of unwanted earth, spoil material, away from the site and disposed at locations designated or acceptable to the Engineer or as per the stipulated waste management criteria of this EMP

Table 19: Environmental management plan for Construction of collection centre (with drying facilities)

SN	Potential Environmental Impacts and Risk Level	Key project activities causing the impact	Mitigation Measures proposed and action to be implemented by the Contractor
1	Public complaints and lack of community support for the project implementation	• Information Disclosure among Stakeholders • Community Outreach activities including training	• Discussions should be conducted with the beneficiary farmers including women, and youth • MASL Consent for the proposed construction should be obtained • Residents in the area will be briefed on the project, purpose and design, and outcomes with a comprehensive discussion • Communication and training activities focusing on women, youth, and farmers who are poor in communication • The contractor should take note of all impacts, especially temporary issues and safety hazards that will be of concern to the cropping pattern of the farmers. All possible impacts will be mitigated as stipulated in the EMP to mitigate them • The contractor will maintain a log of any grievances/complaints and actions taken to resolve them • A copy of the EMP should be available at all times at the project supervision office on site
2	Spreading COVID 19 virus	• All activities	• take all necessary precautions to maintain the health and safety of all Staffs including labourers • The contractor must ensure that all workers, including managers, are well trained on COVID 19 safety precautions published by the health ministry. • appoint a health and safety officer at site, who will have the authority to issue directives for the purpose of maintaining the health and safety of all personnel authorized to enter and or work on the site and to take protective measures to prevent accidents • ensure suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics • Follow all necessary guidance stipulated under Interim Guidance on COVID-19 Version 1- April 2020 (see Annex 6)
3	Exposing and damaging of physical cultural resources	• Site preparation work	Upon discovery of physical cultural material during project implementation work, the following should be carried out; 1. Immediately stop construction activities. 2. With the approval of the resident engineer delineate the discovered site area. 3. Secure the site to prevent any damage or loss of removable objects. In case of removable antiquities or sensitive remains, a night guard should be present until the responsible authority takes over. 4. Through the Resident Engineer, notify the responsible authorities, the Department of Archaeology and local authorities within 24 hours. 5. Submit a brief chance find report, within a specified time period, with date and time of

SN	Potential Environmental Impacts and Risk Level	Key project activities causing the impact	Mitigation Measures proposed and action to be implemented by the Contractor
			discovery, location of discovery, description of finding, estimated weight and dimension of PCR and temporary protection implemented. 6. Responsible authorities would be in charge of protecting and preserving the site before deciding on the proper procedures to be carried out. 7. An evaluation of the finding will be performed by the Department of Archaeology who may decide to either remove the PCR deemed to be of significance, further excavate within a specified distance of the discovery point and conserve on-site, and/or extend/reduce the areas demarcated by the contractor etc. This should ideally take place within about 7 days. 8. Construction work could resume only when permission is given from the Department of Archaeology after the decision concerning the safeguard of the heritage is fully executed.
4	Impact on Vegetation Cover (Tree Cover)	▪ Site preparation including tree removal ▪ Working Space	1. The contractor shall make every effort to avoid removal and/or destruction of trees, including those of religious, cultural and aesthetic significance. 2. If such action is unavoidable, the Engineer shall be informed in advance to verify and report on the technical justification for the trees that will be required to be removed. • The following steps are to be followed if trees are identified for removal during the renovation. • Identify and document the number of trees that will be affected with girth size & species type • Trees shall be removed from the construction sites before commencement of construction with prior permission from the concerned department (LA). • Compensatory plantation by way of Re-plantation of at least twice the number of trees cut should be carried out in the project area. • The contractor shall adhere to the guidelines and recommendations made by the Central Environmental Authority (CEA), if any with regard to felling of trees and removal of vegetation. • Removed trees of economic value must be handed over to the State Timber Corporation.
5	Water Quality of adjoining canals, streams and drains	• Spill out of fuels and lubricants from machinery	• Avoid stockpiling of earth fill especially during the monsoon season unless covered by tarpaulins or plastic sheets • Prioritize re-use of excess spoils and materials in the construction works. • Install temporary silt traps or sedimentation basins along the drainage leading to adjoining drains; • Place storage areas for fuels and lubricants away from any drainage leading to water bodies; • Dispose of any wastes generated by construction activities in designated sites.

SN	Potential Environmental Impacts and Risk Level	Key project activities causing the impact	Mitigation Measures proposed and action to be implemented by the Contractor
6	Spreading of Invasive Alien Species	• Vegetation clearing • Material transportation	• Close monitoring of transportation, storage of borrowing material for the spread of any invasive species must be done. • Borrow material to be brought from properly identified borrow pits and quarry sites, the sites should be inspected in order to ensure that no invasive plant species are being carried with the burrowing material. • Washing the vehicles should be conducted periodically to prevent carrying any invasive species • The construction site should be inspected periodically to ensure that no invasive species are establishing themselves at the site. • Good housekeeping
7	Noise Pollution & Vibration that can affect nearby structures	• Operation of equipment and machinery. • Material storage and transport	• Working time for noise/vibration generation activities should be restricted and carried out only from 6.00 am to 6.00 pm. • All equipment and machinery should be operated of noise not to exceed 75 dB (during construction) as practical as possible. Regularly maintenance of all construction vehicles and machinery to meet noise control regulations stipulated by the CEA in 1996 (Gazette Extra Ordinary, No 924/12). If the construction activities happen during the night-time, it is necessary to maintain the noise level at below 50 db. • Use of mechanically driven saw blades for tree felling will make the noise levels restricted to only a short period of time. • Construction equipment and machinery should be maintained in good condition. The contractor shall submit the list of high noise/vibration generating machinery & equipment to the PE for approval
8	Air Pollution including dust generation that can affect nearby vegetation and households	• Site Preparation activities setting up of material storage yards, and removal of vegetation • Transport of construction material and storage on site	• In the construction method statement, the contractor should clearly designate areas for maintaining material stockpiles, waste stockpiles, labor camps, and vehicle maintenance yards. These dust-emitting sources should be located away from human activity and natural drainage paths as much as possible. • All heavy equipment and machinery shall be fitted in full compliance with the national and local regulations. • Stockpiled soil and sand shall be slightly wetted before loading, particularly in windy conditions. • The site should be wetted at least 2/3 times a day during dry weather to keep dust levels low. • Vehicles transporting soil, sand, and other construction materials shall be covered. Limitations to the speeds of such vehicles are necessary. Transport through densely populated areas should be avoided. • Regular and proper maintenance of construction vehicles and machinery to avoid air emissions.

SN	Potential Environmental Impacts and Risk Level	Key project activities causing the impact	Mitigation Measures proposed and action to be implemented by the Contractor
			• There should be no burning of wastes on-site. • Until removal to arranged disposal sites, waste from demolition shall be held stockpiled in a place with minimal interference with local drainage paths and obstruction to traffic, local residents.
9	Solid Waste Disposal	• Site clearing • Construction waste • Waste from labour resting areas	• The contractor shall make a list of all types of waste resulting from the construction activity, and obtain direction from the LA on possible disposal sites for each waste type. • Any hazardous type of waste shall be dealt with special care and instructions from the LA. • The contractor shall document all types and quantities of waste generated and removed from the site and the disposal locations. • The contractor shall remove waste from the site each day and dispose of the waste in the LA-approved site/s.
10	Public/occupational safety hazard	• Site clearing, storage of equipment, material etc. • Increased traffic of heavy vehicles for material transportation • Noise and vibration of construction machinery	**Training** 1. The contractor must ensure that all workers, including managers, are trained on occupational health and public safety risks and mitigation measures for the site, prior to commencement of construction. **Personal Protective Equipment** 2. All workers will be provided with necessary PPEs (basic should include a safety helmet, protective footwear, and high visibility jackets). 3. In addition, the contractor shall maintain in stock at the site office, gloves, ear muffs, goggles, dust masks, safety harness, and any other equipment considered necessary. 4. A safety inspection checklist should be prepared to take into consideration what the workers are supposed to be wearing and monitoring. **Site Delineation and Warning Signs** 5. The entire construction site should be delineated using devices such as cones, lights, tubular markers, orange and white stripes, and barricades to inform oncoming vehicular traffic and pedestrians in the area about work zones. 6. All digging and installation work items that are not accomplished should be isolated and warned of by signposts and flash lamps in the night-time. 7. Dangerous warning signs should be raised to inform the public of particular dangers and to keep the public away from such hazards. 8. Trenches should be progressively rehabilitated once work is completed. 9. Overloading of vehicles with materials should be controlled 10. Construction wastes should be removed as much as possible within 24 hours from the site to ensure public safety.

SN	Potential Environmental Impacts and Risk Level	Key project activities causing the impact	Mitigation Measures proposed and action to be implemented by the Contractor
			11. The safety inspection checklist must look to see that the delineation devices are used, whether they are appropriately positioned if they are easily identifiable, and whether they are reflective. **Equipment safety** 12. Work zone workers use tools, equipment, and machinery that could be dangerous if used incorrectly or if the equipment malfunctions. Inspections must be carried out to test the equipment before it is used so that worker safety can be secured. Inspections should look for evidence of wear and tear, frays, missing parts, and mechanical or electrical problems. **Emergency Procedures** 13. An emergency aid service must be in place on the worksite. 14. During health and safety training, site staff should be properly briefed as to what to do in the event of an emergency, such as who to notify and where to assemble in an emergency. This information must be conveyed to employees by the site manager on the first occasion a worker visits the site. **Information management** 15. Develop and establish the contractor's own procedure for receiving, documenting, and addressing complaints from the affected public and nearby communities. 16. Provide advance notice to local communities by way of information boards or leaflets about the schedule of construction activities, interruption to services and access, etc.
11	Mosquito breeding places and spreading vector borne diseases	• Temporary water ponding due to construction	• Water pocketing should be avoided specially during rainy season • Temporary pond should be filled as soon as possible • Construction equipment and tanks should be emptied immediate after the construction concluded for the day
Post construction phase			
12	Solid waste	• Operational stage crops related waste, general household waste & machinery parts.	• Any hazardous type of waste shall be dealt with special care and instructions from the LA. • The farmer societies shall document all types and quantities of waste generated and removed from the site and the disposal locations. • Degradable waste shoube directed to the compost yard • The farmer societies shall remove waste from the site each day and dispose of the waste in the LA approved site/s.
13	Environmental Enhancement/ Landscaping		• Landscape plantation, including turfing shall be taken up as per either detailed design or typical design guidelines given as part of the Bid Documents.

SN	Potential Environmental Impacts and Risk Level	Key project activities causing the impact	Mitigation Measures proposed and action to be implemented by the Contractor
			• The contactor also shall remove all debris, piles of unwanted earth, spoil material, away from the site and disposed at locations designated or acceptable to the Engineer or as per the stipulated waste management criteria of this EMP
14	Greenhouse gas emission	• Use of electricity during processing activities (Electricity usage for machineries)	• The farmer society shall use eco-friendly practices • The farmer society shall get recommendation for the efficient machineries by experts • Conservation practices for electricity should be followed options such as use of Solar power instead of Kerosine
15	Contamination of Soil and Water Resources due to discharge of wastewater	• Discharges of wastewater	• Wastewater generate should not be discharged to outside site • Primary trapping and treatment methods can be followed

9. COST OF MITIGATION

Table 20: Cost Estimate for Implementation of EMP/SMP

№	Environmental mitigation measure	Cost (LKR)	Remarks
1	Information Boards, leaflets	100,000	Awareness leaflets for organic cultivation practices and IPM
2	On site first aid facilities	35,000	
3	Safety equipment's including COVID-19	150,000	Personal protection equipment should be provided for road and canal renovation activities
4	Dust suppression	50,000	Need to be done during road and canal renovation activities
5	Waste removal from site	75,000	Waste from vegetation clearing, site preparation, labour camps
6	Training of farmers and village level stakeholders on IPM and new technological applications	250,000	Should be scheduled to a few sessions
	Total	**660,000**	

10. CONCLUSION AND SCREENING DECISION

Table 21: 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
During Agricultural activities		
Land preparation	Solid waste generation Removal of Trees	SN
Introduction of basic flood prevention and drainage field techniques	Less water consumption, less soil erosion	SP
Use of fertilisers and chemicals	Land, water an air contamination	NS
Manual weed control	Solid waste generation	NS
New and improved quality enhancing technologies	No such harm, less use of water and Less contamination of agrochemicals on Land, air and water Less insect impact	SP
Operational activities		
Operations such as collection, drying, sorting, etc	Disposal of Waste in a haphazard manner Energy Consumption and Greenhouse gas emission	NS SN
Infrastructure Activities (Renovation of roads, agro wells, collection centres, compost yards and elephant fence)		

Key project activities	Potential environmental effects	Significance of environmental effect with mitigation in place
Vegetation clearing	Clearing of vegetation will collect significant amount of waste which will lead to several environmental issues such as blockage of drainage, siltation of downstream, damage to habitats, spreading of invasive species etc	NS
Material transportation and storage	Emission of dust, generation of noise, disturbance to natural drainage, traffic congestion, public inconvenience	NS
Embankment Construction	Emission of dust, generation of noise and vibration, disturbances/blockage of natural drainage paths, public inconvenience	NS
Disposal of waste	Pollution of waterways, blockage of drainage, siltation of downstream and damage to habitats	NS
Wastewater	The proposed agricultural activities will be undertaken using only organic fertiliser and IPM practices. Therefore, application of chemical fertiliser, pesticides and insecticides will be minimised. Hence the soil and ground/surface water will not be polluted	NS

Note: 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

11. EMP IMPLEMENTATION RESPONSIBILITIES AND COSTS

The overall responsibility of ensuring compliance with safeguard requirements lie with the ISP team and supervised by the PMU while the cluster level supporting staffs and contractors will be responsible for implementing the provisions in the EMP. In addition, the ISP will be directly responsible for reviewing the proposed design to ensure that all design related mitigation measures mentioned herein are implemented with the support and supervision of the PMU. The overall supervision will be carried out by the in-house staff of the PMU supported by the Provincial Deputy Project Director who is responsible for the overall supervision of the proposed project. Any consequent design modification will be reflected in the project cost.

Environmental monitoring will be carried out mainly through visual observations and compliance monitoring using the checklist provided in the Environmental Management Framework (EMF) by the Environmental and Social Safeguards Specialist of ISP and Provincial Deputy Project Director's Office of the PMU and the contractor jointly. The Environmental and Social Safeguards Specialist of ISP will need to visit the site on a monthly or quarterly and report on issues and performance on EMP implementation to the PMU. The Cost of Environmental compliance monitoring would be borne by the ISP project implementation cost.

12. SCREENING DECISION RECOMMENDATION

Majority of the potential adverse effects can be classified as general agricultural activities and construction related impacts and can be mitigated on site with proper engineering interventions. These potential impacts are temporary in nature. It is recommended to start the project work off-season for upland cultivation and avoid night time work. However, it should be noted that establishment of Postharvest Processing Centre related activities are excluded from this report and those project activities will be separately investigated and reported. Main activity wise recommendations are given below for better clarity:

Land Preparation: Before land clearance, lands should be properly demarcated and possess a Survey Plan and Consent Letter from MASL. Further, MASL should have written agreement for lands with individual beneficiaries who will be selected. Removal of Trees are discouraged at the maximum level. In case of removal of trees (above 150mm girth), compensatory tree planting should be carried out in minimum of double the number of trees which will be removed. For removal of trees, consent should be obtained from MASL, Environmental and Social Safeguards Specialist-PMU-ASMP and ISP-National Safeguards Specialist with proper details such as number of trees, list of tree species, girth, height, etc. Required to implement mitigation measures proposed in the EMP properly. Proper drainage should be arranged at each cultivation site with proper silt-traps or catch pits to avoid wastewater and sediments carried to adjoining field canals.

Watering: For construction of ground water wells, Water Resources Board yield test report should be obtained in addition to their recommended locations. **NO** water should be taken from field canals-MASL of paddy cultivation.

Construction of Elephant Fence: New method introduced by the Department of Wildlife Conservation (DWLC) in erecting elephant fence should be constructed. Elephant fence design should be approved by DWLC. Use biological fences and ditches outside the electrical fence as much as possible to reduce the pressure on the electrical fence.

Construction of public infrastructures: Implementation of the Environmental Management Plan is sufficient to mitigate the identified impacts and detailed EMP should be updated with detailed designs of infrastructure improvements.

Operations: If any grinding activities other than collection and drying of chilli are envisaged, it is recommended to obtain an EPL or depending on the number of employees.

