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விவசாய நவீனமயமாக்கல் திட்டம்
Agriculture Modernization Project

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Sri Lanka Agriculture Sector Modernisation Project (ASMP)

ENVIRONMENTAL SCREENING REPORT
FOR
CLUSTER DEVELOPMENT PLAN FOR JUMBO PEANUT PRODUCTION IN KILINOCHCHI

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

Submitted: 22 December 2022

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Abbreviations

AEZ.....Agroecological zone
ASD .....Agrarian Services Department
AQI .....Air Quality Index
ASMP .....Agriculture Sector Modernisation Project
ATDP .....Agriculture Technology Demonstration Parks
CDP .....Cluster Development Plan
CEA .....Central Environmental Authority
DCO.....Distributary Canal Organisation
DoA.....Department of Agriculture
DS.....Divisional Secretary
DWLC .....Department of Wildlife Conservation
EPL.....Environmental Protection License
EU.....European Union
FO.....Farmers' organisation
FPO .....Farmer Producer Organisation
GAP .....Good Agricultural Practices
GN .....Grama Niladhari
IPM .....Integrated pest management
IPNS .....Integrated Plant Nutrition System
LA .....Local Authority
LKR.....Sri Lankan Rupee
MoA .....Ministry of Agriculture
MoH .....Medical Officer of Health
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
UP.....Uva Province
WB.....World Bank
WHO.....World Health Organisation

ASMP

ENVIRONMENTAL SCREENING REPORT

1. PROJECT IDENTIFICATION

Project title	Jumbo Peanut Production Cluster in Kilinochchi District (Karachchci and Kandawalai DSDs)
Project proponent	Project Management Unit, ASMP, MoA

2. PROJECT LOCATION

Location

(Relative to the nearest town, highway)

Jumbo Peanut Production Cluster in Kilinochchi district will be implemented in selected GNDs in Karachchi and Kandawalai Divisional Secretariat Divisions. ASMP has started this cluster in 2020 as a pilot cluster which will be expanded in this programme. Kilinochchi will be a main district in Northern Province and considered to be the poorest district in the country.

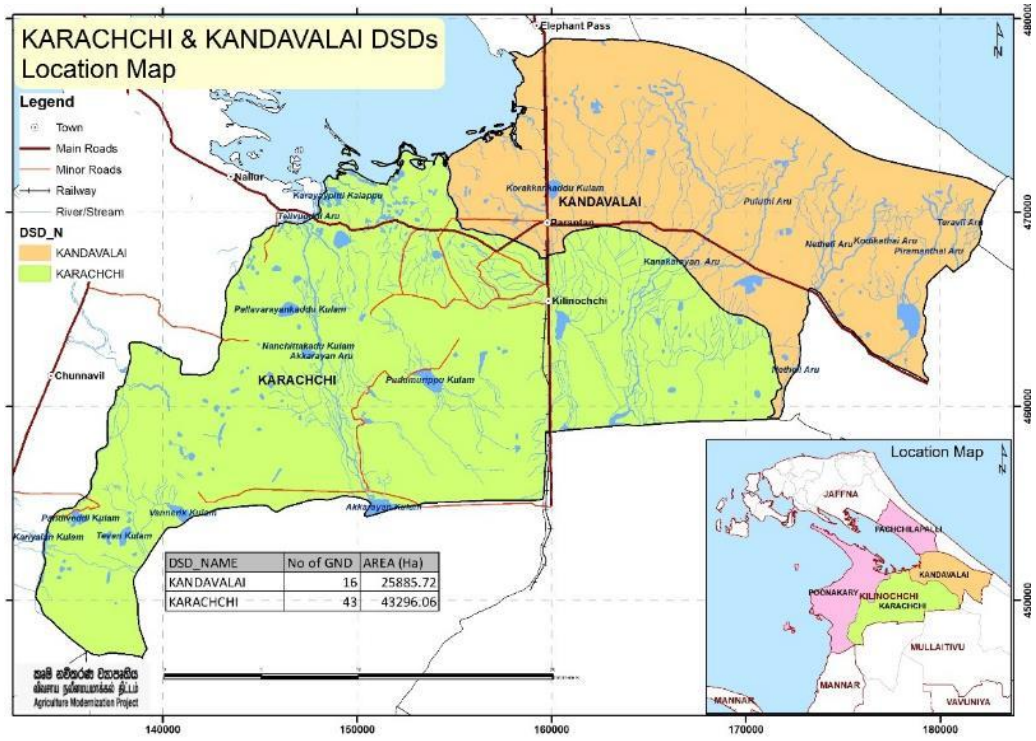


Figure 1: Proposed Jumbo Peanut Production area in Kilinochchi

These two DSs are located close to each other and the area in Karachchi can be accessed via A-9 Kandy-Jaffna main road from Iranamadu Junction while Kandawalai area can be accessed through A35 Paranthan-Mullaitivu at Puliyanpokkanai and Vishwamadu junctions. Selected farmlands in Karachchi are mainly coming under the Iranamadu Lift Irrigation System and located within 5km radius. Cluster area in Kandawalai located about 25km from Kilinochchi town, 20km from Paranthan Junction and about 15km from Puthukudiyirippu junction.

Definition of cluster area

(*The geographical area of the*

Kandawalai Division covers a land area of approximately 183.63Sq.km and water land cover an area of 26.08sq.km. Most of the area of this division lies on the main land. There are 16 GNDs in Kandawalai and out of it 3 GNDs selected under this Cluster.

Table 1: Distribution of Farmers selected for Jumbo Peanut cluster

project and areas affected during construction)

#	DSD	GND	Farmers selected			Land Extent Ha
			Male	Female	Total	
1	Kandawalai	Piramanthanaru	7	1	8	1.62
2	Kandawalai	Puliyanpokkanei	2	4	6	1.21
3	Kandawalai	Punnaineeravi	48	38	86	17.40
4	Karachchi	KN-4		1	1	0.20
5	Karachchi	KN-5	1		1	0.20
6	Karachchi	KN-9	1		1	0.20
7	Karachchi	KN-11	4		4	1.62
8	Karachchi	KN-15	4	1	5	2.02
9	Karachchi	KN-19	3		3	1.21
10	Karachchi	KN-20	45	10	55	22.30
11	Karachchi	KN-26	1		1	0.20
12	Karachchi	KN-30		1	1	0.20
			116	**56**	**172**	**48.38**

Total of 500 farmers from both Karachchi and Kandawalai DSDs will be selected in 250 farmers each in which maximum of 250 acres (0.5 acre each farmer). However, this initial season will be targeted only 300 farmers from both DSDs. Balance 200 farmers will be selected in the next season.

There are infrastructure improrvements including processing facilities proposed under this cluster but this screening will cover only the agricultural related activities. Separate screening report will be prepared for infrastructures.

Adjacent land and features

Kilinochchi District is located in the Northern part of Sri Lanka where geographically most of the area of the district lies on the main land. It is bordered by Jaffna District on the North, Mullaitivu District on the Eastern and Southern borders and Mannar District on the Western and Southern boarders. Karachchi DS Division consist of 42 GNDs and Kandawalai DS division is consisted of 16 GN Divisions. Karachchi DSD extent is about 358 sq.km and Kandawalai extent is about 318 sq.km.

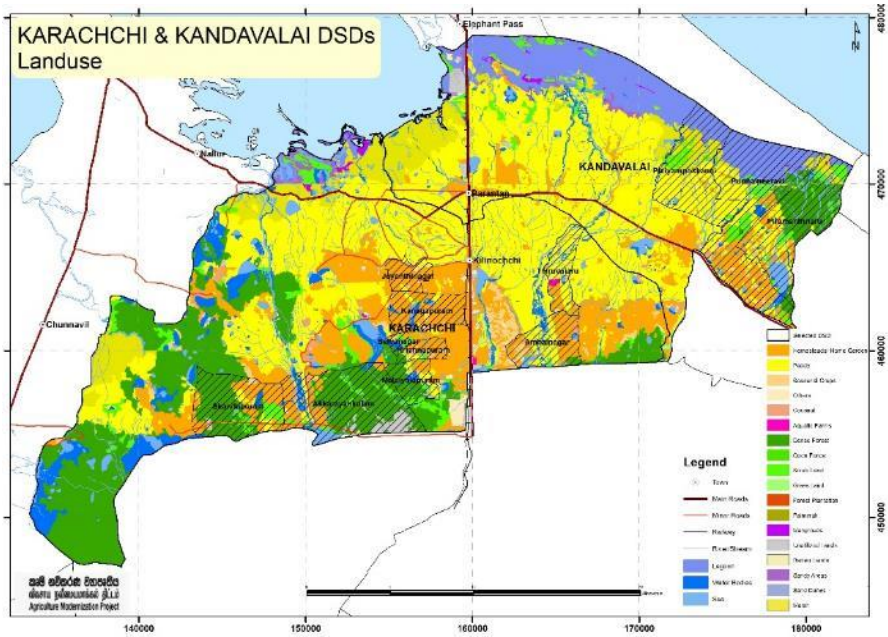


Figure 2: Land Use Pattern of Kilinochchi

Main economic base of the people living in the area is Agriculture and mostly Mung, Black grame, green grame, Cowpea, Paddy, other fruit crops and chena cultivations are prominent. Further, livestock industry is prominent in the area. The land use pattern of these two DSDs are given below:

Table 2: Land Use Pattern in Cluster area

Landuse Type	Area in Ac	
	Karachchi	Kandawalai
Built-up lands	8,427.73	4,156.98
Agricultural Lands	11,875.80	15,174.50
Forest Land	10,875.01	2,837.92
Wet Land	1,416.66	3,236.11
Waterbodies	2,661.52	6,051.63
Sandy Areas	280.96	286.75
Bare Land	262.33	56.11
Total	**35,800.00**	**31,800.00**

Source: LUPPD, Kilinochchi, 2021

There are three forest reserves coming under selected GNDs in Karachchi and one forest reserve in Kandawalai namely Iranamadu forest reserve in Ambalnagar, Kilinochchi forest reserve in Krishnapuram and Malayalapuram and Akkarayan forest reserve in Akkarayankulam. Therivil forest reserve in Punnaineeravi and Piramanthanaru. In addition, Chundikulam National Park is bordering to Punnaineeravi, Piramathanaru and Puliyampokkanai in Kandawalai. There is a plantation forest (Teak) closer to Krishnapuram in Kandawalai. However, no farmlands located within forest reserves or within 100m buffer zone.