Table 22: Screening Recommendations for each activity

Key recommendations	Actions / Approvals to be attended	Time period to attend each action	Responsibility / Remarks
Land Selection	Obtain written consent from MASL for releasing the lands selected with survey plans	Before land preparation	PPMU MASL PMU ISP
Beneficiary selection	Agreement between and MASL and beneficiaries for land	Before land preparation	MASL PPMU ISP
Construction of Agro Wells - 26	Obtain WRB Recommendations with yield test reports	Before mobilise contractors to construct wells	ISP PPMU Engineer-PMU
Drainage within cultivation sites	Construct silt-traps and catch pits	During land preparation for cultivation	ISP PPMU MASL
Any use of ZD Canal and field canal water	**No** water should be pumped	Thrugh out the project	ISP MASL PPMU
Integrated Pest Management Practices	Implement IPM activities proposed above at each stage	From land preparation onwards	National and International Agronomist – ISP Agronomist – PPMU
Construction of rural roads	Construction of silt-traps where drains and canals are adjoining which has the potential for siltation	During construction of rural roads	Civil Engineer – ISP PPMU MASL
Construction of Collection centre with drying facilities	Construction of Building Fencing of land Landscaping of area Installation of Drier Chilli drying activities	During construction Installation of drier During operations	Civil Engineer – ISP Agronomost - ISP PPMU MASL
Construction of compost yard	Construction of Building Fencing of land Landscaping of area Drying and sorting of waste Leachate collection Odor control Operations of composting	During construction Installation of machineries During operations	Civil Engineer – ISP Agronomost - ISP PPMU
Erection of Elephant fence	Obtain concent from DWLC Arrange proper maintenance of fence and corridor	Before construction During Operations	Engineer – ISP PPMU Engineer – PMU MASL

13. DETAILS OF PERSONS RESPONSIBLE FOR THE ENVIRONMENTAL SCREENING

Screening report completed by **J.A.P. Jayaweera** National Safeguards Specialist ISP/ASMP ***Name/Designation/Contact information***	**Date** June 2022 ***Signature***
Screening report reviewed by **D.M. Sanjaya Bandara** Environment and Social Safeguard Specialist Agriculture Sector Modernization Project ***Name/Designation/Contact information***	**Date** August 2022
Screening report Approved by **Dr. Rohan Wijekoon** Project Director Agriculture Sector Modernization Project ***Name/Designation/Contact information***	**Date** August 2022

ANNEX 1: LIST OF REFERENCES

Department of Census and Statistics, 2021

ASMP Project Appraisal Document

Punyawardena, B.V.R., Bandara, T.M.J., Munasinghe, M.A.K., Banda N.J. and Pushpakumara, S.M.V. (2003). Agro-ecological regions of Sri Lanka. Natural Resources Management Centre, Department of Agriculture, Peradeniya, Sri Lanka

Panabokke, C. R. (1996). Soils and Agro-Ecological Environments of Sri Lanka. Colombo: Natural Resources, Energy and Science Authority of Sri Lanka

Bandara J.M.R.S., Wijewardena H.V.P., Bandara Y.M.A.Y., Jayasooriya R.G.P.T., and Rajapaksha H., Pollution of River Mahaweli and farmlands under irrigation by cadmium from agricultural inputs leading to a chronic renal failure epidemic among farmers in NCP, Sri Lanka, Springer Science+Business Media B.V. 2010, Received: 13 November 2009/Accepted: 7 October 2010

Kasthuriarachchi TDW, Wickramaarachchi WDN, Premaratne WAPJ. 2016. Assessment of Water Quality Status and Pollution Levels in Maduro Oya Reservoir in Sri Lanka. International Postgraduate Research Conference 2016 - University of Kelaniya. 161

Silva EIL. 2004. Quality of Irrigation Water in Sri Lanka - Status and Trends. Asian Journal of Water, Environment and Pollution. 1(1 & 2) 5-12

Silva EIL, Wijeyaratne MJS. 1999. The occurrence of Cyanobacteria in the reservoirs of the Mahaweli river basin in Sri Lanka. Sri Lanka Journal of Aquatic Science 4:51- 60

https://www.breezometer.com/air quality-map/air quality

Gunatilleke, Nimal, Pethiyagoda, Rohan and Gunatilleke, Savitri. (2008). Biodiversity of Sri Lanka. Journal of the National Science Foundation of Sri Lanka. 36. 25-62. 10.4038/jnsfsr. v36i0.8047.

irrigationmin.gov.lk/water-resources-board/index.html

Gabadage, Dinesh, Botejue, Madhava, Surasinghe, Thilina, Bahir, Mohomed, Madawala, Majintha, Dayananda, Buddhi, Weeratunga, Vimukthi and Karunarathna, D.M.S. (2015). Avifauna on marginal areas of the Maduruoya National Park in Sri Lanka: With conservation and management implications. Journal of Asia-Pacific Biodiversity. 8. 10.1016/j.japb.2015.04.005

Census and Statistics, 2017

Resource profile of Dimbulagala DS Division, 2019

Resource Profile of Welikanda DS Division, 2020

Census of Population and Housing, 2012

Resource Profile, Agriculture Section, MASL, System B

District Statistical hand Book, Polonnaruwa, 2019

Environmental Assessment and Management Framework, ASMP

CDP-4: Cluster Development Program for chilli cluster in Polonnaruwa (Mahaweli Areas), 2022

ANNEX 2: PROJECT AREA MAP

Figure 10: Proposed chilli cultivation areas for CDP#4

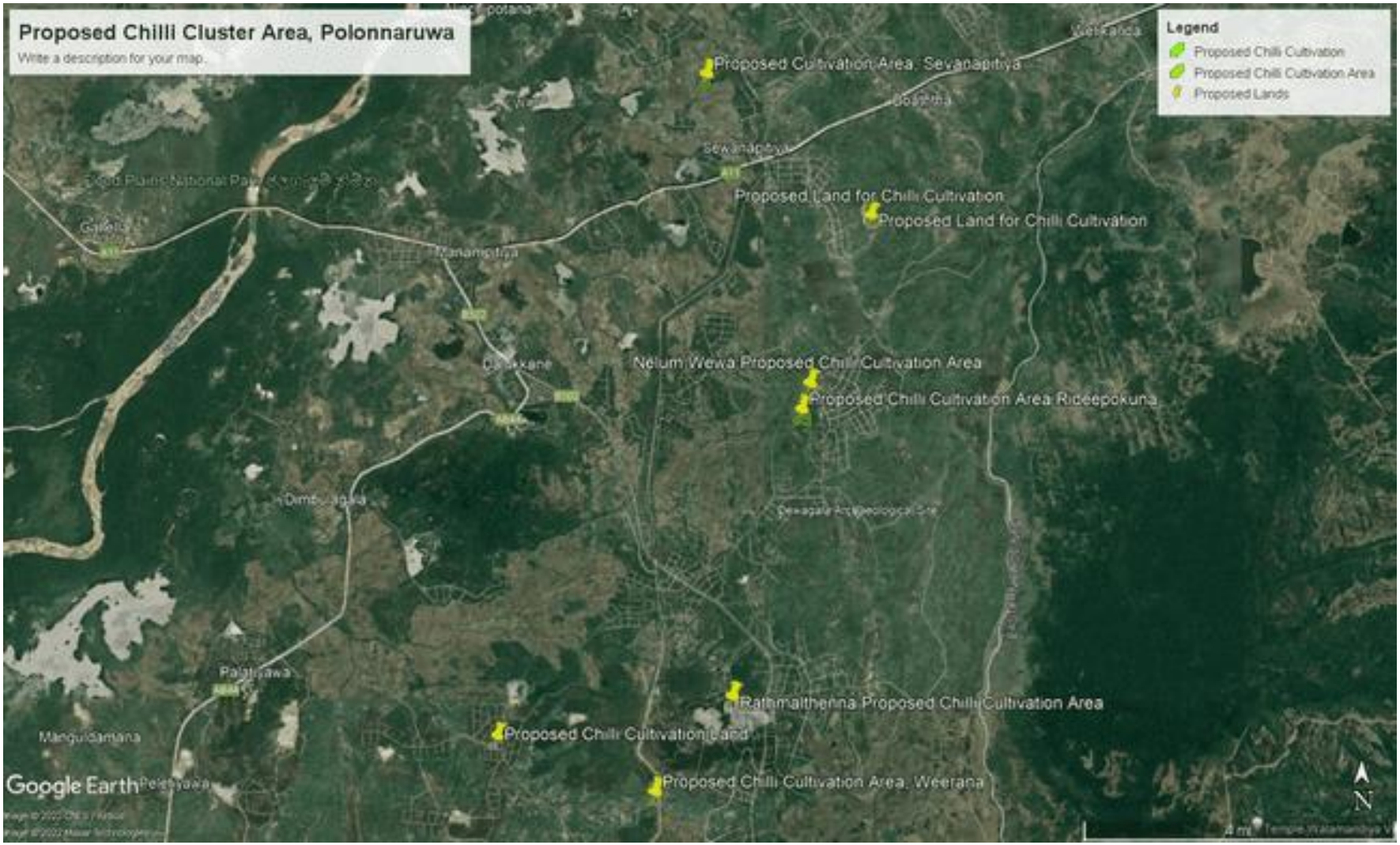


Figure 11: Planning chilli growing area in Borawewa

Figure 12: Planned chilli growing area in Nelumwewa and Rideepokuna

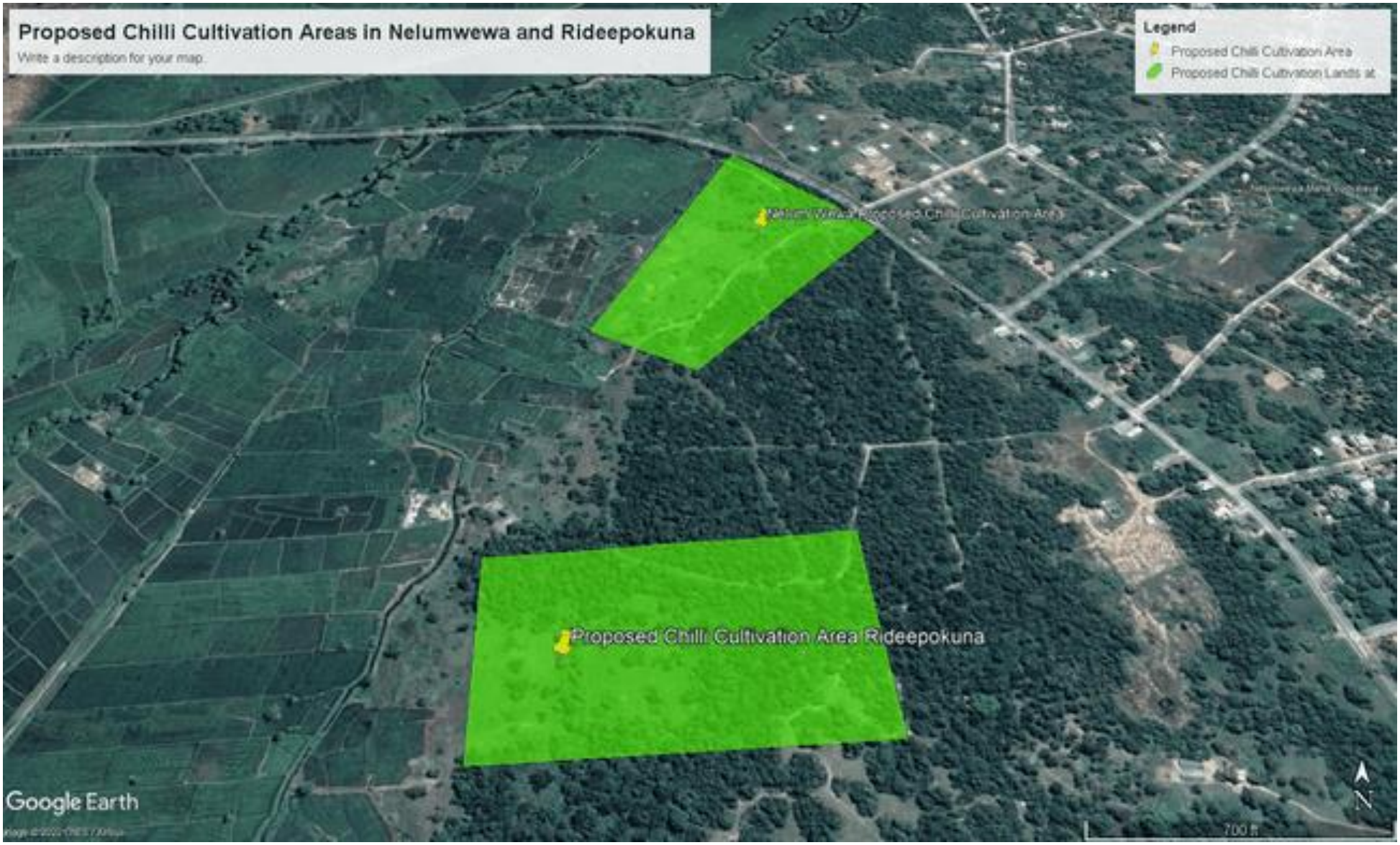


Figure 13: Planning chilli growing area in Rathmalthenna

Figure 14: Planning chilli growing area in Bogaswewa

Figure 15: Planning chilli growing area in Weerana

Figure 16: Planning chilli growing area in Sevanapitiya

ANNEX 3: BENEFICIARY LIST FOR CDP#4 POLONNARUWA (MAHAWELI AREA) – CHILLI

This list is subject to final approval by the North Central PPMU at the time of completing this Environmental Safeguards Report (ESR) for CDP № 4

№	Name of the Farmer	Gender	NIC	ADC	UM Area	GN Division	Address	Mobile TP
Welikanda DS Division								
1	W D Maduro Soysa	Male	600162446V	Welikanda	Aluthwewa	287-Aluthwewa	92, Aluthwewa, Nelumwewa	786490566
2	B G Surangi Chathurika	Female	876224259V	Welikanda	Aluthwewa	287-Aluthwewa	356, Aluthwewa, Neluwewa	703110410
3	D A Renuka Kumari	Female	827123722V	Welikanda	Aluthwewa	287-Aluthwewa	51, Aluthwewa, Nelumwewa	722029026
4	G R Amith Neththasooriya	Male	643071053V	Welikanda	Aluthwewa	287-Aluthwewa	104, Aluthwewa, Nelumwewa	788702953
5	B G Robert Appuhami	Male	612313695V	Welikanda	Aluthwewa	287-Aluthwewa	118, Aluthwewa, Nelumwewa	275687859
6	D A N Sampath Kumara	Male	199915003110	Welikanda	Aluthwewa	287-Aluthwewa	109/1, Aluthwewa, Nelumwewa	782957377
7	G K G T Suresh Kumara	Male	883413784V	Welikanda	Aluthwewa	287-Aluthwewa	8/A, Ginidamana, Nelumwewa	786323405
8	K P Sisira Kumara	Male	881443104V	Welikanda	Aluthwewa	287-Aluthwewa	69/1, Aluthwewa, Nelumwewa	786244605
9	G Sisra Sarath Kumara	Male	760542487V	Welikanda	Aluthwewa	287-Aluthwewa	137/3, Aluthwewa, Nelumwewa	786967649
10	D A Layanal Silva	Male	570111132V	Welikanda	Aluthwewa	287-Aluthwewa	109, Aluthwewa, Nelumwewa	779909103
11	M R Jayantha Kumara	Male	602923533v	Welikanda	Aluthwewa	287-Aluthwewa	107, Aluthwewa, Nelumwewa	788891655
12	K P Susantha Kumara	Male	198320010020	Welikanda	Aluthwewa	287-Aluthwewa	127, Aluthwewa, Nelumwewa	774626951
13	D G Sarath Kumara	Male	842055288v	Welikanda	Aluthwewa	287-Aluthwewa	79, Aluthwewa, Nelumwewa	761989546
14	D P Jayasiri	Male	680553637V	Welikanda	Aluthwewa	287-Aluthwewa	63, Aluthwewa, Nelumwewa	766385576
15	L M W Weerasekara	Male	611925000V	Welikanda	Aluthwewa	287-Aluthwewa	186, Ginidamana, Nelumwewa	787993959
16	U G W K Wikramasingha	Male	812062310v	Welikanda	Aluthwewa	287-Aluthwewa	06, Aluthwewa, Nelumwewa	783278888
17	S A D Roshini Piyathissa	Male	945623420v	Welikanda	Aluthwewa	287-Aluthwewa	179/1, Aluthwewa, Nelumwewa	789284852
18	D M Jayanthi Perera	Female	705290163v	Welikanda	Aluthwewa	287-Aluthwewa	59, Aluthwewa, Nelumwewa	775060959
19	A M C Podimenike	Female	695451482v	Welikanda	Aluthwewa	287-Aluthwewa	3/2, Aluthwewa, Nelumwewa	275716753
20	R G P Semasingha	Female	705203458v	Welikanda	Aluthwewa	287-Aluthwewa	196, Aluthwewa, Nelumwewa	729597262
21	N V P N A Ranasingha	Male	791393019v	Welikanda	Aluthwewa	287-Aluthwewa	20 A, Aluthwewa, Nelumwewa	785576660
22	D G Rasika Kumari	Female	198418810040	Welikanda	Aluthwewa	287-Aluthwewa	79/1, Aluthwewa, Nelumwewa	713537685
23	M A Renuka Wimal	Female	796133384V	Welikanda	Aluthwewa	287-Aluthwewa	273, Aluthwewa, Nelumwewa	787359935
24	G R S K Neththasooriya	Male	861243419V	Welikanda	Aluthwewa	287-Aluthwewa	146, Aluthwewa, Nelumwewa	788702953
25	A H A Jayarathna	Male	701923960v	Welikanda	Aluthwewa	260-Ginidamana	199, Ginidamana	789727543
26	W M Nalin Pushpa Kumara	Male	786418220v	Welikanda	Aluthwewa	287-Aluthwewa	92/A, Aluthwewa	783031199
27	L M W Damith Priyanga	Male	862341538v	Welikanda	Aluthwewa	260-Ginidamana	195, Ginidamana	723840720
28	U G Wasantha Kumara	Male	810103230V	Welikanda	Aluthwewa	287-Aluthwewa	66, Aluthwewa	
29	W M Karunathilaka Banda	Male	561870900V	Welikanda	Nelumwewa	259-Nelumwewa	53, Nelumwewa	768278214

№	Name of the Farmer	Gender	NIC	ADC	UM Area	GN Division	Address	Mobile TP
30	M G Nilmini Kumari	Female	937301472V	Welikanda	Nelumwewa	259-Nelumwewa	239, Nelumwewa	786902568
31	P G Ranjith Mahindasiri	Male	720442647V	Welikanda	Nelumwewa	259-Nelumwewa	160, Nelumwewa	716586743
32	R G Bandula Mohan	Male	760563269V	Welikanda	Nelumwewa	259-Nelumwewa	77, Nelumwewa	
33	R G Sumith Priyantha	Male	843144845v	Welikanda	Nelumwewa	259-Nelumwewa	27, Nelumwewa	785576504
34	P V Ishara Pradeep	Male	200032800581	Welikanda	Nelumwewa	259-Nelumwewa	160, Nelumwewa	781845120
35	U G S K Jayasingha	Male	801701442v	Welikanda	Nelumwewa	259-Nelumwewa	268, Nelumwewa	787942907
36	J M Anil	Male	591483420v	Welikanda	Nelumwewa	259-Nelumwewa	152, Nelumwewa	729303035
37	M W N P Manaweera	Male	721022994v	Welikanda	Nelumwewa	259-Nelumwewa	92, Nelumwewa	784795733
38	E Sameera Pradeep Kumara	Male	199829401474	Welikanda	Nelumwewa	259-Nelumwewa	118, Nelumwewa	786699461
39	M G Sampath Pushpakumara	Male	931513320V	Welikanda	Nelumwewa	259-Nelumwewa	04, Nelumwewa	785460410
40	K Manaseer G Anandathilaka	Male	693612470v	Welikanda	Nelumwewa	259-Nelumwewa	204, Nelumwewa	741831339
41	R M Samantha Kumara	Male	953563878V	Welikanda	Nelumwewa	259-Nelumwewa	52, Nelumwewa	782362023
42	W M Nimal Bandula	Male	872860258v	Welikanda	Nelumwewa	259-Nelumwewa	53, Nelumwewa	768278214
43	H B Wijesingha	Male	583322043v	Welikanda	Nelumwewa	259-Nelumwewa	186, Nelumwewa	783875475
44	R A Suresh Indika	Male	863274036v	Welikanda	Nelumwewa	259-Nelumwewa	168, Nelumwewa	783805445
45	W Wimalawathi	Female	645293851v	Welikanda	Nelumwewa	259-Nelumwewa	218, Nelumwewa	
46	M H M Gamini	Male	733261315v	Welikanda	Nelumwewa	259-Nelumwewa	78, Nelumwewa	781012803
47	L Thusitha Kumara	Male	913542428V	Welikanda	Nelumwewa	259-Nelumwewa	113, Nelumwewa	785611636
48	S G Pathma Kumari	Female	742162575V	Welikanda	Nelumwewa	259-Nelumwewa	59, Nelumwewa	
49	P W Sarath Ranaweera	Male	700840948V	Welikanda	Nelumwewa	259-Nelumwewa	45, Nelumwewa	782945576
50	T A Rasika Kumari	Female	767951620V	Welikanda	Nelumwewa	259-Nelumwewa	94, Nelumwewa	717196612
51	M W Nawarathna	Male	650851714v	Welikanda	Nelumwewa	259-Nelumwewa	265, Nelumwewa	
52	G R S Navaratnam Wickramasooriya	Male	943632936v	Welikanda	Nelumwewa	259-Nelumwewa	D-47/21, Nelumwewa	714701404
53	M G Chandrawathi Menike	Female	688013798v	Welikanda	Nelumwewa	259-Nelumwewa	79, Nelumwewa	767175058
54	N K Wasantha Pathmini	Female	875384279v	Welikanda	Nelumwewa	259-Nelumwewa	54, Nelumwewa	705129235
55	R G Sudesh Asanka	Male	943173702V	Welikanda	Nelumwewa	259-Nelumwewa	80, Nelumwewa	788064294
56	R P G Jayarathna	Male	712192917v	Welikanda	Nelumwewa	259-Nelumwewa	126, Nelumwewa	787700218
57	W Jayasinghe	Male	621453629V	Welikanda	Nelumwewa	259-Nelumwewa	147, Nelumwewa	78939056
58	W G U Pushpa Kumara	Male	822152783V	Welikanda	Nelumwewa	259-Nelumwewa	239, Nelumwewa	786902568
59	G Priyantha	Male	851791779V	Welikanda	Nelumwewa	259-Nelumwewa	176, Nelumwewa	788948899
60	M Asana Manjula Nishantha	Male	940704588v	Welikanda	Nelumwewa	259-Nelumwewa	115, Nelumwewa	788077921
61	N G Kalana Maduranga	Male	980590542v	Welikanda	Nelumwewa	259-Nelumwewa	181, Nelumwewa	783058738

№	Name of the Farmer	Gender	NIC	ADC	UM Area	GN Division	Address	Mobile TP
62	R A Pushpa Kumara	Male	881835690V	Welikanda	Nelumwewa	259-Nelumwewa	109, Nelumwewa	789392946
63	M H M Rumesh Lakshitha	Male	980680177V	Welikanda	Nelumwewa	259-Nelumwewa	58, Nelumwewa	787171136
64	G Lakshita Nimal Karunathilaka	Male	662911704v	Welikanda	Nelumwewa	259-Nelumwewa	263, Nelumwewa	705769695
65	M T Karunathilaka	Male	591751638V	Welikanda	Nelumwewa	259-Nelumwewa	146, Nelumwewa	272052794
66	M Ranjani Senavirathna	Female	737132943v	Welikanda	Nelumwewa	259-Nelumwewa	498/2, Nelumwewa	789965564
67	R V Asela Ruwandeniya	Male	199809803927	Welikanda	Nelumwewa	259-Nelumwewa	167, Nelumwewa	764712202
68	S D S Janaka Singhapura	Male	197311101928	Welikanda	Nelumwewa	259-Nelumwewa	211, Nelumwewa	712709777
69	M G Hemasiri Jayalath	Male	911380250v	Welikanda	Nelumwewa	259-Nelumwewa	189, Nelumwewa	719569294
70	E P Chandrathilaka	Male	863041317v	Welikanda	Nelumwewa	259-Nelumwewa	230, Nelumwewa	786546122
71	R G Pushpa Kanthi	Female	696471967v	Welikanda	Nelumwewa	259-Nelumwewa	89, Nelumwewa	763895176
72	K G Wimalasena	Male	603451333V	Welikanda	Nelumwewa	259-Nelumwewa	60, Nelumwewa	711482568
73	W Wasantha	Female	77505554V	Welikanda	Nelumwewa	259-Nelumwewa	66, Nelumwewa	762092265
74	D M I H G Dissanayaka	Male	200119200417	Welikanda	Nelumwewa	259-Nelumwewa	N: 74, Nelumwewa	764813430
75	J M Keshara Supun	Male	200127702888	Welikanda	Nelumwewa	259-Nelumwewa	152, Nelumwewa	729303035
76	W R Janaka	Male	742162575V	Welikanda	Nelumwewa	259-Nelumwewa	59, Nelumwewa	784795733
77	O G Tikiri Banda	Male	592532174V	Welikanda	Nelumwewa	259-Nelumwewa	255, Nelumwewa	711482568
78	E V Harischandra	Male	741134853V	Welikanda	Nelumwewa	259-Nelumwewa	259, Nelumwewa	
79	A M Ajith Bandara	Male	561542538V	Welikanda	Ginidamana	260-Ginidamana	45, Ginidamana, Nelumwewa	741048033
80	H R Suraj Madushanka	Male	860820846v	Welikanda	Ginidamana	260-Ginidamana	92, Ginidamana, Nelumwewa	766950305
81	R M Mallika	Female	695254598v	Welikanda	Ginidamana	260-Ginidamana	207, Ginidamana, Nelumwewa	784194460
82	R P G Rathnayaka	Male	540492816v	Welikanda	Ginidamana	260-Ginidamana	50, Ginidamana	786168639
83	S P Gamini Wijesooriya	Male	652423329v	Welikanda	Ginidamana	260-Ginidamana	146, Ginidamana	763630226
84	A Gunathilaka	Male	58309221v	Welikanda	Ginidamana	260-Ginidamana	41, Ginidamana	786320707
85	I P J Sumith Kumara	Male	781072907v	Welikanda	Ginidamana	260-Ginidamana	43, Ginidamana	776235467
86	A G Piyasena	Male	533510535v	Welikanda	Ginidamana	260-Ginidamana	42, Ginidamana	785178974
87	M Janaka Chithra Kumara	Male	752844488v	Welikanda	Ginidamana	260-Ginidamana	39, Ginidamana	711479239
88	H G Santha Upul Bandara	Male	79233125v	Welikanda	Ginidamana	260-Ginidamana	202, Ginidamana	783402105
89	A M S Sumith Bandara	Male	823390246v	Welikanda	Ginidamana	260-Ginidamana	45, Ginidamana	718713108
90	D M Chandradasa	Male	632672520V	Welikanda	Ginidamana	260-Ginidamana	238, Ginidamana, Nelumwewa	724802743
91	P Ariyadasa	Male	633445340V	Welikanda	Ginidamana	260-Ginidamana	216, Ginidamana, Nelumwewa	789942582
92	U H P G S Hemachandra	Male	740413880v	Welikanda	Ginidamana	260-Ginidamana	83, Ginidamana, Nelumwewa	718569123
93	W A P Malani Menike	Female	768160252v	Welikanda	Ginidamana	260-Ginidamana	03A, Ginidamana, Nelumwewa	786761557

№	Name of the Farmer	Gender	NIC	ADC	UM Area	GN Division	Address	Mobile TP
94	J P N Dharmasiri	Male	810543663v	Welikanda	Ginidamana	260-Ginidamana	33, Ginidamana, Nelumwewa	716333902
95	D M G D Chandani Kularathna	Female	696371830v	Welikanda	Ginidamana	260-Ginidamana	175, Ginidamana, Nelumwewa	784631816
96	K Nishandini	Female	947494341V	Welikanda	Sevanapitiya	261-Sewanapitiya	78/01, Unawewa, Sevanapitiya	755410885
97	I Wenuja	Female	996733386V	Welikanda	Sevanapitiya	261-Sewanapitiya	79/01, Unawewa, Sevanapitiya	763429392
98	M Gopaal	Male	791242665V	Welikanda	Sevanapitiya	261-Sewanapitiya	424, Unawewa, Sevanapitiya	762082369
99	V Kokidan	Male	790964640V	Welikanda	Sevanapitiya	261-Sewanapitiya	97, Unawewa, Sevanapitiya	760376757
100	V Shiwakumar	Male	992643420V	Welikanda	Sevanapitiya	261-Sewanapitiya	76, Unawewa, Sevanapitiya	753226101
101	I Harischandran	Male	911323443V	Welikanda	Sevanapitiya	261-Sewanapitiya	81/01, Unawewa, Sevanapitiya	771416351
102	K Thawaraasa	Male	821393027V	Welikanda	Sevanapitiya	261-Sewanapitiya	63, Unawewa, Sevanapitiya	774154687
103	K Konalingam	Male	712354453V	Welikanda	Kara Pola	263-Karapola	29, Kara Pola, Muthugala	771355017
104	N P Muthu gala Wasantha Kumara	Male	783420368V	Welikanda	Sevanapitiya	261-Sewanapitiya	309, Unawewa, Sevanapitiya	772056986
105	S Susil Hemantha	Male	197026001215 V	Welikanda	Sevanapitiya	261-Sewanapitiya	243, Unawewa, Sevanapitiya	789390788
106	A D Sugath Prasanna	Male	733580020v	Welikanda	Sevanapitiya	261-Sewanapitiya	364, Sevanapitiya	719501819
107	S Pushparani	Female	917202966v	Welikanda	Kara Pola	263-Karapola	312, Kara Pola	756075402
108	P Indrani	Female	795463550v	Welikanda	Kara Pola	263-Karapola	303, Kara Pola	753138587
109	R J Sheela	Female	828223909v	Welikanda	Kara Pola	263-Karapola	195, Kara Pola	
110	T Nakeshwari	Female	197467201846	Welikanda	Kara Pola	263-Karapola	20, Kara Pola	789465728
111	Y Kumuduwathi	Female	878644301v	Welikanda	Kara Pola	263-Karapola	42, Kara Pola	774206593
112	S Shiwamalar	Female	197466702624	Welikanda	Kara Pola	263-Karapola	18, Kara Pola	750496684
113	R K Ravendiran	Male	198235505407	Welikanda	Kara Pola	263-Karapola	90/A, Kara Pola	771826233
114	L Raveendran S A Gamunusena	Male	530023800v	Welikanda	Kara Pola	263-Karapola	231, Kara Pola	776020477
115	I Jeyakodi	Male	622273152v	Welikanda	Kara Pola	263-Karapola	171/D, Kara Pola	
116	P Pushpakanthan	Male	900961863	Welikanda	Kara Pola	263-Karapola	34, Kara Pola	774877022
117	N Kangeshwaran	Male	197905704770	Welikanda	Kara Pola	263-Karapola	203, Kara Pola	756762909
118	M Sumithdan	Male	902101039v	Welikanda	Kara Pola	263-Karapola	203/1, Kara Pola	750630876
119	Kannaga Murthi	Male	86121077v	Welikanda	Kara Pola	263-Karapola	50, Kara Pola	778828928
120	K Kaneshamurthi	Male	713603554v	Welikanda	Kara Pola	263-Karapola	298, Kara Pola	774019466
121	K Rajendran Kumar	Male	751381646v	Welikanda	Kara Pola	263-Karapola	N/17, Kara Pola	721300723
122	Palan Saraswathi	Male	825954600v	Welikanda	Kara Pola	263-Karapola	23, Kara Pola	752971800

№	Name of the Farmer	Gender	NIC	ADC	UM Area	GN Division	Address	Mobile TP
123	S Janaki	Female	605534520v	Welikanda	Kara Pola	263-Karapola	24, Kara Pola	784883541
124	J R Kedeeshwaran	Male	811734292v	Welikanda	Kara Pola	263-Karapola	273, Kara Pola	775104005
125	W Rajini Kandan	Male	830203168v	Welikanda	Kara Pola	263-Karapola	351, Kara Pola, Muthugala	765223297
126	J L Premarathna	Male	721330419v	Welikanda	Sevanapitiya	261-Sewanapitiya	31, Sevanapitiya	771343875
127	T Sudakaran	Male	923451102v	Welikanda	Kara Pola	263-Karapola	148, Kara Pola, Muthugala	778647281
128	W Nipuna Krishantha	Male	920890288V	Welikanda	Sevanapitiya	261-Sewanapitiya	159, Sevanapitiya	769414501
129	Pushparasha Santhirakmar	Male	913470230v	Welikanda	Kara Pola	263-Karapola	113, Kara Pola, Muthugala	752372614
130	Shiwaneshan Nirmaladevi	Female	68551560v	Welikanda	Kara Pola	263-Karapola	147, Kara Pola, Muthugala	758453568
131	W M Deepika Jayaweera	Female	888601805 V	Welikanda	Borawewa	273 - Borawewa	132, Borawewa, Sevanapitiya	782911186
132	B M Babynona	Female	826580623 V	Welikanda	Borawewa	273 - Borawewa	115, Borawewa, Sevanapitiya	784773965
133	S M Sriyani Amarasinghe	Female	858474574 V	Welikanda	Borawewa	273 - Borawewa	102, Borawewa, Sevanapitiya	
134	A M Sumanawathi	Female	727493557 V	Welikanda	Borawewa	273 - Borawewa	168, Borawewa, Sevanapitiya	769448954
135	A Somnipathy D Janaki Champika	Female	196978902192	Welikanda	Borawewa	273 - Borawewa	74, Borawewa, Sevanapitiya	713366962
136	M M D Gayana Thilakarathna	Female	996021777 V	Welikanda	Borawewa	273 - Borawewa	48, Borawewa, Sevanapitiya	723507334
137	A M Kusumawathi	Female	678594016 V	Welikanda	Borawewa	273 - Borawewa	126, Borawewa, Sevanapitiya	784481685
138	H W G Sakunthala	Female	938461724 V	Welikanda	Borawewa	273 - Borawewa	127, Borawewa, Sevanapitiya	702424133
139	B G Lasantha	Female	697742131 V	Welikanda	Borawewa	273 - Borawewa	62, Borawewa, Sevanapitiya	764830539
140	K W M Indrani Latha	Female	616823663 V	Welikanda	Borawewa	273 - Borawewa	257, Borawewa, Sevanapitiya	701891895
141	K M Pemawathi	Female	555254318 V	Welikanda	Borawewa	273 - Borawewa	80, Borawewa, Sevanapitiya	783597329
142	T B Inoma Damayanthi	Female	197583702936	Welikanda	Borawewa	273 - Borawewa	64, Borawewa, Sevanapitiya	788535036
143	V A Chandani Renuka	Female	645373332V	Welikanda	Borawewa	273 - Borawewa	68, Borawewa, Sevanapitiya	785373332
144	U K R Chithra Malani	Female	197562002995	Welikanda	Borawewa	273 - Borawewa	107, Borawewa, Sevanapitiya	767073332
145	U Damayanti G A Dmayanthi	Female	716751295 V	Welikanda	Borawewa	273 - Borawewa	235, Borawewa, Sevanapitiya	784773965
146	A M Leelawathi	Female	748304495 V	Welikanda	Borawewa	273 - Borawewa	170, Borawewa, Sevanapitiya	785264251
147	R M Deepika Rathnayake	Female	197972700822	Welikanda	Borawewa	273 - Borawewa	56, Borawewa, Sevanapitiya	785389035
148	S M Sriyakanthi	Female	795263250 V	Welikanda	Borawewa	273 - Borawewa	171, Borawewa, Sevanapitiya	785526042
149	K D Inoka Kusum	Female	925090883 V	Welikanda	Borawewa	273 - Borawewa	136, Borawewa, Sevanapitiya	779091361
150	A M Swarnalatha	Female	837645123 V	Welikanda	Borawewa	273 - Borawewa	63, Borawewa, Sevanapitiya	781816137
151	A M Asanka Sanjeewa	Male	782174169 V	Welikanda	Borawewa	273 - Borawewa	130, Borawewa, Sevanapitiya	788325143
152	H B Danapala	Male	860393654 V	Welikanda	Borawewa	273 - Borawewa	92, Borawewa, Sevanapitiya	782303565
153	M Dhanapala Sandeepa Lakshan	Male	200009302316	Welikanda	Borawewa	273 - Borawewa	34, Borawewa, Sevanapitiya	785526196

№	Name of the Farmer	Gender	NIC	ADC	UM Area	GN Division	Address	Mobile TP
154	D M Gunabanda	Male	622563665 V	Welikanda	Borawewa	273 - Borawewa	63, Borawewa, Sevanapitiya	782558016
155	M Gun abanda D S Arunasiri	Male	199127101552	Welikanda	Borawewa	273 - Borawewa	91, Borawewa, Sevanapitiya	779945561
156	T A Samantha Nihal	Male	790363221 V	Welikanda	Borawewa	273 - Borawewa	100, Borawewa, Sevanapitiya	774530813
157	P G M G K Kulasinghe	Male	932242834 V	Welikanda	Borawewa	273 - Borawewa	221, Borawewa, Sevanapitiya	787954851
158	H M P Gamaga	Male	762404818 V	Welikanda	Borawewa	273 - Borawewa	57, Borawewa, Sevanapitiya	783880451
159	D M Darmadasa	Male	642683802 V	Welikanda	Borawewa	273 - Borawewa	65, Borawewa, Sevanapitiya	711760393
160	P G L Indarjith	Male	850561362 V	Welikanda	Borawewa	273 - Borawewa	59, Borawewa, Sevanapitiya	782518004
161	H M Lal Sumeda	Male	197728803374	Welikanda	Borawewa	273 - Borawewa	245, Borawewa, Sevanapitiya	787979512
162	H B Sarath	Male	810856106 V	Welikanda	Borawewa	273 - Borawewa	23, Borawewa, Sevanapitiya	786992995
163	B G M Sisira Kumara	Male	911533243 V	Welikanda	Borawewa	274 - Borawewa	112, Borawewa, Sevanapitiya	782959332
164	W M Gayan Madusanka	Male	199510902797	Welikanda	Borawewa	275 - Borawewa	49, Borawewa, Sevanapitiya	781856420
165	T A Susantha Ajith	Male	8120032332 V	Welikanda	Borawewa	276 - Borawewa	259, Borawewa, Sevanapitiya	785308243
166	W M Dingiribanda	Male	580453481 V	Welikanda	Borawewa	277 - Borawewa	238, Borawewa, Sevanapitiya	788573309
167	B M Heamapala	Male	801784003 V	Welikanda	Borawewa	278 - Borawewa	106, Borawewa, Sevanapitiya	789196467
168	P D Nimal Rohana	Male	781121886V	Welikanda	Borawewa	279 - Borawewa	26, Borawewa, Sevanapitiya	783564661
169	P A Rukman Pradeep	Male	862450639 V	Welikanda	Borawewa	280 - Borawewa	226, Borawewa, Sevanapitiya	783880526
170	H G Chanaka Ravindra	Male	198329901716	Welikanda	Borawewa	281 - Borawewa	239, Borawewa, Sevanapitiya	772338971
171	D M Ranaweerabanda	Male	702022681 V	Welikanda	Borawewa	282 - Borawewa	27, Borawewa, Sevanapitiya	713840773
172	W A Ashan Mahanama	Male	930803006 V	Welikanda	Borawewa	283 - Borawewa	110, Borawewa, Sevanapitiya	785390785
173	H M Dingiribanda	Male	703243495 V	Welikanda	Borawewa	284 - Borawewa	51, Borawewa, Sevanapitiya	766974497
174	W A Amila Nuwan	Male	900890370 V	Welikanda	Borawewa	285 - Borawewa	192, Borawewa, Sevanapitiya	767819474
175	B G Sunil Chandrarathne	Male	632422512 V	Welikanda	Borawewa	286 - Borawewa	60, Borawewa, Sevanapitiya	774407182
176	U G Jayalath Gunasingha	Male	601851679v	Welikanda	Borawewa	286 - Borawewa	31, Borawewa, Sevanapitiya	765234704
177	S H Madushika Lakmali	Female	946044342v	Welikanda	Borawewa	286 - Borawewa	258/3/1, Borawewa, Sevanapitiya	788274201
178	P A C Asanka Premasiri	Male	930774316v	Welikanda	Borawewa	286 - Borawewa	8, Borawewa, Sevanapitiya	762472051
179	B G R Chandrathilaka Banda	Male	652984365v	Welikanda	Borawewa	286 - Borawewa	167, Borawewa, Sevanapitiya	782034725
180	P A V Prabath Premasiri	Male	943090190v	Welikanda	Borawewa	286 - Borawewa	157, Borawewa, Sevanapitiya	762742591
181	W M P Udaya Kumara	Male	872623612v	Welikanda	Borawewa	286 - Borawewa	238, Borawewa, Sevanapitiya	783115119
182	A M Kusumawathi	Female	678594016V	Welikanda	Borawewa	274-Borawewa	126, Borawewa	784481685
183	A M Wasanthi Kumari	Female	845230102V	Welikanda	Borawewa	274-Borawewa	130, Borawewa	
184	K H M Gunarathna	Male	650514149V	Welikanda	Borawewa	274-Borawewa	168, Borawewa	783597329
185	P G U S K Kulasingha	Male	730131860V	Welikanda	Borawewa	274-Borawewa	107, Borawewa	782558016