In the selected cluster area in Karachchi, there are wetlands associated with existing tanks and they are working as flood management. However, these areas observed to be already disturbed due to anthropegenic activities. These wetalnds are not closer to selected lands.

There are six main tanks and several small tanks (rainfed) located within the cluster area namely Iranamadu, Kanakambikaikulam, Akkarayankulam, Piramanthanaru, Kilinochchi and Murippukulam. Many of these tanks are belongs to Provincial Irrigation department.

3. PROJECT JUSTIFICATION

Need for the project *(What problem is the project going to solve)*	Groundnut looking into the past, groundnut cultivation in Sri Lanka has always indicated lower production than required. A number of programs were established with the aim of enhancing the production capacity of the groundnut to meet the national requirement. “Supplementary Food Crop Program”, implemented by the Ministry of Agriculture, set its objectives to gain self-sufficiency in supplementary crops by 2016 (Ministry of Agriculture, 2020). Also, the Ministry of Agriculture sets a 200 acre “peanut cultivation zone” in Mullaitivu in 2018 along with “Let us Grow, Let’s Build the Country” program. Introduction of “Sri Lanka Jumbo” Variety & imposing of trade restrictions on groundnut imports are among other measures taken to achieve the target. However, all operations on the run were unable to produce a satisfactory outcome so far. In dry and intermediate zones of Sri Lanka, it can be grown as rain fed crop in highland during Maha season and irrigated crop in paddy lands during Yala season. Department of Agriculture released eight varieties such as Red Spanish, Number 45, Tissa, Walawe, Indi, Tikiri, ANK G1 and Lanka jumbo (Department of Agriculture, 2012b). Tissa. Higher oleic/linoleic ratio greater than 1.6 offers a longer shelf-life of processed foods, health benefits to consumers and increases profitability to farmers through higher yield compared to normal peanuts. Furthermore, keeping quality of the candidate variety was superior compared to

	other small seeded varieties. This new peanut nominee is well fitted to the cropping pattern of the country. Hence, candidate line ICGV 98396 × ICGV 10663 was released by the Variety Releasing Committee of The Department of Agriculture in 2020, renaming it as ANKGN3 considering its suitability for confectionary industry and greater potential for increasing productivity of peanut in Sri Lanka (Jeewani et al., 2020). Newly introduced variety jumbo peanuts have become a popular high yielding food crop in the country replacing the imported variety. This has helped to save much needed foreign exchange spent to import jumbo peanuts. Although Sri Lanka is growing its own peanuts, the quantities are not sufficient to meet the requirement and the government imports a large amount of the groundnut to the country annually. In 2020, 19,975 hectares of land were cultivated with peanuts and harvested 24,200 metric tons of peanuts. Another 9,904 metric tons of peanuts were imported in the year at a cost of Rs. 689 million. The most imported variety is the 'jumbo peanuts' which have exceptionally large plump kernels. As a substitute for these varieties, Sri Lanka's Department of Agriculture has introduced a new peanut variety called 'Sri Lanka Jumbo'. 'Sri Lanka Jumbo' is a high yielding variety which yields plump and delicious extra-large peanuts. Also, harvesting can be done 110-115 days after cultivation. It is also possible to harvest large groundnuts and the variety will yield more than 4400 kilograms per hectare. It is believed that by cultivating the new variety, the national requirement of 27,294 metric tons can be grown locally and save the Rs. 700 million annually spent on imports.
Purpose of the project *(What is going to be achieved by carrying out the project)*	According to the above, Government of Sri Lanka (GoSL) expects to grow Jumbo peanut targeting followings. CW Makie Company has come to a Memorandum of Understanding (MOU) with the ASMP where ASMP will support CW Makie with growing Jumbo Peanut to cater the total monthly requirement of 90MT. ASMP will not be able to achieve the total requirement of CW Makie but about 400MT per annum will be able to produce. Hence, ASMP has idenitified Kilinochchi as the most potential area to cultivate Jumbo peanut and has started with 30 Jumbo Peanut Seed Producers in 2020. However, due to improper cultivational practices and post-harvest practices by the farmers', expected outcome has not achieved. Therefore, intention of this programme is to resolve all these cultivational and post-harvest practices including storages and provide CW Makie 400MT per annum. Accordingly, ASMP will initially start cultivation with 300 farmers (150 acres) and from the next season onwards extend it to 500 farmers (250 acres). Accordingly, followings expected to be achieved through the cluster: 1. Substitution of importation of Jumbo Peanut 2. Save foreign exchange 3. Boost the economy of Sri Lanka 4. High oleic acid content of peanut improves shelf life, enhances the oil quality and offers health benefits to consumers 5. Open up few more value chains with Peanut oil and peanut-based food products 6. Introduced modern technologies for post-harvest practices with intention of sustainability (water, energy, etc) 7. Capacity build of Farmers specially with deep technical training on Jumbo Peanut cultivation with modern cultivational techniques, farmer mechanization and post-harvest operations 8. Develop the farmers into established business specializing Jumbo Peanut producers where it will open avenues for more negotiation power for Farmers
Justifications and	Cultivation of Jumbo Peanut as per the buyers' requirement will help farmers in Kilinochchi to enhance their income levels and living standards as a result. Jumbo Peanut is a short-term crop while it allows farmers to engage minimum

Alternatives considered *(Different ways to meet the project need and achieve the project purpose)*	two times a year and on the best scenario three times a year. In the meantime, buyers' offer farmers a very fair price for their production while ensuring continuous buying agreement if the standards are met. Adding values to the raw products, will have a greater possibility to go for higher prices and additional income as well. Karachchi and Kandawalai DS Divisions have selected considering the factors such as Soil type, Rainfall, Relative Humidity, land availability, farmers' experience and willingness of farmers. Farmers' experience and willingness identified through the rapid discussions with farmers. Considering three main categories namely Soil type, Rainfall and farmer willingness and experience most suitable, suitable and not suitable areas identified and mentioned in below table. Topography, availability of lands, terrain, availability of water sources, erosive forces, social capitals, etc are potential factors considered in assessing the environmental and social feasibility in addition to the above parameters in Kilinochchi. Accordingly, certain selected areas in Karachchi, and Kandawalai are suitable. However, experience of the farmers, and forest areas in close proximity will hinder the potentials. Water resources in the district has severe stress and therefore, water conserving methods should be introduced in terms of using water resources in a sustainable manner. Selection of farmers in these areas should be carefully and transparently carried out to reduce the biasness which will lead to issues in social cohesiveness. In terms of modern, proper and suitable cultivational methods will be introduced in terms of increasing the yield, quality and subsequently increase the farmers' income level. New and improved quality enhancing technologies and productivity enhancing technologies such as farmer machanization, drone technology, water conserving and sprinkler irrigation systems, basic flood prevention and drainage field techniques, new planting patterns with ridge and furrow, precision fertilisation techniques, pest and disease control based on integrated pest management (IPM) practices, modern spray techniques and precision agriculture practices will be introduced to meet the expected project out comes. The zero alternative would mean that no Jumbo Peanut cluster development is undertaken by the ASMP and hence no financial, technical and market support for the farmers in selected DS Divisions and particularly, CW Mackie will find difficulties to achieve their production targets. Therefore, conventional farm practices, low productivity, high water usage, high volume of chemical usage, low quality and low income will continue to dominate the economy of the farmers and agriculture sector will not develop in this area.

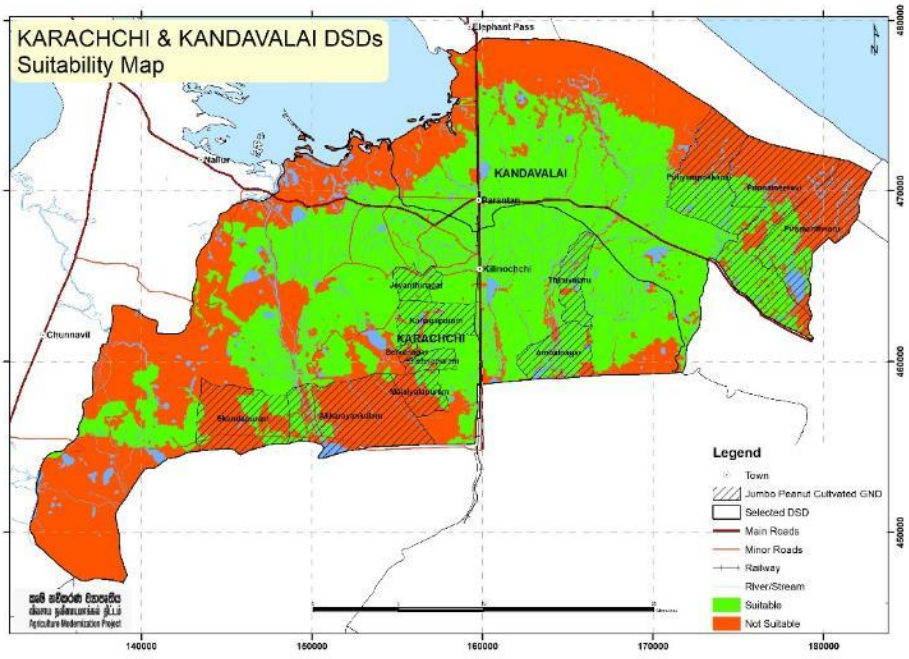


Figure 3 : Suitability Map of Karachchi and Kandawalai

Table 3: Suitability chart

Crop	Area	Soil type			Rainfall			Farmers experience			Environmental			Social			Overall Suitability
		Most suitable	Suitable	Not suitable	Most suitable	Suitable	Not suitable	Most suitable	Suitable	Not suitable	Most suitable	Suitable	Not suitable	Most suitable	Suitable	Not suitable	
Jumbo Peanut	Kandaveli/ Karachchi	√			√			√			√			√			**Most suitable**

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	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
3	The Fauna & Flora Protection Ordinance Act No. 49 of 1993 & its amendments			√	Any cluster activity or infrastructure development closer to Chundikulam national park or within 1600m buffer zone should be avoided
4	Forest Ordinance including Amendments			√	Iranamadhu, Kilinochchi, Akkarayan and Therivil Forest Reserves are falling within the selected GNDs. Forest reserves and their buffer zones should be avoided during land selection.