№	Name of the Farmer	Gender	NIC	ADC	UM Area	GN Division	Address	Mobile TP
186	S M Chandrakanthi	Female	845065586V	Welikanda	Borawewa	274-Borawewa	98, Borawewa	783880451
187	A M Kapila Ariyawansha	Male	841161122V	Welikanda	Rideepokuna	258-Rideepokuna	172, Ridee Pokuna, Nelumwewa	719450540
188	T M Thilakarathna	Male	196533602900	Welikanda	Rideepokuna	258-Rideepokuna	226, Ridee Pokuna, Nelumwewa	715386301
189	K P Punchibanda	Male	693061350V	Welikanda	Rideepokuna	258-Rideepokuna	69, Ridee Pokuna, Nelumwewa	789997455
190	R D K Kaushalya Kumari	Female	946503037v	Welikanda	Rideepokuna	258-Rideepokuna	188, Ridee Pokuna, Nelumwewa	762235403
191	M G Siril	Male	601923734v	Welikanda	Rideepokuna	258-Rideepokuna	248, Ridee Pokuna, Nelumwewa	789965564
192	K Indrani	Female	795552588v	Welikanda	Rideepokuna	258-Rideepokuna	225, Ridee Pokuna, Nelumwewa	7694091006
193	K P A L Bandara	Female	858662981v	Welikanda	Rideepokuna	258-Rideepokuna	23, Ridee Pokuna, Nelumwewa	716586074
194	D M Kusum Menike	Female	688382246v	Welikanda	Rideepokuna	258-Rideepokuna	97, Ridee Pokuna, Nelumwewa	275718253
195	A Swarna Malkanthi	Female	198270600771	Welikanda	Rideepokuna	258-Rideepokuna	59, Ridee Pokuna, Nelumwewa	778540364
196	H Sarath Amarasiri	Male	871353560v	Welikanda	Rideepokuna	258-Rideepokuna	234/B, Ridee Pokuna, Nelumwewa	761705674
197	P Sarath Wimalaweera	Male	561280509v	Welikanda	Maha wewa	262-Mahawewa	305, Maha wewa	275618559
198	M Dhanushka Abewardhana	Male	893584846v	Welikanda	Maha wewa	262-Mahawewa	276, Maha wewa	763447403
199	H B S T Dharmawardana	Male	197914002808	Welikanda	Maha wewa	262-Mahawewa	40, Maha wewa	789443605
200	K M Pushpalatha	Female	805962291v	Welikanda	Maha wewa	262-Mahawewa	47, Maha wewa	741721015
201	H Wijayakumarasingha	Male	743112970v	Welikanda	Maha wewa	262-Mahawewa	79, Maha wewa	785307668
202	K D Chaminda Kumara	Male	822635237v	Welikanda	Maha wewa	262-Mahawewa	250, Maha wewa	717695669
203	M A Ananda	Male	196834910019	Welikanda	Maha wewa	262-Mahawewa	304, Maha wewa	788648029
204	H Jayasingha	Male	542432543v	Welikanda	Maha wewa	262-Mahawewa	252, Maha wewa	275714331
205	W Priyanthi	Female	718503256v	Welikanda	Maha wewa	262-Mahawewa	99/2/2, Maha wewa	773520173
206	H M Munasiri	Male	651837820v	Welikanda	Maha wewa	262-Mahawewa	264, Maha wewa	704897131
207	M A S T Marasingha	Male	197915600241	Welikanda	Maha wewa	262-Mahawewa	273, Maha wewa	704075034
208	R A Jayakanthi Hema	Female	197280504077	Welikanda	Maha wewa	262-Mahawewa	280, Maha wewa	716631536
209	R D Ayrin Chandralatha	Female	757583216v	Welikanda	Maha wewa	262-Mahawewa	256, Maha wewa	771531486
210	P H Karunarathna	Male	601813610v	Welikanda	Maha wewa	262-Mahawewa	75, Maha wewa	
211	M D Manojika	Female	868631171v	Welikanda	Maha wewa	262-Mahawewa	43/ D11, Maha wewa	781970198
212	D R J Bandara	Male	620504505v	Welikanda	Maha wewa	262-Mahawewa	254, Maha wewa	725147251
213	R M Maninka Rathnayaka	Male	700432955v	Welikanda	Maha wewa	262-Mahawewa	199, Maha wewa	774447137
214	K N Jagath Kumara	Male	751102313v	Welikanda	Maha wewa	262-Mahawewa	198, Maha wewa	786262347
215	W N Deshapriya	Male	702460620v	Welikanda	Maha wewa	262-Mahawewa	211, Maha wewa	766590437
216	K A Saman	Male	691873161v	Welikanda	Maha wewa	262-Mahawewa	311, Maha wewa	729334863
217	R D Niluka Pushpakumari	Female	19825802190	Welikanda	Maha wewa	262-Mahawewa	258, Maha wewa	726198209

№	Name of the Farmer	Gender	NIC	ADC	UM Area	GN Division	Address	Mobile TP
218	Lenadi Kumara	Male	813311585v	Welikanda	Maha wewa	262-Mahawewa	319, Maha wewa	772184827
219	U G Vijitha Lasantha	Male	742470636v	Welikanda	Maha wewa	262-Mahawewa	266, Maha wewa	776318449
220	M A Podinilame	Male	600073745v	Welikanda	Maha wewa	262-Mahawewa	279, Maha wewa	771540619
221	S H Srimal Sanjeewa	Male	911121743v	Welikanda	Maha wewa	262-Mahawewa	93/D9, Maha wewa	763422386
222	S H Nimal Ariyarathna	Male	682123664v	Welikanda	Maha wewa	262-Mahawewa	303, Maha wewa	781926731
223	P H Seetha Kumari	Female	866973954v	Welikanda	Maha wewa	262-Mahawewa	80, Maha wewa	705379444
224	R Manjula Prasad	Male	197522400175	Welikanda	Maha wewa	262-Mahawewa	274, Maha wewa	724614634
225	S D Samantha Kumara	Male	198732901893	Welikanda	Maha wewa	262-Mahawewa	D 43, Maha wewa	762192231
226	K M S M Gunathilaka	Male	802231130v	Welikanda	Maha wewa	262-Mahawewa	314, Maha wewa	718459302
227	W P S Wikumsiri	Male	710851034v	Welikanda	Maha wewa	262-Mahawewa	99/2/6, Maha wewa	717005387
228	H M Munasiri	Male	651837820v	Welikanda	Maha wewa	262-Mahawewa	264, Maha wewa	704897131
229	H P Jayasena	Male	583292047v	Welikanda	Maha wewa	262-Mahawewa	251, Sevanapitiya	784950376
230	H K Anil Rohana	Male	680460124v	Welikanda	Sevanapitiya	261-Sewanapitiya	396, Sevanapitiya	784813313
231	W A Jayaweera	Male	591411128v	Welikanda	Sevanapitiya	261-Sewanapitiya	123, Sevanapitiya	778257006
232	I P A Nirosha Dilrukshi	Female	827572578v	Welikanda	Sevanapitiya	261-Sewanapitiya	291, Maha wewa	777568705
233	T H Wijerathna	Male	580062547v	Welikanda	Maha wewa	262-Mahawewa	285, Maha wewa	
234	H A K D Lenard Kumara	Male	813311585v	Welikanda	Maha wewa	262-Mahawewa	319, Maha wewa	772184827
235	R P Udaya Kumara	Male	725487697v	Welikanda	Maha wewa	262-Mahawewa	89/2/28, Maha wewa	725487694
236	U G S Premasiri	Male	19623003655	Welikanda	Maha wewa	262-Mahawewa	272, Maha wewa	766803550
Dimbulagala DS Division								
237	T H Chaminda Kumara	Male	821634687v	Aralaganwila	Maduruthenna	247-Rathmalthenna	17/1, Dimuthugama, Hansayapalama	787053639
238	N L Senadeera Coore	Male	751551568v	Aralaganwila	Maduruthenna	247-Rathmalthenna	214, Dimuthugama, Hansayapalama	789201361
239	A M Gamini Aththanayaka	Male	650852605v	Aralaganwila	Maduruthenna	247-Rathmalthenna	236, Dimuthugama, Hansayapalama	787820147
240	M P S M Meragala	Male	842942675v	Aralaganwila	Maduruthenna	247-Rathmalthenna	243, Dimuthugama, Hansayapalama	783262794
241	N A P H Kumara	Male	902183370v	Aralaganwila	Maduruthenna	247-Rathmalthenna	233/1, Dimuthugama, Hansayapalama	773986426
242	A G Kumarihami	Female	196952504091	Aralaganwila	Maduruthenna	247-Rathmalthenna	237, Dimuthugama, Hansayapalama	760245913

№	Name of the Farmer	Gender	NIC	ADC	UM Area	GN Division	Address	Mobile TP
243	K P Indrani Premalatha	Female	607933944v	Aralaganwila	Maduruthenna	247-Rathmalthenna	244, Dimuthugama, Hansayapalama	776200329
244	K W Sriyalatha	Female	658493469v	Aralaganwila	Maduruthenna	247-Rathmalthenna	239, Dimuthugama, Hansayapalama	788884845
245	S D Sriyani	Female	70583840v	Aralaganwila	Maduruthenna	247-Rathmalthenna	238, Dimuthugama, Hansayapalama	763879262
246	M P Thanuja Dhananjani	Female	925321109v	Aralaganwila	Maduruthenna	247-Rathmalthenna	245, Dimuthugama, Hansayapalama	770315602
247	W G Piyatiss	Male	59040193 V	Manampitiya	Weerana	250-Weerana	103, Weerana	783582030
248	A G J Saranga	Male	961562813 V	Manampitiya	Weerana	250-Weerana	165, Weerana	788451005
249	P G Lahiru Nayanagith	Male	980420418 V	Manampitiya	Weerana	250-Weerana	166, Weerana	786182452
250	R A Gunawathi	Female	606093551 V	Manampitiya	Weerana	250-Weerana	228, Weerana	275714224
251	U K G Chandana Suranga Kumara	Male	853291170 V	Manampitiya	Weerana	250-Weerana	172, Weerana	716834250
252	N G Chandra Kumara	Male	199029101529	Manampitiya	Weerana	250-Weerana	87, Weerana	782555176
253	W G Pradipika Dilruksi	Female	918223835 V	Manampitiya	Weerana	250-Weerana	08, Weerana	776955709
254	K G kulasiri	Male	196164810015 v	Manampitiya	Weerana	250-Weerana	No 13, Weerana	
255	H A Somadasa	Male	682771704v	Manampitiya	Weerana	250-Weerana	No 228, Weerana	782505287
256	H P Susil	Male	773540750v	Manampitiya	Weerana	250-Weerana	No 222, Weerana	725474523
257	K A G Wasantha	Male	853064173V	Manampitiya	Dalukana	210-Dalukana	238, 1 Piyawara, Dimbulagala	770695353
258	K A G Bandara	Male	890482619V	Manampitiya	Dalukana	210-Dalukana	210, Dalukana	786817850
259	K A G Nawarathna	Male	195319401462	Manampitiya	Dalukana	210-Dalukana	251, 1 Piyawara, Dimbulagala	782941832
260	N G Kularathna	Male	623100910V	Manampitiya	Dalukana	210-Dalukana	245, 1 Piyawara, Dimbulagala	711949256
261	P Rajendra Kamar	Male	199307704936	Manampitiya	Dalukana	210-Dalukana	06, 1 Piyawara, Dimbulagala	769788294
262	U M Siripala	Male	571540258V	Manampitiya	Dalukana	210-Dalukana	265/A, Dimbulagala	776542065
263	S Chandrakumar	Male	810323213V	Manampitiya	Dalukana	210-Dalukana	158, Soruwila, Dimbulagala	760063464
264	H M Sanjaya Ruwan	Male	911973570V	Manampitiya	Dalukana	210-Dalukana	145, Soruwila, Dimbulagala	788873534
265	W G Ariyadasa	Male	601924625V	Manampitiya	Dalukana	210-Dalukana	300, Soruwila, Dimbulagala	
266	A kumarasinham		881203138 v	Manampitiya	Dalukana	210-Dalukana	168, Soruwila, Dimbulagala	765688170
267	R M Ariyadasa	Male	693353782v	Manampitiya	Dalukana	210-Dalukana	31 /B/1, Namal Pokuna	721556032
268	N G P kirthirathna	Male	600332511v	Manampitiya	Dalukana	210-Dalukana	166, Namal Pokuna	785654173
269	A M Karunarathna	Male	593101053v	Manampitiya	Dalukana	210-Dalukana	143, Namal Pokuna	787229031

№	Name of the Farmer	Gender	NIC	ADC	UM Area	GN Division	Address	Mobile TP
270	H A Udayasiri	Male	671303172v	Manampitiya	Dimbulagala	211-Dimbulagala	26/D, Dibulagala	787543778
271	R A sarath manel	Male	763112543v	Manampitiya	Dalukana	210-Dalukana	238, E/Manampitiya	765405069
272	L G sunglasses shantha	Male	753091073 v	Manampitiya	Dalukana	210-Dalukana	17, Maliyadewapura, Dalukana	744600644
273	S Selwaraja	Male	782815741 v	Manampitiya	Dalukana	210-Dalukana	80, Namal Pokuna, Dalukana, Dimbulagala	762649305
274	G S murthi	Male	772572441 v	Manampitiya	Dalukana	210-Dalukana	22, Maliyadewapura, 1st step, Dimbulagala	782505287
275	N Janani	Female	908145127 v	Manampitiya	Dalukana	210-Dalukana	152, Namal Pokuna	767390378
276	A A Ranasinha Banda	Male	631163440 v	Manampitiya	Dalukana	210-Dalukana	15, 2nd step, Maliyadewapura	788478116
277	P Punidadevi	Female	845272220 v	Manampitiya	Dalukana	210-Dalukana	138, Namal Pokuna, Manampitiya	757305101
278	T Manaiktharaja	Male	520674713 v	Manampitiya	Dalukana	210-Dalukana	73, Namal Pokuna, Dalukana	
279	W A Nayana Kumari	Female	905894722 v	Manampitiya	Dalukana	210-Dalukana	146, Namal Pokuna, Manampitiya	783031112
280	H A Sumanadasha	Male	603090896 v	Manampitiya	Dalukana	210-Dalukana	28, Maliyadewapura, Manampitiya	725474523
281	K Pashkaran	Male	892881863 v	Manampitiya	Dalukana	210-Dalukana	135, Namal Pokuna, Manampitiya	782848645
282	S Lakshman	Male	911574381 v	Manampitiya	Dalukana	210-Dalukana	234, Sorivila, Dimbulagala	788716136
283	N K Mahinda Wijebandara	Male	197706801293	Manampitiya	Bogaswewa	252-Bogaswewa	7/12, Bogaswewa, Kashapapura	78380633
284	N G W M Wijesekara	Male	682063599 v	Manampitiya	Bogaswewa	252-Bogaswewa	357, Bogaswewa, Kashapapura	783197052
285	D V R G Saroja Damayanthi	Female	857170940 v	Manampitiya	Bogaswewa	252-Bogaswewa	350, Bogaswewa, Kashapapura	786542111
286	W M U G C Kumudu Kumari	Female	198365501990	Manampitiya	Bogaswewa	252-Bogaswewa	230, Bogaswewa, Kashapapura	773000302
287	A T G C Ambagaspitiya	Male	78259204 v	Manampitiya	Bogaswewa	252-Bogaswewa	165, Bogaswewa, Kashapapura	788659009
288	U R C K S B Udawaththa	Male	632993161 v	Manampitiya	Bogaswewa	252-Bogaswewa	248, Bogaswewa, Kashapapura	770655672
289	G P I H Preethi Kumari	Female	987791080v	Manampitiya	Dalukana	210-Dalukana	46, Dalukana	784268350
290	S A P Nilanthi Ramyamali	Female	856043843v	Manampitiya	Dalukana	210-Dalukana	02, Dalukana	783568892
291	H P Nimal Rathan	Male	652733344v	Manampitiya	Dalukana	210-Dalukana	162, Namal Pokuna	784785282
292	Y K Karunasena	Male	600330187v	Manampitiya	Dalukana	210-Dalukana	164, Namal Pokuna	719796551
293	R B Heenbanda	Male	650164377v	Manampitiya	Dalukana	210-Dalukana	03, II Piyawara Maliyadewapura	788429442
294	W D S Weerakkodi	Male	613073361v	Manampitiya	Dalukana	210-Dalukana	240, 2nd Mile post, Manampitiya	785251738
295	K A M S Kumara	Male	801173942v	Manampitiya	Dalukana	210-Dalukana	33, D/Sirigama, Dalukana	784424526

№	Name of the Farmer	Gender	NIC	ADC	UM Area	GN Division	Address	Mobile TP
296	R D Ranathunga	Male	742271072v	Manampitiya	Dalukana	210-Dalukana	D/02, Kudawewa, Dalukana	724602250
297	O Sekara Banda	Male	650054210v	Manampitiya	Dalukana	210-Dalukana	03, II Piyawara, Maliyadewapura	784793418
298	B Sekaran Dharmarathna	Male	642333470v	Manampitiya	Dalukana	210-Dalukana	175, Namal Pokuna	723803525
299	D Sunitha Jayasinha	Male	628480532 v	Manampitiya	Nawamillana	251-Nawamillana	156, Nawamillana, Dimbulagala	762725544
300	A Seelawathi	Female	685185148v	Manampitiya	Dalukana	210-Dalukana	171, Namal Pokuna	724928385

ANNEX 4: INSTITUTIONAL ROLES IN MAHAVELI SYSTEM B (SEVANAPITIYA AND DIMBULAGALA BLOCKS)

Agency/ committee	Officers responsible	Official functions assigned	Expected role in cluster development programme
Resident Project Managers Office	DRPM (Agriculture)	Provide extension support through field staff and maintain data system	Coordinate all the extension activities on new technology and crop management
	DRPM (Engineering)	All the irrigation matters water management, water allocation and operation and maintenance (O&M) of canal systems	Provide guidance to block managers and other staff involved in irrigation and other water management matters
	DRPM (Institutional Development)	Coordinate all Institutional development activities in the System B	Provide guidance to block managers to promote participation for proposed FPO programme in the System
	DRPM (Lands)	Coordinate and settlement of land issues in the System	Assist farmer organisations to settle land disputes and advise block managers accordingly
	Block Manager Agriculture Officer Unit Manager Field Assistants	All management functions in the Block Coordinate all agriculture activities and extension works Coordinate functions at unit level and making links with farmer organisations Make field arrangements at ground level	Provide support through field staff to carry out activities such as providing information, assist to select farmers through farmer organisations and carryout field operations with PPMU and ISP
Agrarian Development Department	Agrarian Development Officer Dimbulagala	Administering of Agrarian Research and Productivity Assistants attached to Agrarian Service centre. FPO registration under 56A and 56B as per request of Mahaveli Officials	Coordinate activities related to input supplies and make relevant the Agrarian Research and Productivity Assistants to work with MEA Officials
	Agrarian Research and Productivity Assistants	Assist the Agrarian Development Officer to implement field programmes with Mahaveli Officials	Communicate with FO members. Organise farmer meetings when requested by the Mahaveli Officials Agriculture Development Officer or Senior Officers
Project Agriculture committee at System level	Members of Project Agriculture Committee: RPM, Divisional secretaries Development Officer, All heads of Mahaveli System B. Block Managers and staff officers	Taking up for discussion of all issues related to agriculture, input supplies, seasonal cultivation decisions and marketing of agriculture produce. Find alternative solutions and assign the responsibilities for remedial actions	Take this forum to discuss the issues related to chilli cultivation and get the active involvement of relevant line agency officers
Agriculture Research Institute (Aralaganwila)	Research activities related to chilli crop, irrigation practices	Involve in research activities related to crops in the area	Provide research support

ANNEX 5: ESTABLISHMENT OF COMPOST PRODUCTION UNIT

1. Rationale

Soil productivity and environmental concerns have revived global interest in organic recycling practices such as composting. Composting considered as an attractive option for turning on-farm organic waste materials into a valuable farm resource. However, at present the quality of organic fertilisers could be considered as one of the most limiting resources in crop production. In this respect compost plays an important role to mitigate and solve the problem of inadequacy of suitable organic fertilisers in crop production.