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	January 2023
Proposed completion date	December 2024
Estimated total cost	LKR 446,292,000
Present land ownership	Private Lands with Deeds, Permits and Leased
Description of the project *(With supporting material such as maps, drawings etc attached as required)*	Once the Farmer Company is established the farmers are entitled to receive some benefits under the financing and service program of ASMP.

Table 4: Agriculture Productivity Improvement Measures

Draw backs	**Reasons for drawbacks**	**Remedies to overcome drawbacks**
Low yields against potential	Poor land utilization.	Introduce systematic training program. Proper monitoring methodology.
	Poor fertilizer usage.	
	Poor water usage.	

	Poor land preparation practices.	Introduce methods to test soils and manage the soil. Should be addressed to the all deficiencies of the soil. Introduce new chemical packages to increase photosynthesis and get more yield. Introduce proper land preparation, fertigation, weeding, watering with modern technology. Introduce organic fertilizer preparation unit. IPM practices.
	Poor crop maintenance.	
	Poor weed control.	
	Poor pest and disease management.	
	Poor soil management.	
	Inefficient labour management.	Modern and appropriate technology to minimize the labour usage.
Quality of the product	Poor knowledge about the markets and demand.	Properly train them as a company, how to link with market, how to build rapport and continue. New technology introduces with relevant implements like computers, Apps etc.
	No idea about the customer expectation.	After having understanding with buyers the FC can have buyers' all the expectation and work accordingly. We should facilitate for this.
	Poor knowledge about the quality and improvement.	
Less adoptability to modern technology.	Poor knowledge about the modern technology.	Improve the quality of training using different videos, exposure visits etc.
	Scarcity of capital.	The project can help to the FCs on this matter. Local manufacturers can be introduced to FCs. If locally not available the project can import those.
	Purchasing difficulties.	
	Not appropriate technology.	

Seeding for Maha will be started before end of January 2023.

Table 5: Training and Capacity building

Training number	Target group	Areas to be considered ***
01	Farmers and relevant officers.	Improve the awareness of the project and the product going to be produced.
02	Relevant Officers in the selected area.	All advanced technical points of product as well as the process.
03	Selected farmers for the cluster.	Soil, soil structure, soil conservation, and importance of the organic matter. IPM practices. Record keeping.
04	Selected farmers for the cluster.	Land preparation and depth of LP. Organic matter and basal fertilizer application. Importance of the high-quality seeds, seeding and importance of the seed treatment etc. Watering and why we water.
05	Selected farmers for the cluster.	Weeds and weeding, Top dressings of fertilizer, relationship watering and fertigation. Guiding of plants (removing male flowers of female plants). Sunshine and Photosynthesis.
06	Selected farmers for the cluster.	Pest and disease management, harvesting drying and transport.
07	Discussion of success stories.	Effectiveness of correct implementing of technical things.

***Trainers from the DOA under MOA (Breeders, Crop leaders, IPM specialists, Soil and nutrient specialist)

In addition to the agriculture productivity enhancement interventions, following farmer machanization activities are proposed under this cluster:

1. Land Preparation - Mould and disc ploughs and harrows - coupled to 4W tractor
2. Seeding cum ridge formation - machine coupled to 4W tractor
3. Harvesting - Peanut digger machine coupled to 4 W tractor
4. Separation machine - coupled to 4 W tyractor.
5. Drying with Shell - sun drying
6. Depodding machine
7. Deshelling cum grading machine
8. Batch type heat pump dryer - energy source electricity.
9. Storing - refrigerative cooling environment or cold room
10. Making briquettes from shells and selling them for thermal applications.

In addition to agriculture improvements, establishment of Public Unlisted Company for the cluster farmers to ensure the sustainability of the cluster, Value chain development, farmer mechanization with modern technology,

	introduction of modern irrigation systems, improvements of selected rural roads and processing centre. Environmental screening for all infrastructure developments will be undertaken separately.
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 – Northern Province No. 340, Point Pedro Road, Anaipanthy, Jaffna. 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

5. DESCRIPTION OF THE EXISTING ENVIRONMENT

5.1 Physical features	
Topography and terrain	The Topography of the area is flat to slightly undulating. The elevation is varying from 0-250 m MSL. However, the elevation of the majority of the area is less than 10 m MSL. The land in kandawalai could be categorized as a flat with less than 10% slop. The highest elevation of this division is 3m.

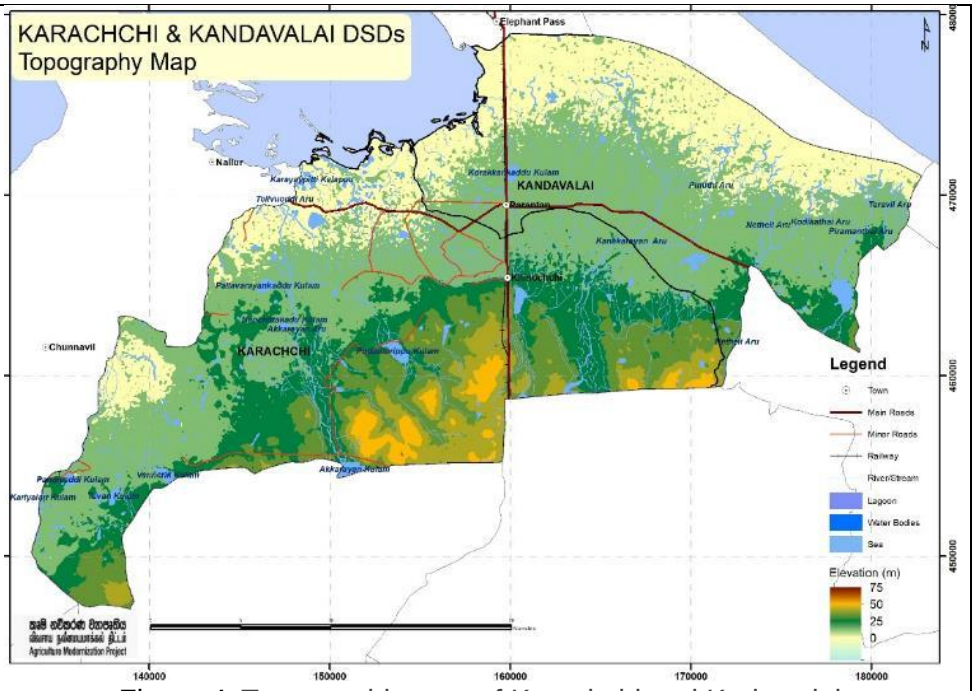


Figure 4: Topographic map of Karachchi and Kadawalai

Soil (type and quality)

The major soil types and their distribution in the areas are shown below. The dominant soil group (approximately 36.36% of the total extent of land) in the area is Red yellow latosols. The next dominant soil group is Soladized solonistz & solo check in flat terrain. It occupies about 27.27%of the total land area. The soil of the district is fertile and having enough minerals for the better growth of many crops.

Table 6: Soil Types

Soil Group	%
Red Yellow Latosols	36.36
Solodized Solonetz and Solonohaks; flat terrain	27.27
Alluvial soil of variable drainage and texture; flat terrain	19.88
Regosols on Recent beach and dune sands; flat terrain	14.25
Erosional remnants (Inselbergs)	2.24
Total	100.00

Total area comes under the Low country Dry Zone (DL) and agro – ecological regions of DL1f, DL3 and DL4.

Table 7: Agro-ecological Regions in Cluster Area

DSD	AEZ	Soil types	Terrain
Karachchi	DL1f, DL3, DL4	RBE, LHG, Grumusol, RYL, regosols	Undulating,
Kandawalai	DL3, DL4	RYL, Regosols	Slightly undulating

Source: LUPPD

Climate and Meteorology

The climate conditions of this division are dry, humid and tropical. The average annual rainfall in this area is 24.38cm and 75% of rainfall receives during the period from September to December by north- east monsoon periodical wind. The remaining period, other than before said of the year is dry and warm. Because of the warm temperature experiences every year from June to August, this period is considered as dry season. The monthly average temperature range is 25^{o} to 30^{o} c.

Surface water

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

There are three major tanks in Kandawalai division. Those are Iranamadu, kalmadu, Piramanthanaru. There are about 75 minor tanks and ponds in this division. Out of these, 27 tanks are located within the selected 3 GNDs.

Ground water

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

Ground water is the main source of drinking water in the area. People are using well water for drinking purposes. Water levels in the area lies 15-35 feet and availability of water in the area is reliable even during dry period.

Table 8: Water Supply in the Area

DSD	Common Well	Open Well	Tube well	Pipeline
Karachchi	284	9900	2856	1214
Kandawalai	189	2337	2813	192

Source: Statistical Handbook, District Secretariats, 2021

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, Check the Air Quality in Poovarasamkulam, Sri Lanka - BreezoMeter shows that the Air Quality Index (AQI) of Thiruwayaru is 61/500 and Piramanthanaru is 57/500 and $PM_{2.5}$ is the dominant pollutant while O_3, PM_{10} and CO are having lower concentration than $PM_{2.5}$.

5.2 Ecological features – Ecosystem components

Vegetation

(Trees, ground cover, aquatic vegetation)

Following list of flora species observed ithin the project sites selected Karachchi and Kandawalai:

Table 9: List of Flora Species recorded within cluster lands

Species	Sinhala Name	H	TS	NCS
Areca catechu	Puwak	T		
Salacia reticulata	Kotala-himbutu	C	N	EN
Diplospora erythrospora	Gal seru	T	E	VU
Alseodaphne semecarpifolia	Wewarana	T	N	VU
Strychnos potatorum	Ingini	T	N	VU
Margaritaria indicus	Maha karawu	T	N	VU
Chloroxyclon swietenia	Burutha	T	N	VU
Manilkara hexandra	Palu	T	N	VU
Sansevieria zeylanica	Maha niyanda	H	N	NT
Combretum ovalifolium	Kaduru-ketiya wel	S	N	NT
Holoptelea integrifolia	Goda-Kirilla	T	N	NT
Derris parviflora	Kala-wel	C	E	LC
Memecylon capitellatum	Weli-Kaha	S	E	LC
Borassus flabellifer	Thal	T		
Swietenia macrophylla	Mahogany	T		
Tamarindus indica	Siyambala	T	I	
Limonia acidissima	Divul	T		
Terminalia elliptica	Asana	T	N	
Drypetes sepiaria	Weera	T		LC
Diospyros ebenum	Kaluwara	T		VU
Vitex altissima	Milla	T		NT
Sterculia foetida	Telambu	T		LC

	Pterospermum suberifolium	Welang	T		LC
	Ixora pavetta	Maha Rathambala	S	I	LC
	Ficus benghalensis	Maha Nuga	T		LC
	Lannea coromandelica	Hik	T		LC
	Flueggea leucopyrus	Katu Pila	S		LC
	Mallotus rhamnifolius	Molabe	S		LC
	Lantana camara	Hinguru	S	IN	
	Carissa spinarum	Heen Karamba	T		LC
	Ehretia microphylla	Heen Thambala	T		LC
	Memecylon umbellatum	Kora Kaha	S	E/I	LC
	Tarenna asiatica	Tharana	S	I	
	Phyllanthus polyphyllus	Kuratiya	S		LC

H=Habit – T – Tree, S – Shrub, H – Herb, C – Creeper,
TS= Taxonomic Status, N-Native, E-Endemic
NCS = National Conservation Status according to 2012 National Red List.
EN- Endangered, VU- Vulnerable, NT- Near Threatened, LC- Least Concern

Presence of wetlands

However, Kandawalai is consist of abandoned paddy fields. However, proposed cultivation lands are up lands mostly home gardens.

Type of Land	Category	Sub category	Area (Ac)
Wet Land	Wet Land	Marsh	856
		Mangroves	113
Total Areas			**969**

Fish and fish habitats

The project area consists of few surfaces water bodies which are having best possible habitats for fish. Even aqua-culture activities can be seen in the area as domestic fresh water fishing.

Birds

(Waterfowl, migratory birds, others)

Bird species recorded during field visits are given below:

Table 10: Bird Species recorded in the Cluster Area
TS=Taxonomic Status, E=Endemic, N=Native
NCS=National Conservation Status, LC=Least concern,
EN=Endangered, VU=Vulnerable

Species	English Name	TS	NCS
Haliastur indus	Brahminy Kite	N	LC
Spilornis cheela	Crested Serpent-eagle	N	LC
Ocyceros gingalensis	Sri Lanka Grey Hornbill	**E**	LC
Pericrocotus cinnamomeus	Small Minivet	N	LC
Chalcophaps indica	Emerald Dove	N	LC
Stigmatopelia chinensis	Spotted Dove	N	LC
Treron bicinctus	Orange-breasted Green-pigeon	N	LC
Coracias benghalensis	Indian Roller	N	LC
Dicaeum erythrorhynchos	Pale Billed Flowerpecker	N	LC
Dicrurus caerulescens	White-bellied Drongo	N	LC
Anthus rufulus	Paddyfield Pipit	N	LC
Phalacrocorax niger	Little Cormorant	N	LC
Pycnonotus cafer	Red-vented Bulbul	N	LC

	Pycnonotus luteolus	White Browed Bulbul	N	LC
	Megalaima haemacephala	Coppersmith Barbet	N	LC
	Megalaima zeylanica	Brown-headed Barbet	N	LC
	Acridotheres tristis	Common Myna	N	LC
	Orthotomus sutorius	Common Tailorbird	N	LC
	Rhopocichla atriceps	Dark Fronted Babbler	N	LC
	Turdoides affinis	Yellow Billed Babbler	N	LC

Presence of special habitat areas (special designations and identified sensitive zones)

There are three forest reserves coming under selected GNDs in Karachchi and one forest reserve in Kandawalai namely Iranamadu forest reserve in Ambalnagar, Kilinochchi forest reserve in Krishnapuram and Malayalapuram and Akkarayan forest reserve in Akkarayankulam. Therivil forest reserve in Punnaineeravi and Piramanthanaru. In addition, Chundikulam National Park is bordering to Punnaineeravi, Piramathanaru and Puliyampokkanai in Kandawalai.

There is a plantation forest (Teak) closer to Krishnapuram in Kandawalai. However, no farmlands located within forest reserves or within 100m buffer zone.

In the selected cluster area in Karachchi, there are wetlands associated with existing tanks and they are working as flood management. However, these areas observed to be already disturbed due to anthropegenic activities. These wetalnds are not closer to selected lands.

However, many of these sensitive areas are not recognized in Environmental Senstive area Map.

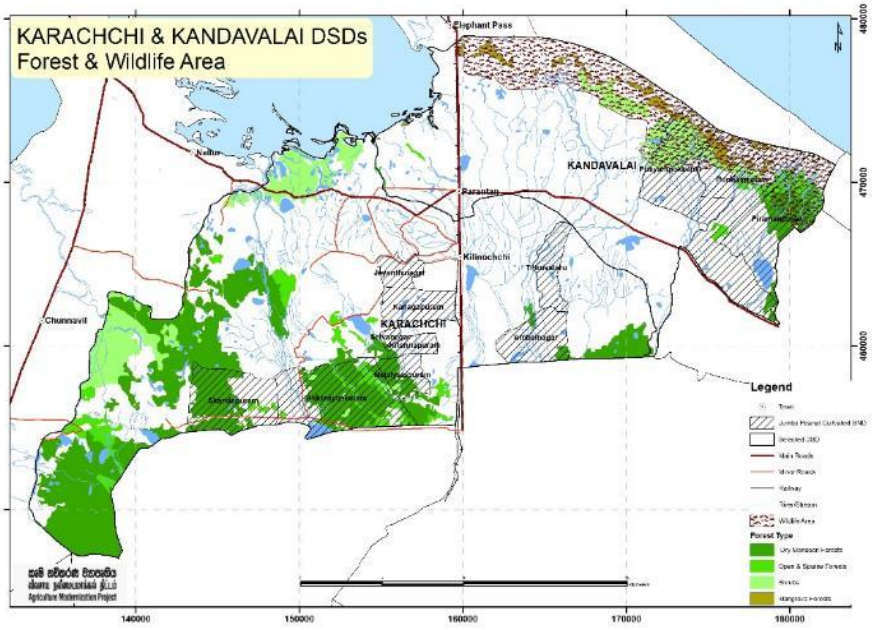
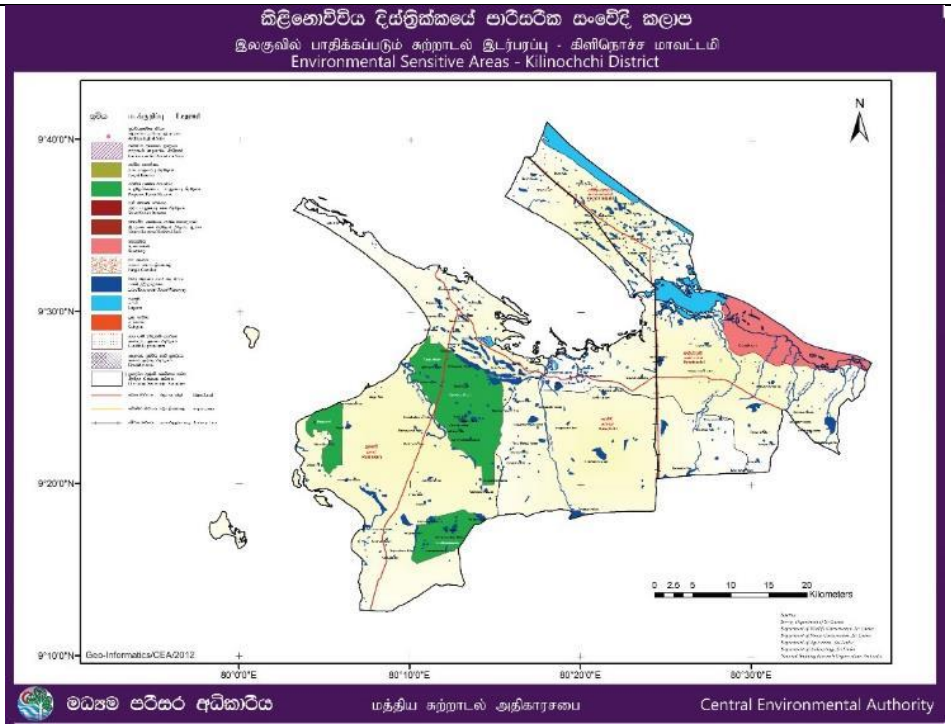


Figure 5: Wildlife and Forest Protected Areas within cluster area



Source: CEA

Figure 6: Environmental Sensitive Areas in Kilinochchi District

Other features	
Residential/sensitive areas (E.g., Hospitals, Schools)	There are 112 schools consisting of 2 National schools, 10 1AB schools, 15 1C schools, 37 type II schools and 40 type III schools. There are 112 schools in the district out of which 104 schools are functioning at present. Out of this 42 are in Karachchi and 24 are in Kandawalai. Only eight schools are temporarily closed in the Kilinochchi district. The student's population is 31,432 in 2021. (According to Zonal Education office' figures) The number of teachers serving in schools in 2021 were 607 North & 1512 South (District Total 2,119) with teacher's ratio 11:5 North & 14:6 South according to zonal education office's in 2021. Basic facilities such as healthcare is available for people in the area. There are four government healthcare institutions i.e General Hospital-Kilinochchi, District Siddha Hospital, Divisional Hospital-Akkarayankulam, and Divisional Hospital- Tharmapuram. And the area falls under Kilinochchi MOH office. In addition to these, there two dispensaries for outpatients in Kandawalai closer to cluster area.
Traditional, economic and cultural activities	There are no published Household Income and Expenditure details specific to crop or agricultural farmers in the selected areas. However, according to the 2019 HIES survey, mean household monthly income of Kilinochchi district is about LKR 44,004 whereas mean household monthly income of Sri Lanka is LKR 76,414. The mean household expenditure per month of Kilinochchi district was LKR 37,237 whereas for Sri Lanka the value was LKR 63,130 for the year 2019 (Department of Census & Statistics, 2019). Estimated head count index (2012/13) under Sri Lanka's official poverty line is 26.4 in Kilinochchi District and 23% of population in Kilinochchi are under poverty line. Per-capita monthly income in Kilinochchi is LKR 11,412 whereas per-capita monthly expenditure is LKR 9,657. In the meantime, according to district statistics, 2021, the level of income in both DSs, about 26,111 are below LKR 10000 monthly income which can be considered as very low income. Apparently, Kilinochchi is considered to be the poorest district in Sri Lanka.