An overall decline of soil fertility is a major problem associated with crop production in Sri Lanka. Decline of soil fertility is mainly due to depletion of soil organic matter and loss of plant nutrients. Organic matter decline takes place due to soil erosion, decomposition due to high soil temperatures and low attention to organic fertiliser added to soil. Low organic matter content in soil has created several problems such as yield decline and yield stagnation even in all crop sectors.

It is a well-known fact that the Cation Exchange Capacity of many Sri Lankan soils is low chiefly due to low organic matter content. Under such conditions, retention of plant nutrients is low and subsequently chemical fertiliser efficiency will decrease. Thus, many agricultural farming systems are becoming non-profitable to farmers even though heavy investments in many other farming activities. Hence, application of organic fertilisers such as compost will be a beneficial effect on crop yield as well as on over all soil fertility. In addition, compost could be considered as the most suitable organic fertiliser for crop production when compared to many other organic fertilisers due to its number of characteristics such as presence of decomposed organic materials, ready availability of plant nutrients, absence of weed seeds and pathogens, high efficiency, low volume etc.

One of the important contributions of compost is the high organic matter fraction, which improves the physical conditions of poor soils such as soil structure, texture, tilth, water holding capacity etc. In addition, compost also improves the chemical and biological properties of soils. Compost carries small quantities of growth promoting substances similar in nature to hormones. The application of organic fertilisers such as compost to soil will be useful for reducing the incidence of plant diseases. Addition of organic fertilisers suppressed the numbers of plant parasitic nematodes. However, in the recent past, most people were unaware that using composts is an effective way to increase healthy plant growth; help to save money by reduce the use of chemical fertilisers, and conserve natural resources while helping to recycle wastes.

2. Integrated plant nutrition system

The complementary role which organic and chemical fertilisers play in crop production is a popular fact. To improve soil fertility, it is important to follow environmentally friendly plant nutrition management practices under what has been termed the Integrated Plant Nutrition System (IPNS). This concept advocates the balanced use of both organic and chemical fertilisers for crop production. IPNS is considered as the most suitable plant nutrient management system to increase the crop yield while maintaining the good soil fertility. Since compost is one of the most important components of the IPNS technology production of compost will be an immense benefit for the development of the country. Therefore, ISP will undertake following steps in all clusters:

- Promote manufacturing of compost using available raw materials in cluster areas.
- Promote utilisation of compost and liquid organic fertilisers, thereby reduce the use of chemical fertilisers.

Farmers in Sri Lanka are used to applying only chemical fertiliser to their crops, and has been said to be a contributory factor towards gradual decline of fertility in the nation's soils. This situation is adversely affecting crop production in all clusters. Hence, the utilisation of organic fertiliser in addition to the chemical fertiliser is essential for successful crop production in clusters. In this regard, it is necessary to increase the overall organic fertiliser production in all clusters as well as in throughout the country. The objective of this modernisation investment and activity is to encourage farmers to produce total

requirement of compost within the cluster areas because transport of compost from long distance is not economical. Therefore, it is expected to encourage some producers to make large scale productions on commercial basis.

3. Objectives of the compost production programme

- Utilise freely available organic materials for crop production
- Creation of a favourable environment through recycling of organic waste materials
- Reduce chemical fertiliser use through compost production and use
- Popularise use organic fertiliser in addition to chemical fertilisers for crop production
- Increase chemical Fertiliser Use Efficiency
- Improve soil fertility and maintain sustainability
- Popularise quality compost production
- Minimise environmental pollution
- Economical crop production
- Minimise chemical fertiliser use
- Popularise proper waste management system
- Introduce compost production on commercial scale
- Emergence of a market for compost
- Initiate a compost sale as a viable business

At present the amount of waste materials which are freely available in clusters could be considered as important resources for successful compost production. They are rich in plant nutrients. In general, banana waste materials available in Rajanganaya and Jaffna are high in potassium. Waste minimisation is a very important aspect in banana crop production to minimise pest and diseases. Therefore, ISP will establish compost production in all clusters as an important intervention. This action will ensure increase the soil fertility in clusters as well as increase crop production and subsequent sustainability of agricultural crop production.

4. Site selection

Generally, well-chosen site can speed up the composting process. In this regard, well-drained area of the location is suitable for compost production. Similarly, shadier spot is more suitable so it does not dry out too quickly. Preparation of compost over soil or grasses is better than concrete floor, to take advantage of microbes and other decomposers. Site should be selected from reasonable distance of houses. The selected location should have access roads, electricity, water sources (well), area for unloading raw materials and loading final product, parking access, production area, processing area, storage facilities, small management room, changing room, lunch room, bathroom etc.

5. Steps of compost production process

1. Collection of raw materials
2. Production of compost
3. Drying
4. Crushing
5. Sieving
6. Packaging
7. Distribution
8. Marketing

6. Main activities under the compost production programme in clusters:

- Selection of farmers or FPOs those who can do compost production
- Registration of compost production in relevant authorities
- Collection of information on raw- materials availability in each cluster areas
- Selection of suitable sites in each cluster
- Establishment of compost production units in each cluster

- Training of farmers in groups through field demonstrations on complete package of the compost production
- Educate farmers on quick compost production technologies, maintenance of the quality, storage, stocks, run as a business etc.
- Arrange compost production with individuals or FPOs
- Laboratory testing of produced compost samples for quality testing
- Design bags with brand names and other relevant details
- Guide for marketing of compost

7. Buildings, Tools and Equipment Required for Compost Production Unit (100 t/month)

№	Item	Number
1.	Shovel	5
2.	Pitch fork	5
3.	Wheel barrow	5
4.	2-wheel tractor	1
5.	Boots	10 pairs
6.	Water pump 1”	1
7.	1” hose pipes	200m
8.	Chipper/ Shredder	1
9.	Black polythene (Gauge 750, 3ft width and double)	500kg
10.	Compost turner	1
11.	Rotary Sieve	1
12.	Weighing machine up to 100kg	1
13.	Manual Bag closer/ stitcher machine	2
14.	Small truck (Optional)	1
15.	Printed bags 25kg and 50kg	10,000 each
16.	Compost Aerator (Optional)	1
17.	Compost thermometer (Optional)	1
18.	Drying, processing and sieving hut 15m x 20m	1
19.	Storage building with basic office room, changing room and toilet 20m x40m	1
20.	Miscellaneous items	

8. Heap method of compost production

Heap method is more advantageous than any other methods for commercial compost productions. Under heap method aerobic composting takes place in the presence of oxygen. In this process, aerobic microorganisms break down organic matter and produce carbon dioxide, ammonia, water, heat and humus, producing the relatively stable organic end product. The heat generated accelerates the breakdown complex compounds such as proteins, fats, cellulose and hemi-cellulose in raw materials. In heap method the processing time is shorter. In addition, this process destroys harmful pathogens; as well as weed seeds due to undergo sufficiently high temperature. Therefore, aerobic composting is considered more efficient and effective than anaerobic composting for agricultural production.

The aerobic composting process starts with the formation of the pile. First, mesophilic organisms multiply rapidly with the temperature of 20 - 450C on the readily available sugars and amino acids. Under such conditions, they generate heat by their own metabolism and raise the temperature to a point where their own activities become suppressed. Then some thermophilic fungi and several thermophilic bacteria under the temperature range 50 - 700C or more continue the process, raising the temperature up to 650C or higher. In many cases, the temperature goes up to 70 - 800C and this peak heating phase is important for the quality of the compost as the heat kills pathogens and weed seeds.

The general process of producing compost involves piling the organic waste in long rows. The heap is usually started with 20-30 cm layer of different raw materials. Alternate layers should be placed with different raw materials available in the area in the heap. The manure, dung and animal urine are excellent for composting due to high nitrogen content and less C/N ratio. The application of Eppawala rock

phosphate is also an important step in compost production. It is well-known fact that quality of compost could be improved when rock phosphate is added. Different raw materials are placed until the pile is 1.5 - 2.0m high. It is advisable to maintain the width about 2 - 2.5m at the base for successful aeration. The sides are tapered so that the top is about 0.5m narrower in width than the base. The substrates should be piled loosely in a compost heap to provide better aeration within the heap. After 3-4 layers of raw materials normally apply sufficient water and compost activator/inoculant. After formation, the pile is covered with black polythene to retain heat and moisture but leave a sufficient space at the bottom for ventilation. The active composting stage is followed by turning stage, and the pile temperature decreases gradually with the time. Therefore, turning/mixing should be done every 3 - 4 weeks interval to activate the decomposition of raw materials.

However, maximum three turning/mixing steps are recommended during the whole period of the composting process due to high labour involvement for this process. At each turning, the material is mixed thoroughly and moistened with water and apply compost activator/inoculant such as Trichoderma fungus. In general, the C/N ratio should be maintained with carbonaceous and nitrogenous materials for successful decomposition. Under such conditions, compost can be typically produced within 8-12 weeks depend on raw materials used. In reasonably mature compost contains a wide range of particle sizes from fine grains to partly decomposed twigs and un-compostable fragments from refuse. Therefore, compost may need sieving by 4mm sieve before sending to the market. Mature compost should have a crumbly texture, an earthy smell and be dark brown or black in colour.

Compost has high market share in a growing market. Produced compost in the cluster has the option to sell directly to the end users such as cluster farmers and other farmers in the area. The government's stance on promoting local, organic fertiliser is a favourable signal for businesses venturing into the industry. Since, organic fertiliser is a major requirement for high productivity of crops and can be considered an essential product.

Disposal of banana waste is a major challenge for many banana farmers, due to the costs and logistics involved; with almost all farmers just dumping it inside their farms. Inefficient disposal of crop waste and other waste materials has a severe impact on the crop and the environment. Hence, production of compost using waste materials can mitigate the disposal problem as well to obtain useful organic fertilisers for crop production. In addition, this will be an additional venture for FPOs and cluster farmers.

9. Management of compost production unit

a. Approvals

Before initiating the compost facility, the person or FPO shall obtain the approval from relevant authorities of the area. Several regulatory regimes come into play prior to initiate compost production.

b. Management

Managing the composting process involves the balancing of several different variables, all impacting on the others. These interactions therefore need to be managed. Operators need to encourage the right conditions to aid microbial growth and activity. A careful balance of these variables results in a quality product, in minimum time, and considerably reduces the potential environmental impacts from the composting activity.

c. Compost quality

Quality Management systems play a fundamental part in good processing and product. Hence, person or FPO responsible for compost production in clusters shall produce compost that meets the standards established by Sri Lanka Standards Institution in 2019. In this regard, regular testing of compost samples should be undertaken.

d. Record keeping

The person or FPO will be responsible to establish and maintain an operating record for the compost facility. Records are needed in relation to: waste acceptance and disposal, validation and on-going assessment of process monitoring and sample testing, traceability, environmental monitoring and dispatched material.

10. Marketing

The marketing strategy needs to be prepared to market the compost in various market segments such as farmers, nurseries, institutions, home garden etc. The strategy includes product design, pricing, distribution and promotional strategies. The strategy will be used to market compost to ensure that activity is sustainable.

Overall, this activity has the success in demonstrating the application of composting technology to process the market waste. Both technical and financial feasibility of the application of this technology on a large scale will be demonstrated. Since, compost has high demand in many crop sectors it indicates that the production can be done in a sustainable manner which has additional advantages for the community.

The compost marketing and distribution system in Sri Lanka is a free enterprise mainly in the hands of the private sector. The present marketing channels through, which compost flow from the producer to the farmers and end users throughout the country consist of three main levels of handlers namely: Producers, Distributors and Dealers/ Retailers.

Establishing a price for a product is one of the most important marketing decisions. In a developing market or in a competitive market pricing is an important element in a marketing strategy. The pricing system should cover the cost of the product and the cost of marketing the product. However, it should be noted that price and quality of compost in local market is vary drastically. The sales promotion and market development activities should be done to stimulate demand, thus increase sales of the product. In marketing terms, compost must compete with the chemical fertilisers to be able to take a share of the latter's market. Therefore, promotional activities should be done to show the importance of usage of organic fertiliser in combination with chemical fertilisers as basal dose for annual crops and for perennial crops basal as well as for top dressings.

The means of promoting the sales of organic fertilisers include the following:

- Training farmers, extension officers, traders and other relevant target groups
- Field demonstrations, field days, field tours etc.
- Outdoor advertising / Billboards
- Use mass media for various promotional activities
- Poster displays in strategic places
- Distribution of samples for trial use
- Granting of promotional discounts on purchases
- Arrange credit facilities

11. Environmental impact

The unit will be established to minimise the environmental impact including measures to minimise odour, dust, leachate, etc. Breakdown of organic matter by aerobic oxidation produces no odours. It is important therefore, to supply sufficient air during the composting process. Another important aspect of some of the materials that can be used in composting is their attractiveness of flies. To avoid the problem, the suggestion is maintaining high temperature. Fly larvae are unlikely to survive if temperature is above 550C. In addition, by turning the heap and placing the outer material in the hot central region many of the larvae will be destroyed; satisfactory fly control is possible by proper turning. Similarly, maintain the high temperature is the most significant factor in causing the death of pathogens too. In addition, steps should be taken to avoid release of leachate to the environment by avoiding excess water use, construction a place to collect leachate and reuse for compost production etc. As a further safety measures, it is recommended that no compost unit be set up close to drinking water source. This should prevent any liquid percolating from the compost heap into the water supply, particularly during the rainy season.

ANNEX 6: INTERIM GUIDELINES ON COVID-19 OF WORLD BANK

ESF/SAFEGUARDS INTERIM NOTE: COVID-19 CONSIDERATIONS IN CONSTRUCTION/CIVIL WORKS PROJECTS

This note was issued on April 7, 2020 and includes links to the latest guidance as of this date (e.g. from WHO). Given the COVID-19 situation is rapidly evolving, when using this note it is important to check whether any updates to these external resources have been issued.

1. INTRODUCTION

The COVID-19 pandemic presents Governments with unprecedented challenges. Addressing COVID-19 related issues in both existing and new operations starts with recognizing that this is not business as usual and that circumstances require a highly adaptive responsive management design to avoid, minimize and manage what may be a rapidly evolving situation. In many cases, we will ask Borrowers to use reasonable efforts in the circumstances, recognizing that what may be possible today may be different next week (both positively, because more supplies and guidance may be available, and negatively, because the spread of the virus may have accelerated).

This interim note is intended to provide guidance to teams on how to support Borrowers in addressing key issues associated with COVID-19, and consolidates the advice that has already been provided over the past month. As such, it should be used in place of other guidance that has been provided to date. This note will be developed as the global situation and the Bank's learning (and that of others) develops. This is not a time when 'one size fits all'. More than ever, teams will need to work with Borrowers and projects to understand the activities being carried out and the risks that these activities may entail. Support will be needed in designing mitigation measures that are implementable in the context of the project. These measures will need to take into account capacity of the Government agencies, availability of supplies and the practical challenges of operations on-the-ground, including stakeholder engagement, supervision and monitoring. In many circumstances, communication itself may be challenging, where face-to-face meetings are restricted or prohibited, and where IT solutions are limited or unreliable.

This note emphasizes the importance of careful scenario planning, clear procedures and protocols, management systems, effective communication and coordination, and the need for high levels of responsiveness in a changing environment. It recommends assessing the current situation of the project, putting in place mitigation measures to avoid or minimize the chance of infection, and planning what to do if either project workers become infected or the work force includes workers from proximate communities affected by COVID-19. In many projects, measures to avoid or minimize will need to be implemented at the same time as dealing with sick workers and relations with the community, some of whom may also be ill or concerned about infection. Borrowers should understand the obligations that contractors have under their existing contracts (see Section 3), require contractors to put in place appropriate organizational structures (see Section 4) and develop procedures to address different aspects of COVID-19 (see Section 5).

2. CHALLENGES WITH CONSTRUCTION/CIVIL WORKS

Projects involving construction/civil works frequently involve a large work force, together with suppliers and supporting functions and services. The work force may comprise workers from international, national, regional, and local labor markets. They may need to live in on-site accommodation, lodge within communities close to work sites or return to their homes after work. There may be different contractors

permanently present on site, carrying out different activities, each with their own dedicated workers. Supply chains may involve international, regional and national suppliers facilitating the regular flow of goods and services to the project (including supplies essential to the project such as fuel, food, and water). As such there will also be regular flow of parties entering and exiting the site; support services, such as catering, cleaning services, equipment, material and supply deliveries, and specialist sub-contractors, brought in to deliver specific elements of the works.

Given the complexity and the concentrated number of workers, the potential for the spread of infectious disease in projects involving construction is extremely serious, as are the implications of such a spread. Projects may experience large numbers of the work force becoming ill, which will strain the project's health facilities, have implications for local emergency and health services and may jeopardize the progress of the construction work and the schedule of the project. Such impacts will be exacerbated where a work force is large and/or the project is in remote or under-serviced areas. In such circumstances, relationships with the community can be strained or difficult and conflict can arise, particularly if people feel they are being exposed to disease by the project or are having to compete for scarce resources. The project must also exercise appropriate precautions against introducing the infection to local communities.

3. DOES THE CONSTRUCTION CONTRACT COVER THIS SITUATION?

Given the unprecedented nature of the COVID-19 pandemic, it is unlikely that the existing construction/civil works contracts will cover all the things that a prudent contractor will need to do. Nevertheless, the first place for a Borrower to start is with the contract, determining what a contractor's existing obligations are, and how these relate to the current situation.