Table 11: Level of income in Cluster area

#	DSD	Income Categories in LKR				Total
		Below 2500	2501-5000	5000-10000	Above 10000	
1	Karachchi	5332	8318	6449	6290	26389
2	Kandawalai	829	1994	3189	3030	9042
		6161	**10312**	**9638**	**9320**	**35431**

Source: Statistical Handbook, District Secretariats, 2021

This population consists with two groups namely economically active and economically inactive. The economically active population called labour force comprises all persons of working age either employed of unemployed during the reference period. The percentage of males and females under economically active population in the district is 78.3% and 21.7% respectively (Annual Bulletin, 2014)

The vast majority of economically active population is employed in agriculture and fishery. It is about 62 %. The second and third higher proportions of employed persons are occupied in the Government and Private sectors. Unemployment rate is 5.3 in 2021.

However, as per the District Statistical Handbook (2021) income of 17,755 families are below in Rs. 3500/= per month. These families are depending on Samurdhi and other livelihood assistance.

Table 12: No of Samurdhi Recipients

DSD	Samurdhi
	No of Families %
Karachchi	12682
Kandawalai	5073

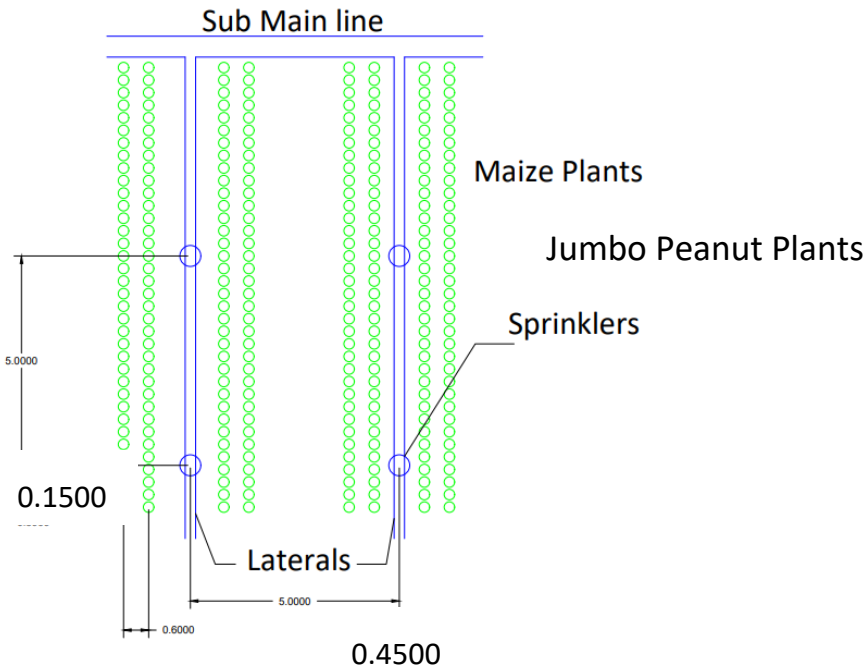
Source: Statistical Handbook, District Secretariats, 2021

Archaeological resources (Recorded or potential to exist)	There are archaeologically important locations identified from Karachchi but Puliyanpokkani Nagathampiram Kovil in Kandawalai recognized as Archaeologically important location. Proposed mitigation measures in EMP will avoid such locations or impact due to cluster activities on archaeological places.

6. DESCRIPTION OF PROPOSED AGRICULTURAL ACTIVITIES

6.1 CULTIVATION	
Existing condition of the crop	Peanut (Arachis hypogaea L.), is a major oil crop grown on nearly 28.2 million ha in the world with a global production of 47.4 million metric tons during 2017 (FAO stat, 2017). Peanut is consumed as nutritionally unique and healthy cooking oil, confectionery and in various food products. In Sri Lanka, it is used to prepare confectionaries and consumed as a snack. The Agriculture Sector Modernization Project has been implemented with the support of World Bank in Kilinochchi District for promoting the seed production of ground nut and enhance the living standard of the farmers. Under this project, 30 beneficiaries have been selected in Thiruvaiaaru and Kanagaampikaikulam AI Ranges. 20 kg of Lanka Jumbo pea nut seeds, 25kg of gypsum and water pump were supplied to each beneficiary to cultivate

	Lanka jumbo peanut in half an acre. At present, the established crops are in harvesting stage. As a substitute for these varieties, Sri Lanka's Department of Agriculture has introduced a new peanut variety called 'Sri Lanka Jumbo'. The cultivation of Lanka Jumbo pea nut will be expanded under Irranaimadu Irrigation Tank in Thiruvaiaaru lift irrigated high lands and Kanagaampikaikulam Gravity Irrigation to increase the seed production and commercial cultivation of Lanka Jumbo pea nut. SCAN Maggie Company agreed to purchase these Lanka Jumbo pea nuts based on the Tri Parties contract basis. In Sri Lanka, peanut crop is mainly cultivated in Dry and Intermediate Zones and the annual cultivation extent was 15,752 ha with the production of 27,602 t pods. Meanwhile, Sri Lanka has imported 4,300 t of peanut in 2018 and the majority belonged to large seeded or jumbo peanut category (Agstat, 2019). **Peanuts having a seed mass of more than 70 g per 100 seeds are considered as Jumbo peanuts.**
Polluting Processes (point source)	
In cultivation some key polluting steps, although limited, takes place; mainly in the cultivating and post harvesting phases.	
Land Preparation for cultivation	The maximum moisture retention, precision planting, fast uniform seed germination and effective weed and disease control are expected from good land preparation practices. Mould Board or Disc plough attached to a four-wheel tractor can be used to have the desired ploughing depth about 45 cm. To provide a better root growing environment, the land must be prepared to the possible depth. The second tillage operation can be conducted using a harrow in order to create a suitable seedbed that is loose, smooth and level. Land preparation should be planned to provide facilities for mechanical harvesting and well managed water drainage facilities. Thus, sowing in ridges is highly recommended. Ploughing equipment are to be provided from the project where it is expected to use available four-wheel tractors in hire out basis. Seeding Locally designed and fabricated machines are available for seeding cum ridge formation. Approximately these type machines can be used for seeding 3 acres per day. The proposed seeding arrangement is 45 cm x 15 cm (45 cm between two rows and 15 cm between two plants). Seeding cum ridge forming machines are to be provided from the project.
Water requirement	**Water requirement for Jumbo Peanut** The total water requirement for hybrid Jumbo Peanut production is 500 – 800 mm per annum (*Water and Soil requirements – Fao.org*). Flowering, peg formation and pod development stages are critical for irrigation in groundnut. The highest water requirement is at the flowering (75 – 90 DAP) stage. **Recommended Irrigation System** The total water requirement for Groundnut production is 500 – 800 mm per annum (1.5 mm to 2.5 mm/day) (Water and Soil requirements – Fao.org). The highest water requirement which is 50 mm per week for groundnut is at the fruiting stage (Source: *Paul L. Hollis Farm Press Editorial*, *Timing critical in watering peanuts – 2007 retrieved September 8, 2022 from*

	https://www.farmprogress.com/: https://www.farmprogress.com/). The average rainfall in Kilinochchi is around 3.60 - 4.27 mm/ day with highest and lowest average values of 15mm/day and 1mm/day respectively. The most of rainfall could be expected in the months of January, March, April, May, October, November and December. Thus, it is advisable to plan cultivation cycles according to the probable rainfall patterns. Considering the past irrigation applications, thoughts of field experts, regional climate conditions, soil type, water availability and water requirement, 5m x 5m sprinkler irrigation method is recommended.  Figure 7: Sprinkler arrangement
Use of fertiliser and pesticides and weedicides	**Weeding** Weeds are a major problem for peanuts especially during the first 4-8 weeks. They reduce yields by competition for water, fertilizer and sunshine. Weeds increase the threat on pest as well. Peanut is inherently a poor weed competitor and emphasis on cultural practices such as good land preparation and crop rotation are best recommended practices to farmers. Inter cultivator machine cab ne used for managing weeds. The gap between two rows (45 cm) needs to be considered at the selection of inter-cultivator machines. Groundnuts are exposed to pests and diseases that reduce yield and quality and increase the cost of production wherever the crop is grown. **Major Diseases of Groundnuts.** A large number of fungal, viral, nematode and bacterial diseases have been reported on groundnuts, most of which are widespread, but only a few of them are economically important on a regional basis. Major diseases in this region include groundnut rosette, early leaf spot (C. arachidicola), late leaf spot (Phaeoisariopis personata), Rusts (Puccinia arachidis) and aflatoxin (caused by Aspergillus niger, Aspergillus flavus).

Management

Grow resistant cultivars like ANKG 1 and 3.
Sow groundnut early and synchronously in rainy.
Mulch the soil with straw within 10 days after germination wherever possible.
Avoid water stress in irrigated crop to avoid the pest infestation.
Maintain the fields and bunds free from weeds.

Fertilizer recommendation

Obtained the reasonable number of soil samples according to the methodology mentioned above analysed by the reputed laboratory. According to the outcome of the analytical report following recommendation made for the Jumbo peanut cultivation.
According to the soil analysis report, having fair value of pH. CEC level is far below the optimum level and you have to bring up the CEC before starting cultivation. **Compost application is the easy solution to bring up the CEC value up to optimum level.**

Chemical fertilizer quantities to be applied for Jumbo Peanut cultivation in Kilinochchi

Crop	**All are in Kgs per ½ acre**							
	Sample no.	**N as NO3**	**As Urea**	**P as P2O5**	**As TSP**	**K as K2O**	**As KCl (MOP)**	**Compost**
Jumbo Peanut	Kili JU1	4.4	**10**	8.8	**15**	14	**22**	2000

Gypsum: 50 Kgs

While consider the Macro nutrients in the samples “K” and “P” are in low levels while “N” is in very low level. Ammonium Sulphate (NH4)2SO4 cannot be recommended.

In addition to this:

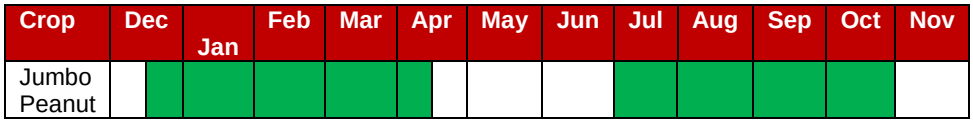
From 10th day after Germination until first flowering: Vegie – N – plus 100ml + 16 lit of water Every Mondays and Fridays.
Flowering stage (until 95 days after germination): Stop Vegie N and start K plus 100ml + 16 lit of water (8 tanks of 16 lit) on every Fridays.
Every Mondays: Boronca plus 70 ml + Zinca – Plus 30 ml + 16 lit of water (8 tanks of 16 lit).
Fungicides or Insecticides can be mix to any of this if necessity is there.
At the time of flower initiation **“Triacontanol**” (PGR 100 ml per ½ acre) must be applied for high quality and quantity of yield.

Integrated pest management (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. These agrochemicals are recommended by the Pesticides Register of Department of Agriculture and PMP as well.

Harvesting

Harvesting peanuts is a two-step process. First, a farmer drives a machine called a digger along the peanut rows. The digger pulls up the peanut plant, flips it upside down and sets it back down on the row. The peanuts dry for a few days then the farmer uses another machine called a shaker or a picker, which separates the peanut pods from the rest of the plant.

Peanut harvest starts along the South-eastern U.S. in September and October and can continue until November as far as west as New Mexico and Oklahoma. Peanuts have a relatively long growing season compared to

	many other crops, taking 140-150 days to mature before they're ready whereas in our proposed cluster two crop seasons starting from mid December to mid-april and July to October which takes about 110 days. During harvest time, farmers want to avoid wet weather and get their peanuts off the ground before the first frost.  US farmers can produce a lot of peanuts per acre. In 2015, farmers harvested about 4,000 pounds of peanuts per acre (1). Investments in research and responsible growing practices help peanut farmers keep their yields high. Although Sri Lanka is growing its own peanuts, the quantities are not sufficient to meet the requirement and the government imports a large amount of the groundnut to the country annually. Last year, 19,975 hectares of land were cultivated with peanuts and harvested 24,200 metric tons of peanuts. Another 9,904 metric tons of peanuts were imported in the year at a cost of Rs. 689 million. **Harvesting** Jumbo Peanuts are harvested mainly by hand. Around 40% out of the total labour requirement goes for manual harvesting. It is important to harvest at the right time since this is critical for determining peanut quality. Too early harvest results in pod loss, and late harvest may result in fungal infestation. As per the experienced gained in Kilinochchi district Jumbo Peanut pilot project, it was found that only 60 % of jumbo peanuts pods can be harvested for beneficiary purpose as a 20% is immature while another 20% is overmature at the time of harvesting. The overmature portion is remained in the field with manual harvesting due to weakened pegs/links with roots. Thus, it is suggested to plant jumbo peanuts on well-made ridges and introduce mechanical harvesters. Application of mechanical harvesters coupled to four-wheel tractors should be considered at the land preparation and cultivation stage. Generally, Jumbo Peanuts are harvested at an average kernel moisture content of 18-25 %. **Depodding (Pod Separation)** Currently ground nut separation from roots is taking place manually. Workers are paid at Rs. 35/kg. Generally, one worker can manage 50 kg per day. Locally fabricated separator machine coupled to a four-wheel tractor has an output around 1 ton/h. Provision has been made in cluster development plan to provide depodding machines to the farmer company.
Postharvest storage and transportation	It is recommended that Jumbo Peanut be sun dried with shell to 12- 15% moisture content from its initial value of 18 – 25% moisture in wet basis at the time of harvesting to have a minimum broken and blemish during mechanical shelling (*Surapong Nawungkalatusart; Chirata Tamtawatchai (Chulalongkorn Univ., Bangkok (Thailand). Faculty of Science. Dept. of Food Technology*. "Groundnut *drying by hot air" retrieved September 1, 2022 from https://agris.fao.org/agris-search/: https://agris.fao.org/agris-search/*). Thus, the farmer company should accept Jumbo Peanuts with moisture around 12 – 13%.

	The unit should have sufficient provision for natural as well as forced ventilation in order to maintain congenial atmosphere inside the building. Storing area are to be designed with proper pest control measures and air conditioners to maintain the desirable temperature (10 C) and humidity (RH – below 70%). Based on Jumbo Peanut bulk density, the required storing capacity is around 40 kg per square feet at 6 feet height. **Deshelling cum grading** Shelling is the removal of kernel from their pod either by stripping, impact action and rubbing or any combination of these methods. The most popular method of groundnut shelling, which is still widely used is the method of crushing or pressing the pods in between the thumb and the first finger to break off the pods and release the seed. This method has low efficiency, it is time consuming, and has high demand of energy (Adwal Ravindra, et al., 2017). Power operated groundnut shelling machines are available. The optimum moisture content of groundnut kernels at 10-15 % wet basis gave minimum broken and blemish during mechanical shelling (Groundnut drying by hot air (fao.org)). A vibratory conveyor type grading unit is going to be introduced to segregate the final product into three different categories based on kernel size. The splitted peanuts can be segregated as well. Grading will enhance 1st product quality to fetch a higher selling price. It also helps to product branding based on its qualitative aspects. Locally fabricated shelling and grading machines having output capacity around 400 – 500 kg/h are available. Jumbo peanut farmers in Kilinochchi don't have deshelling facilities and some of them send their harvest to Mullaitivu. **Drying** Peanuts must be properly dried if desirable flavour, texture, germination and overall quality are to be maintained. Moisture reduction is the major consideration in peanut and it is going to be accomplished by son/solar drying and artificially drying (machine drying) in a control environment. Farmers need to sun dried their harvest to reduce the moisture content around 10 -15% in wet basis from its initial value of 18 – 25%. The dried Jumbo Peanuts are to be brought to the processing centre for further processing and value addition purposes. Deshelled peanuts are to machine drying in order to reduce the moisture content favourable for storing (8 – 10 % in w.b.). A batch type heat pump drier having capacity around 5 ton/ hour is recommended. The said dryer can be used for Chili, OFCs and fruits as well. Thus, dryer utilization factor as well as farmer company income can be increased with the selection of a multipurpose dryer. Drying should be rapid to prevent mould growth and the possible formation of Aflatoxin. However, the drying rate must be controlled to prevent excessive slippage and splitting. Nuts should be dried to a moisture content of approximately 8-10% using hot air at 40 – 45 ^{0}C temperature. Current practice in Kilinochchi area is sun drying for three to four days prior to pack in poly bags. The average packing density is 15 to 20 kg per bag. Drying at low temperature of 35 ^{0}C or high temperature of 55 ^{0}C enhanced the development of higher quantity of free fatty acid than drying at medium

	temperatures i.e., 40, 45 and 50 ^{0}C. It has been tested that Kernels which were dried at 55 ^{0}C or above had the lowest seed germination. **Packing and Storing** The key issue found with Kilinochchi Jumbo peanut farmers is not having storing/warehouse facilities. This leads to insect and rodent infestation, fungal development, flavour changes, rancidity, viability loss, physical changes like shrinkage and weight loss. Best storage condition for Jumbo Peanuts is about 8% kernel moisture content at 10°C and 65% relative humidity i.e., moisture in the surrounding air. If such storage conditions are maintained, groundnuts can be stored without significant loss in quality for about 10 months. (Source: Bharati – *"Storage of Groundnut"* **–** *2010 retrieved October 2, 2022 from* *http://agropedia.iitk.ac.in/content/: http://agropedia.iitk.ac.in/content/*). It is recommended to store jumbo peanuts as pods rather than as kernels. The deshelling process should start in line with buyer orders. It is very much essential to have agreements with selected buyers on minimum collection quantities in order to streamline the processing, storing and product selling. Based on feedback on a minimum product collection quantity from a potential buyer C.W. Mackie which is 4 ton per load, the dedicated storing facility is designed at 300 ft^2 which has a potential of storing 10 tons to 12 tons (one week processing capacity) of packed jumbo peanuts in poly bags at the storing height of 6 ft.
Other factors	
Solid waste	**Compost making** A compost making facility is going to be established for the cluster. The capacity based on cluster requirement is going to be decided. The availability of material i.e., gliricidia, banana trunks, livestock waste -etc are being accessed. Making Briquettes from Peanut shell. Selling jumbo peanut shells as a biomass for thermal applications after densifying (making briquettes). The cluster (250 acres) potential is 50 tons of peanut shells. The solid organic waste is generated as crop residuals and at post-harvest period. All the crop residuals and post-harvest waste is good farmyard manure. The solid organic waste is generated as crop residuals and at postharvest period and all are biodegradable. However, compost production unit (See Annexure 4: 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. Most of the waste generated can be used as an animal feed. 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. Water supply is controlled by micro irrigation system. So, the wastages will be minimized.