The obligations on health and safety will depend on what kind of contract exists (between the Borrower and the main contractor; between the main contractors and the sub-contractors). It will differ if the Borrower used the World Bank's standard procurement documents (SPDs) or used national bidding documents. If a FIDIC document has been used, there will be general provisions relating to health and safety. For example, the standard FIDIC, Conditions of Contract for Construction (Second Edition 2017), which contains no 'ESF enhancements', states (in the General Conditions, clause 6.7) that the Contractor will be required:

- to take all necessary precautions to maintain the health and safety of the Contractor's Personnel
- to appoint a health and safety officer at site, who will have the authority to issue directives for the purpose of maintaining the health and safety of all personnel authorized to enter and or work on the site and to take protective measures to prevent accidents
- to ensure, in collaboration with local health authorities, that medical staff, first aid facilities, sick bay, ambulance services and any other medical services specified are available at all times at the site and at any accommodation
- to ensure suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics

These requirements have been enhanced through the introduction of the ESF into the SPDs (edition dated July 2019). The general FIDIC clause referred to above has been strengthened to reflect the requirements of the ESF. Beyond FIDIC's general requirements discussed above, the Bank's Particular Conditions include a number of relevant requirements on the Contractor, including:

- to provide health and safety training for Contractor's Personnel (which include project workers and all personnel that the Contractor uses on site, including staff and other employees of the Contractor and Subcontractors and any other personnel assisting the Contractor in carrying out project activities)
- to put in place workplace processes for Contractor's Personnel to report work situations that are not safe or healthy
- gives Contractor's Personnel the right to report work situations which they believe are not safe or healthy, and to remove themselves from a work situation which they have a reasonable justification to believe presents an imminent and serious danger to their life or health (with no reprisal for reporting or removing themselves)
- requires measures to be in place to avoid or minimize the spread of diseases including measures to avoid or minimize the transmission of communicable diseases that may be associated with the influx of temporary or permanent contract-related labor
- to provide an easily accessible grievance mechanism to raise workplace concerns

Where the contract form used is FIDIC, the Borrower (as the Employer) will be represented by the Engineer (also referred to in this note as the Supervising Engineer). The Engineer will be authorized to exercise authority specified in or necessarily implied from the construction contract. In such cases, the Engineer (through its staff on site) will be the interface between the PIU and the Contractor. It is important therefore to understand the scope of the Engineer's responsibilities. It is also important to recognize that in the case of infectious diseases such as COVID-19, project management – through the Contractor/subcontractor hierarchy – is only as effective as the weakest link. A thorough review of management procedures/plans as they will be implemented through the entire contractor hierarchy is important. Existing contracts provide the outline of this structure; they form the basis for the Borrower to understand how proposed mitigation measures will be designed and how adaptive management will be implemented, and to start a conversation with the Contractor on measures to address COVID-19 in the project.

4. WHAT PLANNING SHOULD THE BORROWER BE DOING?

Task teams should work with Borrowers (PIUs) to confirm that projects (i) are taking adequate precautions to prevent or minimize an outbreak of COVID-19, and (ii) have identified what to do in the event of an outbreak. Suggestions on how to do this are set out below:

- The PIU, either directly or through the Supervising Engineer, should request details in writing from the main Contractor of the measures being taken to address the risks. As stated in Section 3, the construction contract should include health and safety requirements, and these can be used as the basis for identification of, and requirements to implement, COVID-19 specific measures. The measures may be presented as a contingency plan, as an extension of the existing project emergency and preparedness plan or as standalone procedures. The measures may be reflected in revisions to the project's health and safety manual. This request should be made in writing (following any relevant procedure set out in the contract between the Borrower and the contractor).

- In making the request, it may be helpful for the PIU to specify the areas that should be covered. This should include the items set out in Section 5 below and take into account current and relevant

guidance provided by national authorities, WHO and other organizations. See the list of references in the Annex to this note.

- The PIU should require the Contractor to convene regular meetings with the project health and safety specialists and medical staff (and where appropriate the local health authorities), and to take their advice in designing and implementing the agreed measures.

- Where possible, a senior person should be identified as a focal point to deal with COVID-19 issues. This can be a work supervisor or a health and safety specialist. This person can be responsible for coordinating preparation of the site and making sure that the measures taken are communicated to the workers, those entering the site and the local community. It is also advisable to designate at least one back-up person, in case the focal point becomes ill; that person should be aware of the arrangements that are in place.

- On sites where there are a number of contractors and therefore (in effect) different work forces, the request should emphasize the importance of coordination and communication between the different parties. Where necessary, the PIU should request the main contractor to put in place a protocol for regular meetings of the different contractors, requiring each to appoint a designated staff member (with back up) to attend such meetings. If meetings cannot be held in person, they should be conducted using whatever IT is available. The effectiveness of mitigation measures will depend on the weakest implementation, and therefore it is important that all contractors and sub-contractors understand the risks and the procedure to be followed.

- The PIU, either directly or through the Supervising Engineer, may provide support to projects in identifying appropriate mitigation measures, particularly where these will involve interface with local services, in particular health and emergency services. In many cases, the PIU can play a valuable role in connecting project representatives with local Government agencies, and helping coordinate a strategic response, which takes into account the availability of resources. To be most effective, projects should consult and coordinate with relevant Government agencies and other projects in the vicinity.

- Workers should be encouraged to use the existing project grievance mechanism to report concerns relating to COVID-19, preparations being made by the project to address COVID-19 related issues, how procedures are being implemented, and concerns about the health of their co-workers and other staff.

5. WHAT SHOULD THE CONTRACTOR COVER?

The Contractor should identify measures to address the COVID-19 situation. What will be possible will depend on the context of the project: the location, existing project resources, availability of supplies, capacity of local emergency/health services, the extent to which the virus already exist in the area. A systematic approach to planning, recognizing the challenges associated with rapidly changing circumstances, will help the project put in place the best measures possible to address the situation. As discussed above, measures to address COVID-19 may be presented in different ways (as a contingency plan, as an extension of the existing project emergency and preparedness plan or as standalone procedures). PIUs and contractors should refer to guidance issued by relevant authorities, both national

and international (e.g. WHO), which is regularly updated (see sample References and links provided in the Annex).

Addressing COVID-19 at a project site goes beyond occupational health and safety, and is a broader project issue which will require the involvement of different members of a project management team. In many cases, the most effective approach will be to establish procedures to address the issues, and then to ensure that these procedures are implemented systematically. Where appropriate given the project context, a designated team should be established to address COVID-19 issues, including PIU representatives, the Supervising Engineer, management (e.g. the project manager) of the contractor and sub-contractors, security, and medical and OHS professionals. Procedures should be clear and straightforward, improved as necessary, and supervised and monitored by the COVID-19 focal point(s). Procedures should be documented, distributed to all contractors, and discussed at regular meetings to facilitate adaptive management. The issues set out below include a number that represent expected good workplace management but are especially pertinent in preparing the project response to COVID-19.

(a) ASSESSING WORKFORCE CHARACTERISTICS

Many construction sites will have a mix of workers e.g. workers from the local communities; workers from a different part of the country; workers from another country. Workers will be employed under different terms and conditions and be accommodated in different ways. Assessing these different aspects of the workforce will help in identifying appropriate mitigation measures:

- The Contractor should prepare a detailed profile of the project work force, key work activities, schedule for carrying out such activities, different durations of contract and rotations (e.g. 4 weeks on, 4 weeks off).
- This should include a breakdown of workers who reside at home (i.e. workers from the community), workers who lodge within the local community and workers in on-site accommodation. Where possible, it should also identify workers that may be more at risk from COVID-19, those with underlying health issues or who may be otherwise at risk.
- Consideration should be given to ways in which to minimize movement in and out of site. This could include lengthening the term of existing contracts, to avoid workers returning home to affected areas, or returning to site from affected areas.
- Workers accommodated on site should be required to minimize contact with people near the site, and in certain cases be prohibited from leaving the site for the duration of their contract, so that contact with local communities is avoided.
- Consideration should be given to requiring workers lodging in the local community to move to site accommodation (subject to availability) where they would be subject to the same restrictions.
- Workers from local communities, who return home daily, weekly or monthly, will be more difficult to manage. They should be subject to health checks at entry to the site (as set out above) and at some point, circumstances may make it necessary to require them to either use accommodation on site or not to come to work.

(b) ENTRY/EXIT TO THE WORK SITE AND CHECKS ON COMMENCEMENT OF WORK

Entry/exit to the work site should be controlled and documented for both workers and other parties, including support staff and suppliers. Possible measures may include:

- Establishing a system for controlling entry/exit to the site, securing the boundaries of the site, and establishing designating entry/exit points (if they do not already exist). Entry/exit to the site should be documented.
- Training security staff on the (enhanced) system that has been put in place for securing the site and controlling entry and exit, the behaviors required of them in enforcing such system and any COVID - 19 specific considerations.
- Training staff who will be monitoring entry to the site, providing them with the resources they need to document entry of workers, conducting temperature checks and recording details of any worker that is denied entry.
- Confirming that workers are fit for work before they enter the site or start work. While procedures should already be in place for this, special attention should be paid to workers with underlying health issues or who may be otherwise at risk. Consideration should be given to demobilization of staff with underlying health issues.
- Checking and recording temperatures of workers and other people entering the site or requiring self-reporting prior to or on entering the site.
- Providing daily briefings to workers prior to commencing work, focusing on COVID-19 specific considerations including cough etiquette, hand hygiene and distancing measures, using demonstrations and participatory methods.
- During the daily briefings, reminding workers to self-monitor for possible symptoms (fever, cough) and to report to their supervisor or the COVID-19 focal point if they have symptoms or are feeling unwell.
- Preventing a worker from an affected area or who has been in contact with an infected person from returning to the site for 14 days or (if that is not possible) isolating such worker for 14 days.
- Preventing a sick worker from entering the site, referring them to local health facilities if necessary or requiring them to isolate at home for 14 days.

(c) GENERAL HYGIENE

Requirements on general hygiene should be communicated and monitored, to include:

- Training workers and staff on site on the signs and symptoms of COVID-19, how it is spread, how to protect themselves (including regular handwashing and social distancing) and what to do if they or other people have symptoms (for further information see WHO COVID-19 advice for the public).
- Placing posters and signs around the site, with images and text in local languages.
- Ensuring handwashing facilities supplied with soap, disposable paper towels and closed waste bins exist at key places throughout site, including at entrances/exits to work areas; where there is a toilet, canteen or food distribution, or provision of drinking water; in worker accommodation; at waste stations; at stores; and in common spaces. Where handwashing facilities do not exist or are not adequate, arrangements should be made to set them up. Alcohol based sanitizer (if available, 60-95% alcohol) can also be used.
- Review worker accommodations, and assess them in light of the requirements set out in IFC/EBRD guidance on Workers' Accommodation: processes and standards, which provides valuable guidance as to good practice for accommodation.
- Setting aside part of worker accommodation for precautionary self-quarantine as well as more formal isolation of staff who may be infected (see paragraph (f)).

(d) CLEANING AND WASTE DISPOSAL

Conduct regular and thorough cleaning of all site facilities, including offices, accommodation, canteens, common spaces. Review cleaning protocols for key construction equipment (particularly if it is being operated by different workers). This should include:

- Providing cleaning staff with adequate cleaning equipment, materials and disinfectant.
- Review general cleaning systems, training cleaning staff on appropriate cleaning procedures and appropriate frequency in high use or high-risk areas.
- Where it is anticipated that cleaners will be required to clean areas that have been or are suspected to have been contaminated with COVID-19, providing them with appropriate PPE: gowns or aprons, gloves, eye protection (masks, goggles or face screens) and boots or closed work shoes. If appropriate PPE is not available, cleaners should be provided with best available alternatives.
- Training cleaners in proper hygiene (including handwashing) prior to, during and after conducting cleaning activities; how to safely use PPE (where required); in waste control (including for used PPE and cleaning materials).
- Any medical waste produced during the care of ill workers should be collected safely in designated containers or bags and treated and disposed of following relevant requirements (e.g., national, WHO). If open burning and incineration of medical wastes is necessary, this should be for as limited a duration as possible. Waste should be reduced and segregated, so that only the smallest amount of waste is incinerated (for further information see WHO interim guidance on water, sanitation and waste management for COVID-19).

(e) ADJUSTING WORK PRACTICES

Consider changes to work processes and timings to reduce or minimize contact between workers, recognizing that this is likely to impact the project schedule. Such measures could include:

- Decreasing the size of work teams.
- Limiting the number of workers on site at any one time.
- Changing to a 24-hour work rotation.
- Adapting or redesigning work processes for specific work activities and tasks to enable social distancing, and training workers on these processes.
- Continuing with the usual safety trainings, adding COVID-19 specific considerations. Training should include proper use of normal PPE. While as of the date of this note, general advice is that construction workers do not require COVID-19 specific PPE, this should be kept under review (for further information see WHO interim guidance on rational use of personal protective equipment (PPE) for COVID-19).
- Reviewing work methods to reduce use of construction PPE, in case supplies become scarce or the PPE is needed for medical workers or cleaners. This could include, e.g. trying to reduce the need for dust masks by checking that water sprinkling systems are in good working order and are maintained or reducing the speed limit for haul trucks.
- Arranging (where possible) for work breaks to be taken in outdoor areas within the site.
- Consider changing canteen layouts and phasing meal times to allow for social distancing and phasing access to and/or temporarily restricting access to leisure facilities that may exist on site, including gyms.

- At some point, it may be necessary to review the overall project schedule, to assess the extent to which it needs to be adjusted (or work stopped completely) to reflect prudent work practices, potential exposure of both workers and the community and availability of supplies, taking into account Government advice and instructions.

(f) PROJECT MEDICAL SERVICES

Consider whether existing project medical services are adequate, taking into account existing infrastructure (size of clinic/medical post, number of beds, isolation facilities), medical staff, equipment and supplies, procedures and training. Where these are not adequate, consider upgrading services where possible, including:

- Expanding medical infrastructure and preparing areas where patients can be isolated. Guidance on setting up isolation facilities is set out in WHO interim guidance on considerations for quarantine of individuals in the context of containment for COVID-19). Isolation facilities should be located away from worker accommodation and ongoing work activities. Where possible, workers should be provided with a single well-ventilated room (open windows and door). Where this is not possible, isolation facilities should allow at least 1 meter between workers in the same room, separating workers with curtains, if possible. Sick workers should limit their movements, avoiding common areas and facilities and not be allowed visitors until they have been clear of symptoms for 14 days. If they need to use common areas and facilities (e.g. kitchens or canteens), they should only do so when unaffected workers are not present and the area/facilities should be cleaned prior to and after such use.
- Training medical staff, which should include current WHO advice on COVID-19 and recommendations on the specifics of COVID-19. Where COVID-19 infection is suspected, medical providers on site should follow WHO interim guidance on infection prevention and control during health care when novel coronavirus (nCoV) infection is suspected.
- Training medical staff in testing, if testing is available.
- Assessing the current stock of equipment, supplies and medicines on site, and obtaining additional stock, where required and possible. This could include medical PPE, such as gowns, aprons, medical masks, gloves, and eye protection. Refer to WHO guidance as to what is advised (for further information see WHO interim guidance on rational use of personal protective equipment (PPE) for COVID-19).
- If PPE items are unavailable due to world-wide shortages, medical staff on the project should agree on alternatives and try to procure them. Alternatives that may commonly be found on constructions sites include dust masks, construction gloves and eye goggles. While these items are not recommended, they should be used as a last resort if no medical PPE is available.
- Ventilators will not normally be available on work sites, and in any event, intubation should only be conducted by experienced medical staff. If a worker is extremely ill and unable to breathe properly on his or her own, they should be referred immediately to the local hospital (see (g) below).
- Review existing methods for dealing with medical waste, including systems for storage and disposal (for further information see WHO interim guidance on water, sanitation and waste management for COVID-19, and WHO guidance on safe management of wastes from health-care activities).

(g) LOCAL MEDICAL AND OTHER SERVICES

Given the limited scope of project medical services, the project may need to refer sick workers to local medical services. Preparation for this includes:

- Obtaining information as to the resources and capacity of local medical services (e.g. number of beds, availability of trained staff and essential supplies).
- Conducting preliminary discussions with specific medical facilities, to agree what should be done in the event of ill workers needing to be referred.
- Considering ways in which the project may be able to support local medical services in preparing for members of the community becoming ill, recognizing that the elderly or those with pre-existing medical conditions require additional support to access appropriate treatment if they become ill.
- Clarifying the way in which an ill worker will be transported to the medical facility, and checking availability of such transportation.
- Establishing an agreed protocol for communications with local emergency/medical services.
- Agreeing with the local medical services/specific medical facilities the scope of services to be provided, the procedure for in-take of patients and (where relevant) any costs or payments that may be involved.
- A procedure should also be prepared so that project management knows what to do in the unfortunate event that a worker ill with COVID-19 dies. While normal project procedures will continue to apply, COVID-19 may raise other issues because of the infectious nature of the disease. The project should liaise with the relevant local authorities to coordinate what should be done, including any reporting or other requirements under national law.

(h) INSTANCES OR SPREAD OF THE VIRUS

WHO provides detailed advice on what should be done to treat a person who becomes sick or displays symptoms that could be associated with the COVID-19 virus (for further information see WHO interim guidance on infection prevention and control during health care when novel coronavirus (nCoV) infection is suspected). The project should set out risk-based procedures to be followed, with differentiated approaches based on case severity (mild, moderate, severe, critical) and risk factors (such as age, hypertension, diabetes) (for further information see WHO interim guidance on operational considerations for case management of COVID-19 in health facility and community). These may include the following:

- If a worker has symptoms of COVID-19 (e.g. fever, dry cough, fatigue) the worker should be removed immediately from work activities and isolated on site.
- If testing is available on site, the worker should be tested on site. If a test is not available at site, the worker should be transported to the local health facilities to be tested (if testing is available).
- If the test is positive for COVID-19 or no testing is available, the worker should continue to be isolated. This will either be at the work site or at home. If at home, the worker should be transported to their home in transportation provided by the project.
- Extensive cleaning procedures with high-alcohol content disinfectant should be undertaken in the area where the worker was present, prior to any further work being undertaken in that area. Tools used by the worker should be cleaned using disinfectant and PPE disposed of.
- Co-workers (i.e. workers with whom the sick worker was in close contact) should be required to stop work, and be required to quarantine themselves for 14 days, even if they have no symptoms.

- Family and other close contacts of the worker should be required to quarantine themselves for 14 days, even if they have no symptoms.
- If a case of COVID-19 is confirmed in a worker on the site, visitors should be restricted from entering the site and worker groups should be isolated from each other as much as possible.
- If workers live at home and has a family member who has a confirmed or suspected case of COVID-19, the worker should quarantine themselves and not be allowed on the project site for 14 days, even if they have no symptoms.
- Workers should continue to be paid throughout periods of illness, isolation or quarantine, or if they are required to stop work, in accordance with national law.
- Medical care (whether on site or in a local hospital or clinic) required by a worker should be paid for by the employer.

(i) CONTINUITY OF SUPPLIES AND PROJECT ACTIVITIES

Where COVID-19 occurs, either in the project site or the community, access to the project site may be restricted, and movement of supplies may be affected.