Table 13: Application of IPM for the development of CDP for Jumbo Peanut Production Cluster

Stages	**IPM Practices**	**Impacts of Implementation**	**Benefit for farmers**
Pre-Land preparation stage	Remove all crop debris of the previous crops and weeds and burn. Clean surrounding areas as far as possible.	Minimize all pathogens from the selected land and very close areas.	Minimize all possibilities transmitting to new crop. Minimize the risk of getting pest and disease to new crop. Ultimate result will be the potential yield with good quality.
Land preparation stage	Plough the land minimum depth of 9inches and invert the soil. Introduce correct quantity of Compost.	Get all soil born pathogens destroy due the change of their living environment. Improve the CEC and the soil nutrity level.	Pathogen free crop and better yield. Cost of production become lower due to the minimum application of pesticides. Better absorption of nutrition from the soils gives potential yield.
Bed Making	Maintain the optimum height of the beds or ridges.	Imrpove the drainage of the soil and minimize the fungus infeststion to the root zone.	Minimize the fungi diseases and improve the yield as well as reduce the COP due to minimum usage fungicides.
Nursary and Planting stage	Seed treatment with fungicide and Insecticide.	Minimize the the room for infestation of fungus and insects for the minimum period of two weeks.	Healthy crop with minimum COP.
Sapling stage	Closely monitor the cultivation. Then only the farmers can identify the initial stage of any infection. Maintai all cultivation area and border free of weeds. Remove and burn the infected parts of the plant or whole plant. Introduce pheramone traps to destroy male insects.	Diagnosing at the initial stage means, the infection can be controlled at the initial satage with minimum damage and cost.	Better results: Maximum yield with minimum COP.
Juvenile, Flowering and Maturity stages	Closely monitoring is the best practice. Watering and fertigation of optimim volumes and quantities. Remove and burning of the infected parts, if not application of the most suitable pesticide only to the spots.	Infection can be controlled at early stage with minimum damage.	Maximum yield with minimum COP.

Harvesting stage	Not allowed any pesticide. Close monitoring and removing infected parts is the best practice. Harvesting should be done with minimum damage to the fruits.	Minimize the risk of chemical residual in final product. Quality of final product will be improved.	Maximum yield with expected quality.
Transport stage	Introduce plastic crates or hard containers to trnasport with minimum damages.	If there is any damage, infection may be taken place easily.	Reduce the post harvest losses and that may affect to maintain the superior quality of final yield.

7. PUBLIC CONSULTATION

Consultations conducted with potential farmers of the selected areas in Karachchi and Kandawalai, DD-DOA, Agriculture Instructors, District and Cluster Coordinators. Focus Groups Discussions held with Farmers and Key Informant Interviews carried out with Key Officials. In addition, Consultation with District Forest Department Office in Kilinochchi conducted in terms of identifying sensitive forest areas falling within selected GNDs. FD agreed to verify the selected lands whenever necessary to avoid selection of forest areas including their buffer zones. Outcomes of the discussions are summarised below:

Figure 8: Stakeholder Consultation in Kilinochchi

Figure 9: Attendance Sheets of Public and Stakeholder Consultations

- Existing crop related issues

At present, pilot scale 30 farmers in Thiruwayaru GND has started jumbo peanut seed production. These initial 30 farmers have been given original parental material by the Department of Agriculture and irrigation system. However, no proper storage facilities have been arranged by ASMP for those seed farmers and quality of initial seeds observed to very low. Technical know-how given to the farmers observed to not up to the mark and monitoring and follow up mission seems inefficient. However, selected farmers in Kandawalai area seems new farmers and they only have experience with Gorund nut and no experience in Jumbo Peanut.

Following concerns were raised by the farmers during the consultations:

1. There are opportunities for cluster expansion
2. Pest and diseases such as Leaf spot (C. arachidicola) infestation, Leaf minor (Aproaeroma modicella), Larva of Leaf Minor, etc
3. No proper technical training for Jumbo Peanut cultivation including land preparation, seeding, watering, fertigation, pest & disease management, harvesting, drying, deshelling, storing, etc
4. No proper storage facilties
5. Farmers in Thiruwayaru are Iranamadu lift irrigation scheme farmers in addition to tube/agro wells and Wells in Kadawalai
6. Fertiliser application is not practised by based on soil and foliar analyses
7. No attention for micronutrient fertilisers
8. Poor primary post- harvest handling and high wastage
9. Low quality standards for marketing
10. Continuity of jumbo peanut Clusters as business entity
11. Stable market for production and price
12. Engagement of youth observed to be highly positive

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

Farmers have no experience in jumbo peanut cultivation, but experienced ground nut production. However, understading basics of peanut cultivation, availability of lands with owenrship, availability of water throughout the year, farmer leadership and positive attitudes, farmers willingness, etc can be recognised as positives in establishing the cluster. Required technical know-how cultivation of jumbo peanut, post-harvest practices will be given very initially to all potential farmers before starting even land preparation. Adhering to the technical requirements are very much important to ensure the quality of the produced and for storing purpose.

Farmer mechanization such as seeding and weeding will be arranged as a technological improvement. This will save both time and money. Land preparation assistance will also be provided by the project to the Farmer Company. Farmer Company will have to allocate the available machineries to each farmer. However, initial land preparation will be critical as these lands are not properly ploughed previously.

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

Hygienic and moisture conditions of Jumbo peanut are vital factors. All technical requirements will be trained for farmers and follow up closely by the team and AIs. Harvesting time, post-harvest practices, treatment, by-products, etc will have greater importance here.

- Infrastructure development

Mainly, processing centre with central access to the entire cluster and with required facilities such as shelling, drying, seed cleaning & grading, packing & storing, etc will be provided by the project.

Figure 10: Community Mapping at Thiruwayaru

Figure 11: Public Consultation at Poovarasankulam and Kurukkalputhukkulam

Figure 12: Existing Condition of the Selected Lands at Thiruwayaru

Figure 13: Existing Irrigation methods

8. ENVIRONMENTAL EFFECTS AND MITIGATION MEASURES

8A. SCREENING FOR POTENTIAL ENVIRONMENTAL IMPACTS

Table 14: Checklist for screening for possible environmental impact (Infrastructure development activities are not considered here)

№	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	Land preparation techniques will focus on reducing the effects of flood irrigation. Slight physical changes will be made during land prepration to accommodate modern technology applications and proper and quick drain of water
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	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. Due to implementation of IPM, use of chemicals will be drastically reduced and project will not assist for purchasing of chemicals.
3	Will the Project produce solid wastes during construction or operation?	√		Low	During the operation solid organic waste will be produced as crop residuals. Crop residual will be used for the compost production unit.
4	Will the Project release pollutants or any hazardous, toxic or noxious substances to air?	√		Low	Pesticides, weedicides will be used and released to the air. However, due to precision of apploication of chemical fertiliser through fertigation units, volume and magnitude of the impact will be low
5	Will the Project cause noise and vibration or release of light, heat energy or electromagnetic radiation?	√		Low	Land preparation, and transportation may create noise and vibration impacts and it can be mitigated through proper implementation of EMP.
6	Will the Project lead to risks of contamination of land or water from releases of pollutants onto the ground or into surface waters, groundwater or coastal wasters?	√		Low	All chemicals used to include pesticides and weedicides during cultivation may contaminate land or water. Due to use of Sprinkler system, wastage which will be leading to major contaminations will be low
7	Will the project cause localised flooding and poor drainage during construction? Is the project area located in a flooding location?		√		Project will not create localise flooding but the area specially in Thiruwayaru observed to be potential inundating area. However, ridge and furrow method of planting will reduce the impact on the crop. During land preparation, proper drainage patterns will be established and ensure the smooth draining
8	Will there be any risks and vulnerabilities to public safety due to physical hazards during construction or operation of the Project?		√		No infrastructure development activities considered under this ESR

№	Screening question	Yes	No	Significance of the effect (Low, moderate, high)	Remarks
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?		√		Impact due to transport is negligible. Therefore, No creation of significant environmental problems.
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?	√		Moderate - High	Chundikulam National Park bordered to GNDs selected in Kandawalai. However, selection of lands will ensure NO lands falling within the buffer zone
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?	√		Moderate - High	Chundikulam National Park bordered to GNDs selected in Kandawalai. However, selection of lands will ensure NO lands falling within the buffer zone
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 cultivated lands will be used.
15	Will the project cause the removal of trees in the locality?		√		Removal of trees will not be required as all these lands are existing cultivating 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?		√		
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,		√		

№	Screening question	Yes	No	Significance of the effect (Low, moderate, high)	Remarks
	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.

8B. ENVIRONMENTAL MANAGEMENT PLANS

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	Implementation	Supervision
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 • Obtain continuous institutional support from DD-DOA and AIs in the area • Land selection should be considered the Chundikulam National Park and avoid such sensitive locations including minimum of 1600m buffer zone • Selected farmlands should be cross verified with DWLC to avoid encroachment of such sensitive areas • Farmers should possess legally acceptable ownership document for each selected land and should not have conflicts • 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	• PUC/Farmers • Cluster Coordinator • District Coordinator • PPMU • DOA	• EU Consultant Team

№	Potential environmental impacts and risk level	Key project activities causing the impact	Mitigation measures proposed and action to be implemented by the contractor	Implementation	Supervision
			• 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 • 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 • 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 Seed production technology, basic harvest and postharvest practices lead to low quality of product and high amount of waste	Land selection Land preparation (ridge & furrow) Seeding Shelling, and Drying Sorting and packaging Storing the harvested product	• Initial technical training on Jumbo peanut cultivation as per the best method • 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 immediate drying facilities • Introduce methods of using bi-products	• PUC/Farmers • Cluster Coordinator • District Coordinator • PPMU • DOA	• EU Consultant Team
3	Activities related to installation of irrigation systems (Adjustable Sprinklers) with Sump	Installation of 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	• PUC/Farmers • Cluster Coordinator • District Coordinator • PPMU • Service Provider	• EU Consultant Team
4	Exposing and damaging of physical cultural resources (PCR)	Site preparatory work Land preparations	• Upon discovery of physical cultural material during project implementation work, the following should be carried out: • Immediately stop construction activities	• PUC/Farmers • Cluster Coordinator	• EU Consultant Team • Dept of Archaeology

№	Potential environmental impacts and risk level	Key project activities causing the impact	Mitigation measures proposed and action to be implemented by the contractor	Implementation	Supervision
			• 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 • 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	• District Coordinator • PPMU • DOA	
5	Spreading of Invasive Alien Species	Vegetation clearing Planting of Jumbo Peanut	• Provide DoA approved parental lines or certified 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	• PUC/Farmers • Cluster Coordinator • District Coordinator • PPMU • DOA	• EU Consultant Team
6	Soil erosion due to lossen of topsoil which will lead to many drainage issues and siltation of drainage systems	Land preparation	• Establish a proper dranage system during land preration • Regular cleaning of catch pits, sil-traps and drains	• PUC/Farmers • Cluster Coordinator • District Coordinator • PPMU	• EU Consultant Team