- Identify back-up individuals, in case key people within the project management team (PIU, Supervising Engineer, Contractor, sub-contractors) become ill, and communicate who these are so that people are aware of the arrangements that have been put in place.
- Document procedures, so that people know what they are, and are not reliant on one person's knowledge.
- Understand the supply chain for necessary supplies of energy, water, food, medical supplies and cleaning equipment, consider how it could be impacted, and what alternatives are available. Early pro-active review of international, regional and national supply chains, especially for those supplies that are critical for the project, is important (e.g. fuel, food, medical, cleaning and other essential supplies). Planning for a 1-2 month interruption of critical goods may be appropriate for projects in more remote areas.
- Place orders for/procure critical supplies. If not available, consider alternatives (where feasible).
- Consider existing security arrangements, and whether these will be adequate in the event of interruption to normal project operations.
- Consider at what point it may become necessary for the project to significantly reduce activities or to stop work completely, and what should be done to prepare for this, and to re-start work when it becomes possible or feasible.

(j) TRAINING AND COMMUNICATION WITH WORKERS

Workers need to be provided with regular opportunities to understand their situation, and how they can best protect themselves, their families and the community. They should be made aware of the procedures that have been put in place by the project, and their own responsibilities in implementing them.

- It is important to be aware that in communities close to the site and amongst workers without access to project management, social media is likely to be a major source of information. This raises the importance of regular information and engagement with workers (e.g. through training, town halls, tool boxes) that emphasizes what management is doing to deal with the risks of COVID-19. Allaying fear is an important aspect of work force peace of mind and business continuity. Workers should be given an opportunity to ask questions, express their concerns, and make suggestions.

- Training of workers should be conducted regularly, as discussed in the sections above, providing workers with a clear understanding of how they are expected to behave and carry out their work duties.
- Training should address issues of discrimination or prejudice if a worker becomes ill and provide an understanding of the trajectory of the virus, where workers return to work.
- Training should cover all issues that would normally be required on the work site, including use of safety procedures, use of construction PPE, occupational health and safety issues, and code of conduct, taking into account that work practices may have been adjusted.
- Communications should be clear, based on fact and designed to be easily understood by workers, for example by displaying posters on handwashing and social distancing, and what to do if a worker displays symptoms.

(k) COMMUNICATION AND CONTACT WITH THE COMMUNITY

Relations with the community should be carefully managed, with a focus on measures that are being implemented to safeguard both workers and the community. The community may be concerned about the presence of non-local workers, or the risks posed to the community by local workers presence on the project site. The project should set out risk-based procedures to be followed , which may reflect WHO guidance (for further information see WHO Risk Communication and Community Engagement (RCCE) Action Plan Guidance COVID-19 Preparedness and Response). The following good practice should be considered:

- Communications should be clear, regular, based on fact and designed to be easily understood by community members.
- Communications should utilize available means. In most cases, face-to-face meetings with the community or community representatives will not be possible. Other forms of communication should be used; posters, pamphlets, radio, text message, electronic meetings. The means used should take into account the ability of different members of the community to access them, to make sure that communication reaches these groups.
- The community should be made aware of procedures put in place at site to address issues related to COVID-19. This should include all measures being implemented to limit or prohibit contact between workers and the community. These need to be communicated clearly, as some measures will have financial implications for the community (e.g. if workers are paying for lodging or using local facilities). The community should be made aware of the procedure for entry/exit to the site, the training being given to workers and the procedure that will be followed by the project if a worker becomes sick.
- If project representatives, contractors or workers are interacting with the community, they should practice social distancing and follow other COVID-19 guidance issued by relevant authorities, both national and international (e.g. WHO).

6. EMERGENCY POWERS AND LEGISLATION

Many Borrowers are enacting emergency legislation. The scope of such legislation, and the way it interacts with other legal requirements, will vary from country to country. Such legislation can cover a range of issues, for example:

- Declaring a public health emergency

- Authorizing the use of police or military in certain activities (e.g. enforcing curfews or restrictions on movement)
- Ordering certain categories of employees to work longer hours, not to take holiday or not to leave their job (e.g. health workers)
- Ordering non-essential workers to stay at home, for reduced pay or compulsory holiday

Except in exceptional circumstances (after referral to the World Bank's Operations Environmental and Social Review Committee (OESRC)), projects will need to follow emergency legislation to the extent that these are mandatory or advisable. It is important that the Borrower understands how mandatory requirements of the legislation will impact the project. Teams should require Borrowers (and in turn, Borrowers should request Contractors) to consider how the emergency legislation will impact the obligations of the Borrower set out in the legal agreement and the obligations set out in the construction contracts. Where the legislation requires a material departure from existing contractual obligations, this should be documented, setting out the relevant provisions.

ANNEX

WHO Guidance

Advice for the public

WHO advice for the public, including on social distancing, respiratory hygiene, self-quarantine, and seeking medical advice, can be consulted on this WHO website:
https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public

Technical guidance

Infection prevention and control during health care when novel coronavirus (nCoV) infection is suspected, issued on 19 March 2020

Coronavirus disease (COVID-19) outbreak: rights, roles and responsibilities of health workers, including key considerations for occupational safety and health, issued on 18 March 2020

Risk Communication and Community Engagement (RCCE) Action Plan Guidance COVID-19 Preparedness and Response, issued on 16 March 2020

Considerations for quarantine of individuals in the context of containment for coronavirus disease (COVID-19), issued on 19 March 2020

Operational considerations for case management of COVID-19 in health facility and community, issued on 19 March 2020

Rational use of personal protective equipment for coronavirus disease 2019 (COVID-19), issued on 27 February 2020

Getting your workplace ready for COVID-19, issued on 19 March 2020

Water, sanitation, hygiene and waste management for COVID-19, issued on 19 March 2020

Safe management of wastes from health-care activities issued in 2014

Advice on the use of masks in the community, during home care and in healthcare settings in the context of the novel coronavirus (COVID-19) outbreak, issued on March 19, 2020

ILO GUIDANCE

ILO Standards and COVID-19 FAQ, issued on March 23, 2020 (provides a compilation of answers to most frequently asked questions related to international labor standards and COVID-19)

MFI GUIDANCE

IDB Invest Guidance for Infrastructure Projects on COVID-19: A Rapid Risk Profile and Decision Framework

INTERIM GUIDANCE ON COVID-19 VERSION 1: APRIL 7, 2020

KfW DEG COVID-19 Guidance for employers, issued on 31 March 2020

CDC Group COVID-19 Guidance for Employers, issued on 23 March 2020

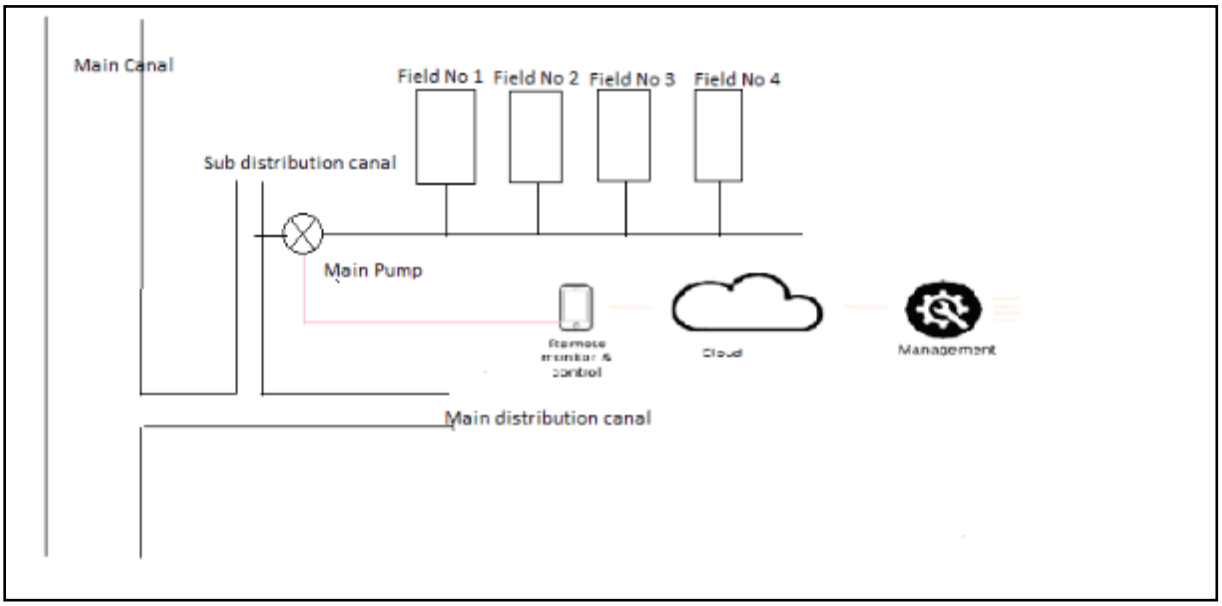
ANNEX 7: CLUSTER SCALE OR COMMUNAL MICRO IRRIGATION SYSTEM

The ASMP pilot projects and some other earlier small projects funded by grants have found that farmers that were given drip irrigation systems do not manage them properly. Often, the systems are abandoned. In most cases, farmers use the systems sparingly, not supplying the amount of water required for optimum production by the crops of interest for example one farmer interviewed only applies water to his crop once per month. He feels is too expensive to turn on the petrol-fuelled water pump more than once a month.

Another common issue with drip systems given to farmers by the ASMP is a severe lack of maintenance. As a result, emitters clog easily. In addition, farmers were not trained properly to use the equipment for fertigation purposes. They do not know how to schedule irrigation cycles to maximise the efficiency of the systems and meet crop demands under different conditions of rainfall, evaporation and the stage in the crop's growth cycle.

Moreover, low pressure irrigation systems such as drip and mini sprinklers are expensive to acquire for small plots of land by individual farmers, mostly because of the cost of the "head" or control centre necessary to operate these systems properly.

Figure 17: Cluster automated micro irrigation system



The advent of automated low pressure irrigation systems has provided an efficient way to easily manage such systems, even remotely, using laptop computers and/or cellular phones. Automation can facilitate the management of these systems in large and small tracts of land. One control centre will manage several hundred hectares of low pressure irrigation with very low manpower requirements. One individual is capable of such task with very little training. Different types of sensors and weather station equipment supplement the hardware necessary to execute many system functions automatically and at a high level of efficiency making the complexity of irrigation management by making it easier. The technology has, additionally, lightened the operational and managerial load for farmers on critical aspects of production such as watering and fertilising. Even the maintenance of the system can be programmed for execution by the control centre. In addition, by having one control centre for several hundreds of hectares of irrigation, the cost per farmer of these systems has also been decreased through economy of scale.

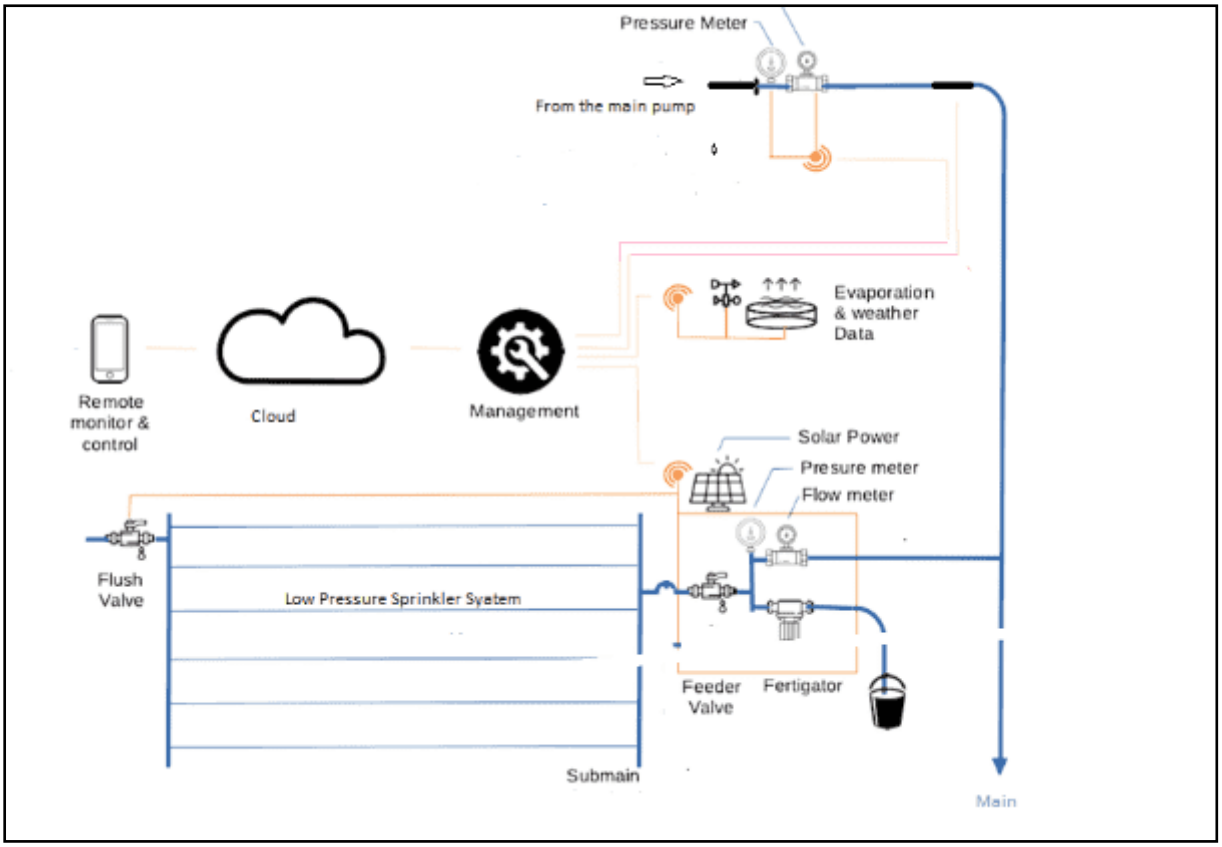
Such communal systems are ideal for the ASMP cluster and ATDP's development model. Perhaps one of the drawbacks is that a tailored made design is required for every location and every situation in order to maximise the communality of the systems. Nevertheless, the concept itself fits the cluster concept like a glove because it calls for a grouping of farmers working towards a common commercial goal.

To improve the irrigation system in for chilli and priority food security crop demonstration areas (0.2 ha each), a communal pressurised micro irrigation system will be established with programmable automatic control. The system will be established for 50 demonstration plots. Land preparation techniques, water saving irrigation techniques will be introduced in the demonstration plots.

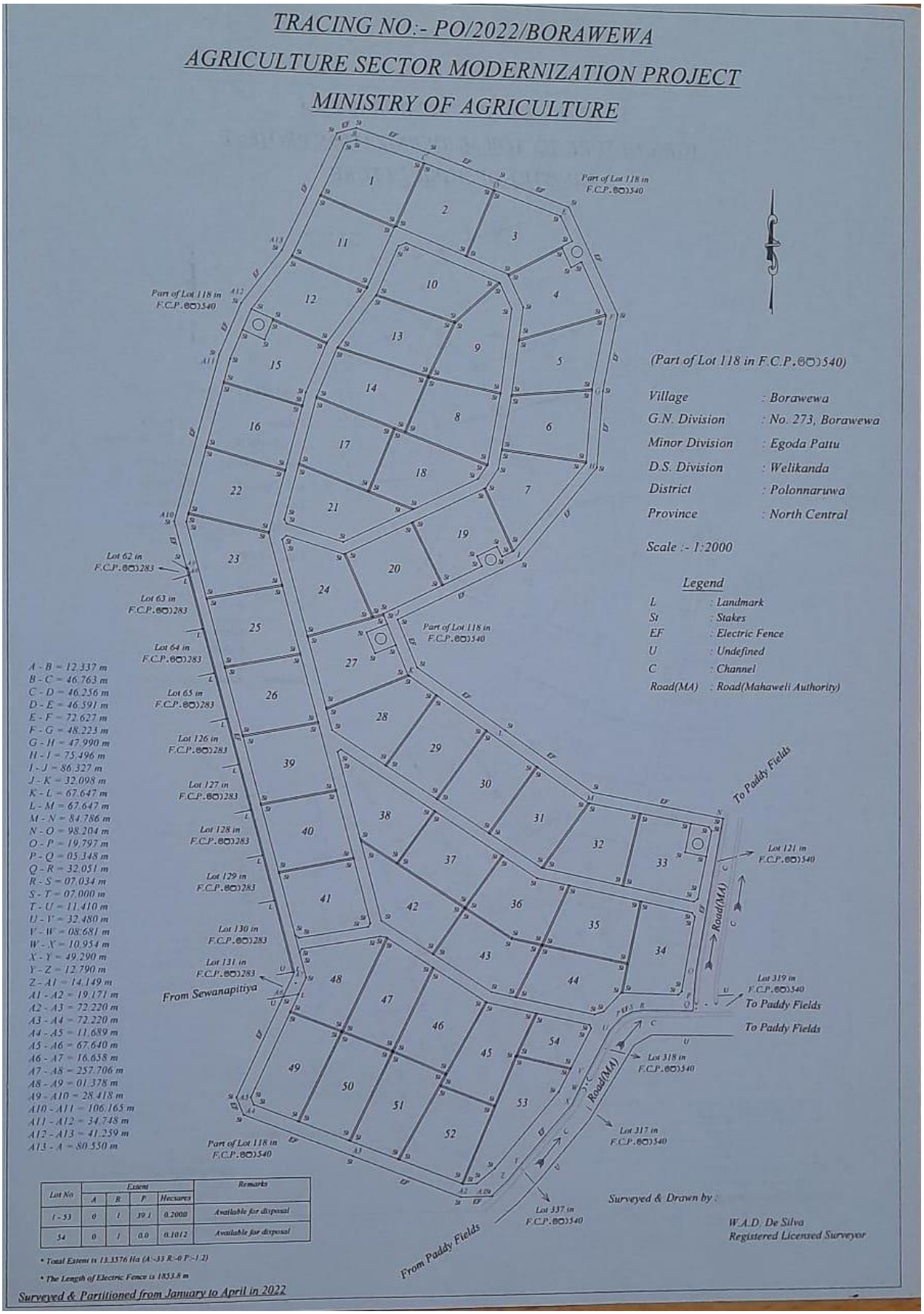
Renovation to the present drainage system has to be done in consultation with the Mahaweli irrigation engineer, Dimbulagala and Welikanda. Irrigation water for the chilli cluster area is from Mahaweli irrigation canals managed by Mahaweli Authority. Institutional aspects of irrigation water supply to the Mahaweli system are coordinated by the Mahaweli Authority through Resident Project Manager.

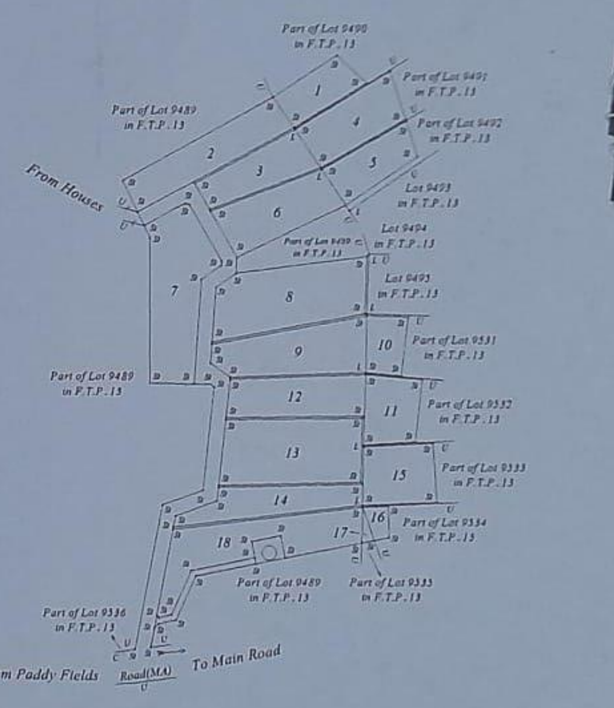
The mechanism for water distribution, O&M for each unit is with chilli farmers Distributary Canal Organisation already functioning under the RPM of Mahaweli system B of MASL. According to the amended irrigation ordinance, the DCO is responsible for water distribution, O&M, in the particular of the distributary and field canals on which farm outlets are located. Most of these chilli farmers are members of DCO or successors of DCO members.

Figure 18: Field layout of micro irrigation system



ANNEX 8: SURVEY PLANS AND CONSENT LETTERS FROM MASL FOR LANDS ALLOCATED FOR CHILLI CULTIVATION





TRACING NO:- PO/2022/RATHMALTHENNA

AGRICULTURE SECTOR MODERNIZATION PROJECT

MINISTRY OF AGRICULTURE

Lot No	Extent				Remarks
	A	R	P	Hectares	
1	0	0	26.0	0.0656	Part of Lot 9490 in Final Topo Plan 13
2	0	1	13.1	0.1344	Part of Lot 9489 in Final Topo Plan 13, Available for disposal
3	0	0	37.0	0.0936	Part of Lot 9489 in Final Topo Plan 13, Available for disposal
4	0	1	2.1	0.1064	Part of Lot 9491 in Final Topo Plan 13
5	0	0	30.6	0.0774	Part of Lot 9492 in Final Topo Plan 13
6	0	1	8.5	0.1226	Part of Lot 9489 in Final Topo Plan 13, Available for disposal
7	0	1	39.1	0.2000	Part of Lot 9489 in Final Topo Plan 13, Available for disposal
8	0	1	39.1	0.2000	Part of Lot 9489 in Final Topo Plan 13, Available for disposal
9	0	1	19.7	0.1510	Part of Lot 9489 in Final Topo Plan 13, Available for disposal
10	0	0	19.4	0.0490	Part of Lot 9531 in Final Topo Plan 13
11	0	0	31.4	0.0794	Part of Lot 9532 in Final Topo Plan 13
12	0	1	7.7	0.1206	Part of Lot 9489 in Final Topo Plan 13, Available for disposal
13	0	1	39.1	0.2000	Part of Lot 9489 in Final Topo Plan 13, Available for disposal
14	0	1	1.9	0.1058	Part of Lot 9489 in Final Topo Plan 13, Available for disposal
15	0	0	37.2	0.0942	Part of Lot 9533 in Final Topo Plan 13
16	0	0	5.5	0.0143	Part of Lot 9534 in Final Topo Plan 13
17	0	0	2.0	0.0032	Part of Lot 9535 in Final Topo Plan 13, Available for disposal
18	0	1	31.3	0.1803	Part of Lot 9489 in Final Topo Plan 13, Available for disposal

* Total Extent is 2.3297 Ha (A:-5 R:-3 P:-1.1)

(Part of Lot 9489,9490,9491,9492,9531, 9532,9533,9534,9535 in Final Topo Plan 13)

Village	: Rathmalthenna (System 'B', Block 507)
G.N. Division	: No. 247, Rathmalthenna
Minor Division	: Egoda Pattu
D.S. Division	: Dimbulagala
District	: Polonnaruwa
Province	: North Central

Scale :- 1:2000

Legend

L	: Landmark
St	: Stakes
EF	: Electric Fence
U	: Undefined
C	: Channel
Road(MA)	: Road(Mahaweli Authority)

Surveyed & Drawn by :

W.A.D. De Silva
Registered Licensed Surveyor

Surveyed & Partitioned from January to April in 2022

TRACING NO:- PO/2022/WEERANA

AGRICULTURE SECTOR MODERNIZATION PROJECT

MINISTRY OF AGRICULTURE

(Part of Lot 4 in CADASTRAL MAP120009)

Village : Weerana
G.N. Division : No. 250, Weerana
Minor Division : Egoda Pattu
D.S. Division : Dimbulagala
District : Polonnaruwa
Province : North Central

Scale :- 1:2000

Legend

St : Stakes
E.F : Electric Fence
U : Undefined
C : Channel
Road(MA) : Road(Mahaweli Authority)

Surveyed & Drawn by :

W.A.D. De Silva
Registered Licensed Surveyor

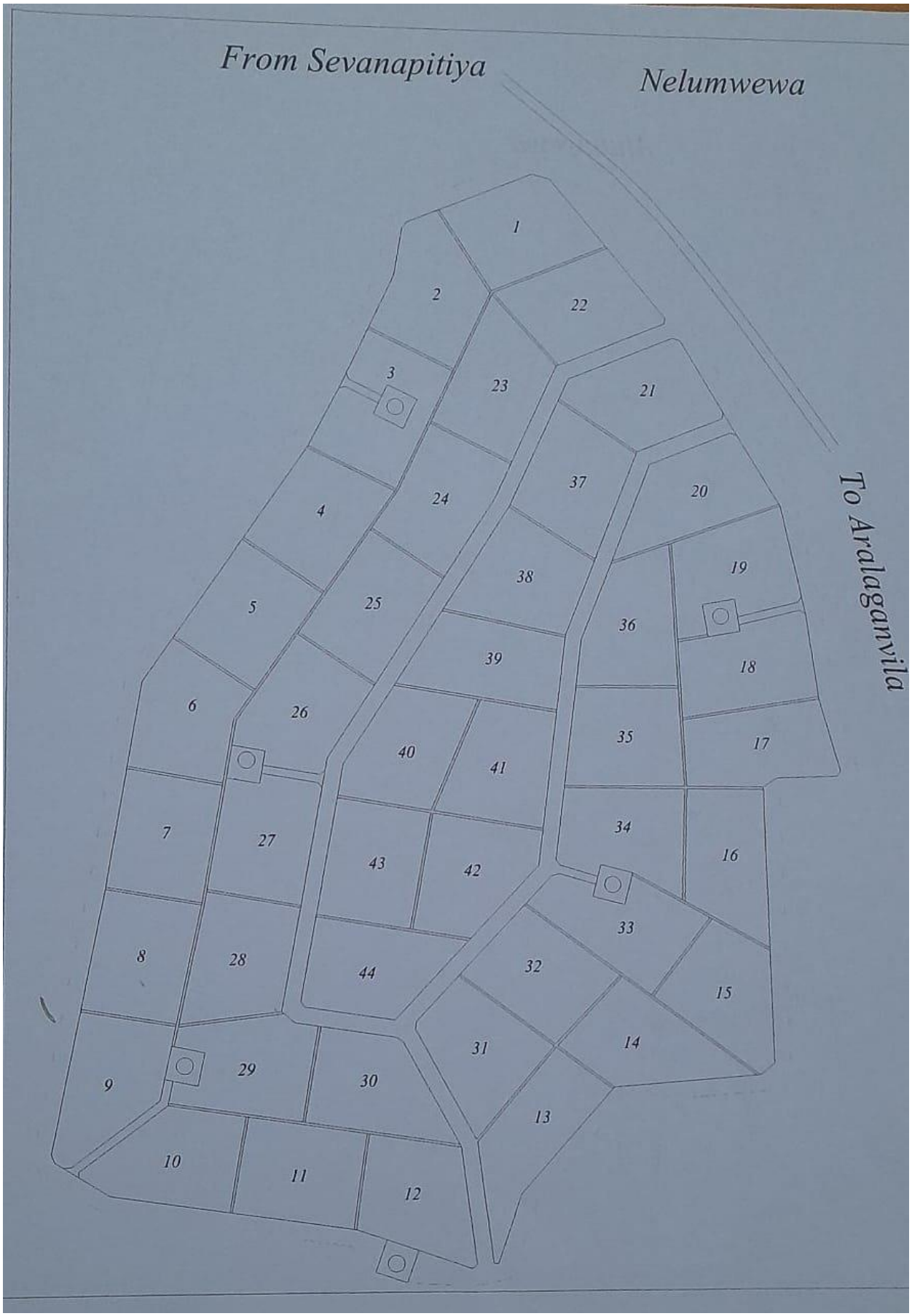
A - B – 38.876 m
B - C – 11.332 m
C - D – 65.653 m
D - E – 39.808 m
E - F – 86.189 m
F - G – 34.657 m
G - H – 52.358 m
H - I – 37.771 m
I - J – 35.246 m
J - K – 35.098 m
K - L – 110.589 m
L - M – 24.758 m
M - N – 46.121 m
N - O – 10.523 m
O - P – 19.840 m
P - Q – 26.430 m
Q - R – 31.816 m
R - S – 12.663 m
S - T – 24.167 m
T - U – 28.138 m
U - V – 20.858 m
V - W – 07.369 m
W - X – 42.641 m
X - Y – 34.126 m
Y - Z – 80.298 m
Z - A – 37.196 m

Lot No	Extent			Remarks
	A	R	P	Hectares	
1 - 10	0	1	39.1	0.2000	Available for disposal

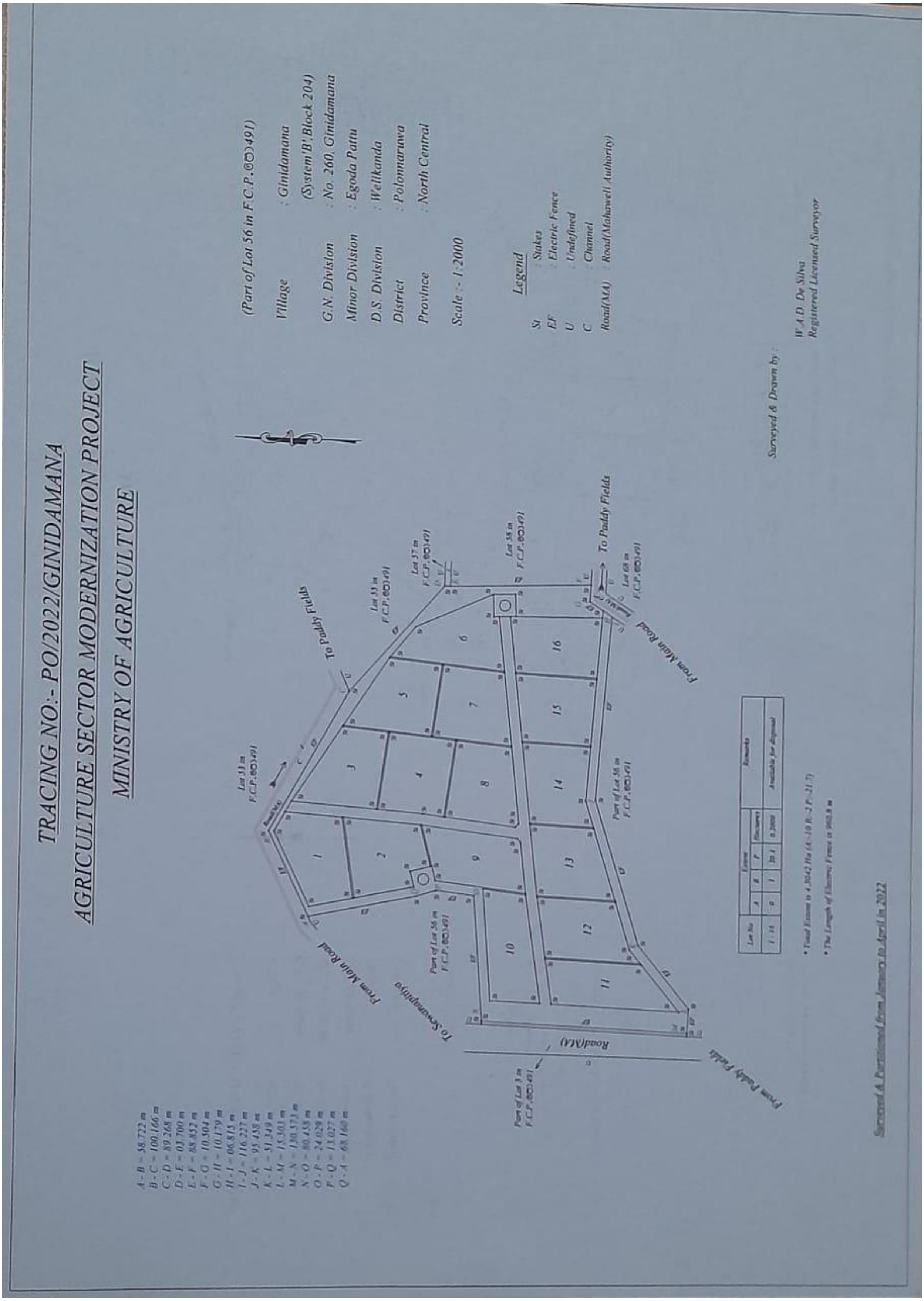
• Total Extent is 3.0894 Ha (A-7 R-2 P-9.6)

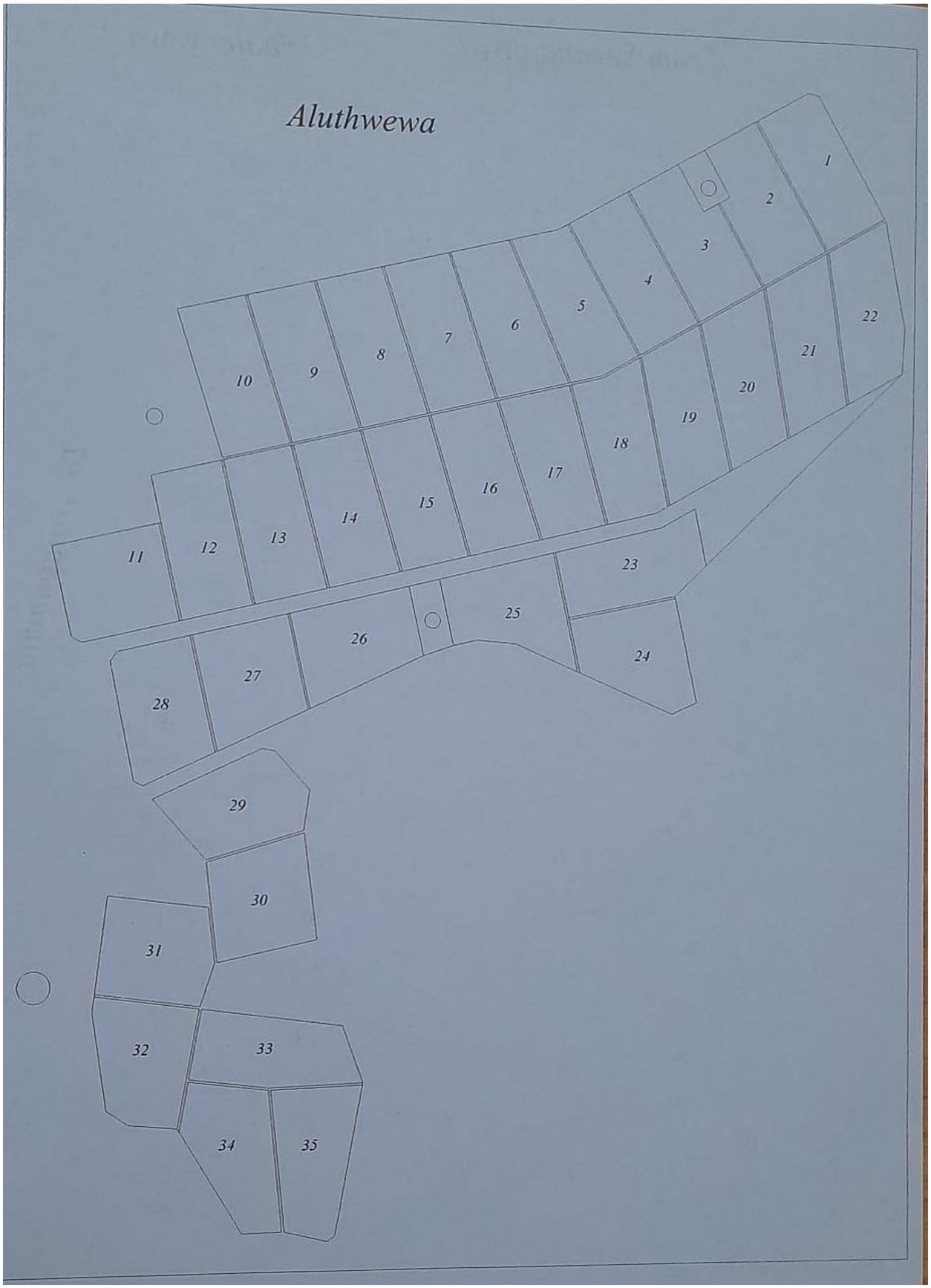
• The Length of Electric Fence is 1015.8 m

Surveyed & Partitioned from January to April in 2022


From Sevanapitiya
Nelumwewa
To Aralaganvila
1
2
22
3
23
21
4
24
37
20
5
25
38
19
6
26
39
36
18
7
27
40
41
35
17
8
28
43
42
34
16
9
29
44
33
32
15
10
30
31
14
11
12
13

TRACING NO:- PO/2022/MAHAWEWA
AGRICULTURE SECTOR MODERNIZATION PROJECT
MINISTRY OF AGRICULTURE
(Part of Lot 47 in CADASTRAL MAP 120025)
Village : Mahawewa
G.N. Division : No. 262, Mahawewa
Minor Division : Egoda Pattu
D.S. Division : Dimbulagala
District : Polonnaruwa
Province : North Central
Scale - 1:2000
Legend
St : Stakes
EF : Electric Fence
U : Undefined
C : Channel
Road(MA) : Road(Mahaweli Authority)
From Main Road
From Paddy Fields
Lot 48 in CM120025
Part of Lot 47 in CM120025
Lot 101 in CM120025
Lot 102 in CM120025
Lot 19 in CM120025
Road(MA)
To Houses
Rock
Part of Lot 47 in CM120025
Part of Lot 47 in CM120025
Part of Lot 47 in CM120025
Part of Lot 47 in CM120025
Surveyed & Drawn by :
W.A.D. De Silva
Registered Licensed Surveyor
Surveyed & Partitioned from January to April in 2022


TRACING NO:- PO/2022/GINIDAMANA
AGRICULTURE SECTOR MODERNIZATION PROJECT
MINISTRY OF AGRICULTURE
Village : Ginidamana
(System 'B' Block 204)
G.N. Division : No. 260, Ginidamana
Minor Division : Egoda Pattu
D.S. Division : Wellkanda
District : Polonnaruwa
Province : North Central
Scale :- 1:2000
Legend
St : Stakes
EF : Electric Fence
U : Undefined
C : Channel
Road(MA) : Road(Mahaweli Authority)
Surveyed & Drawn by :
W.A.D. De Silva
Registered Licensed Surveyor
To Paddy Fields
From Main Road
To Sewanapitiya
Road(MA)
From Paddy Fields
Surveyed & Partitioned from January to April in 2022


Aluthwewa
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35