№	Potential environmental impacts and risk level	Key project activities causing the impact	Mitigation measures proposed and action to be implemented by the contractor	Implementation	Supervision
				• DOA	
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 and IPM action plan proposed above • Introduce technological methods to reduce dosage amounts • Awareness on usage time, handling and storage including precision fertigation • 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	• PUC/Farmers • Cluster Coordinator • District Coordinator • PPMU • DOA	• EU Consultant Team
8	Impaired water quality	Cultivation of Jumbo Peanut	• Excess water extraction is to be cut down to preserve water • Proper introduction of sprinkler irrigation practices instead of flood irrigation to preserve water and use of modern techniques as discussed in the CDP for reduce water consumption	• PUC/Farmers • Cluster Coordinator • District Coordinator • PPMU • DOA	• EU Consultant Team
9	Solid Waste Disposal	Discarding poor quality organic materials in the field Waste from weed control activities	• Burnt to maintain the farmlands' hygienic condition • Use postharvest waste for compost production • Use organic waste generating from the jumbo peanut crop for compost, animal feed, etc	• PUC/Farmers • Cluster Coordinator • District Coordinator • PPMU • DOA	• EU Consultant Team • LAs
10	Spread of crop related pests and diseases	Throughout the cultivation period	• Provide technical guidance on application of chemicals including dosage, suitable time and frequency • 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 • Try to apply bio-pesticides for places and instances where practicable	• PUC/Farmers • Cluster Coordinator • District Coordinator • PPMU • DOA	• EU Consultant Team

№	Potential environmental impacts and risk level	Key project activities causing the impact	Mitigation measures proposed and action to be implemented by the contractor	Implementation	Supervision
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	• PUC/Farmers • Cluster Coordinator • District Coordinator • PPMU • DOA	• EU Consultant Team • MOH
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 modern 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*) • 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	• PUC/Farmers • Cluster Coordinator • District Coordinator • PPMU • DOA	• EU Consultant Team • MOH

9. COST OF MITIGATION

Table 16: Cost Estimate for Implementation of EMP/SMP

№	Environmental mitigation measure	Cost (LKR)	Remarks
1	Information Boards, leaflets	500,000	Project Name board, Awareness leaflets including Project benefits, GRM and IPM
2	On site first aid facilities	500,000	Including first-aid box and allocation for any emergency treatment

№	Environmental mitigation measure	Cost (LKR)	Remarks
3	Safety equipment's including COVID-19	1,750,000	Gum boots, Gloves and masks for all farmers
4	Soil erosion control measures	250,000	Wherever necessary EMP mitigation measures can be implemented
5	Provision of overall kit for farmers	1,750,000	3500*500
	Total	**4,750,000**	

NB: Cost of mitigation given only for cultivation related activities and its impacts

10. CONCLUSION AND SCREENING DECISION

Table 17: 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 Edge effects on the forest areas closeby	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

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 EU Consultants' team and the PPMU while the cluster level supporting staffs and farmers will be responsible for implementing the provisions in the EMP. In addition, the EU Consultants' team will be directly responsible for preparing and 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 implementation and supervision will be carried out by the EU Consultant team and the PPMU while PMU is responsible to monitor the effectiveness. 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 Assessment and Management Framework (EAMF) by the Environmental and Social Safeguards Specialist of ASMP and Provincial Deputy Project Director's Office of the PMU and the EU Consultants jointly. The Consultant Environmental and Social Safeguards of EU Consultants' team 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 ASMP project implementation cost. However, cost of mitigation proposed under section 9, considered only cultivation related activities and its impacts. Infrastructure development interventions will be considered separately.

12. SCREENING DECISION RECOMMENDATION

Majority of the potential adverse effects can be classified as general agricultural activities related impacts and can be mitigated on site with good practices. These potential impacts are temporary in nature. Main activity wise recommendations are given below for better clarity:

Selection of Lands: Selection of farmers from the proposed area should be complied with basic ownership to the selected lands. Minimum of Permits or leased lands should be considered in case farmers do not possess deeds. Selection of lands should ensure the lands are not encroached any protected areas or their buffer zones such as Chundikulam National Park

Land Preparation: Soil erosion will be a significant impact for which mitigation measures are provided in the EMP. Following of such mitigation measures will be important. Potentials for natural localise flooding should be considered seriously and taken adequate measures to reduce severity

Watering: In case of constructing any tube or agro wells, Water Resources Board yield test should be carried out and get their recommendations. Water conservation practices such as proposed micro sprinkling should be encouraged and farmers should be educated on the benefits of the same.

Agriculture activities: Proper implementation of Integrated Pest Management practices proposed above should be highly encouraged and use of chemical fertilizers should be avoided. Reuse/recycling of polythene bags is recommended up to maximum possible. Failing with, proper segregation, collection and disposal of polythene through LA's collectors is recommended. Organic solid waste should be directed to the compost facility as much as possible.

Table 18: Screening Recommendations for each activity

Key recommendations	Actions / Approvals to be attended	Time period to attend each action	Responsibility / Remarks
Land Selection	Ownership should be proven and should not have conflicts Avoid forest/wildlife areas including buffer zones	Before land preparation	PPMU DD-DOA EU Consultants PMU
Integrated Pest Management Practices	Implement IPM activities proposed above at each stage	From land preparation onwards	Agronomist – EU team Agronomist – PPMU AIs- DOA

13. DETAILS OF PERSONS RESPONSIBLE FOR THE ENVIRONMENTAL SCREENING

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

ANNEX 1: LIST OF REFERENCES

Census and Statistics, 2019

Statistical Handbook, Kilinochchi, 2021

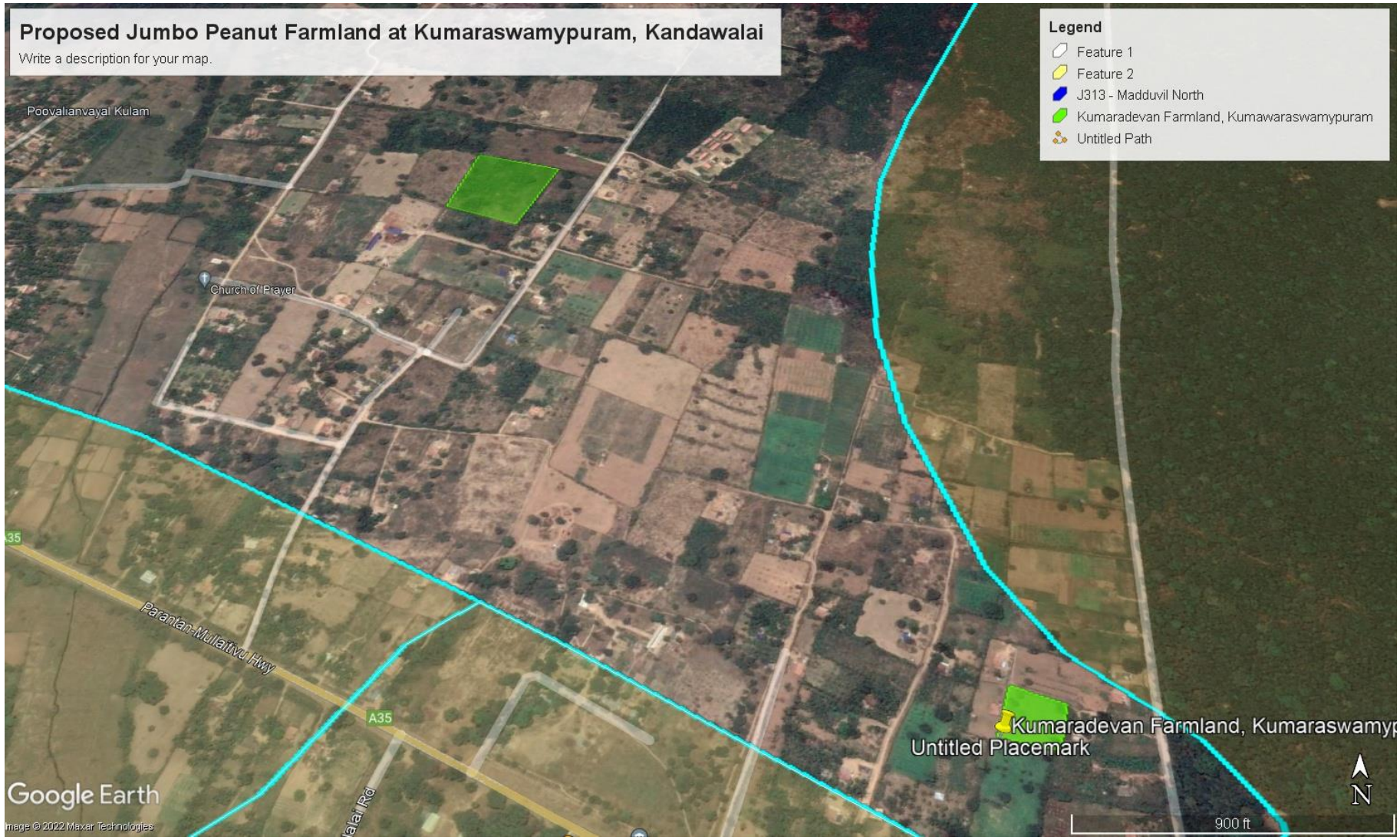
Resource profile of Kandawalai DS Division, 2021

Census of Population and Housing, 2016

Environmental Assessment and Management Framework, ASMP

District Level Feasibility Report for Kandy, Badulla, Ampara, Vavuniya and Kilinochchi, 2022

ANNEX 2: PROJECT AREA MAP


Proposed Jumbo Peanut Farmland at Kumaraswamypuram, Kandawalai
Write a description for your map.
Legend
Feature 1
Feature 2
J313 - Madduvil North
Kumaradevan Farmland, Kumawaraswamypuram
Untitled Path
Poovaliamvayal Kulam
Church of Prayer
A35
Paranlan-Mullaitivu Hwy
A35
Kumaradevan Farmland, Kumaraswamyp
Untitled Placemark
Google Earth
Image © 2022 Maxar Technologies
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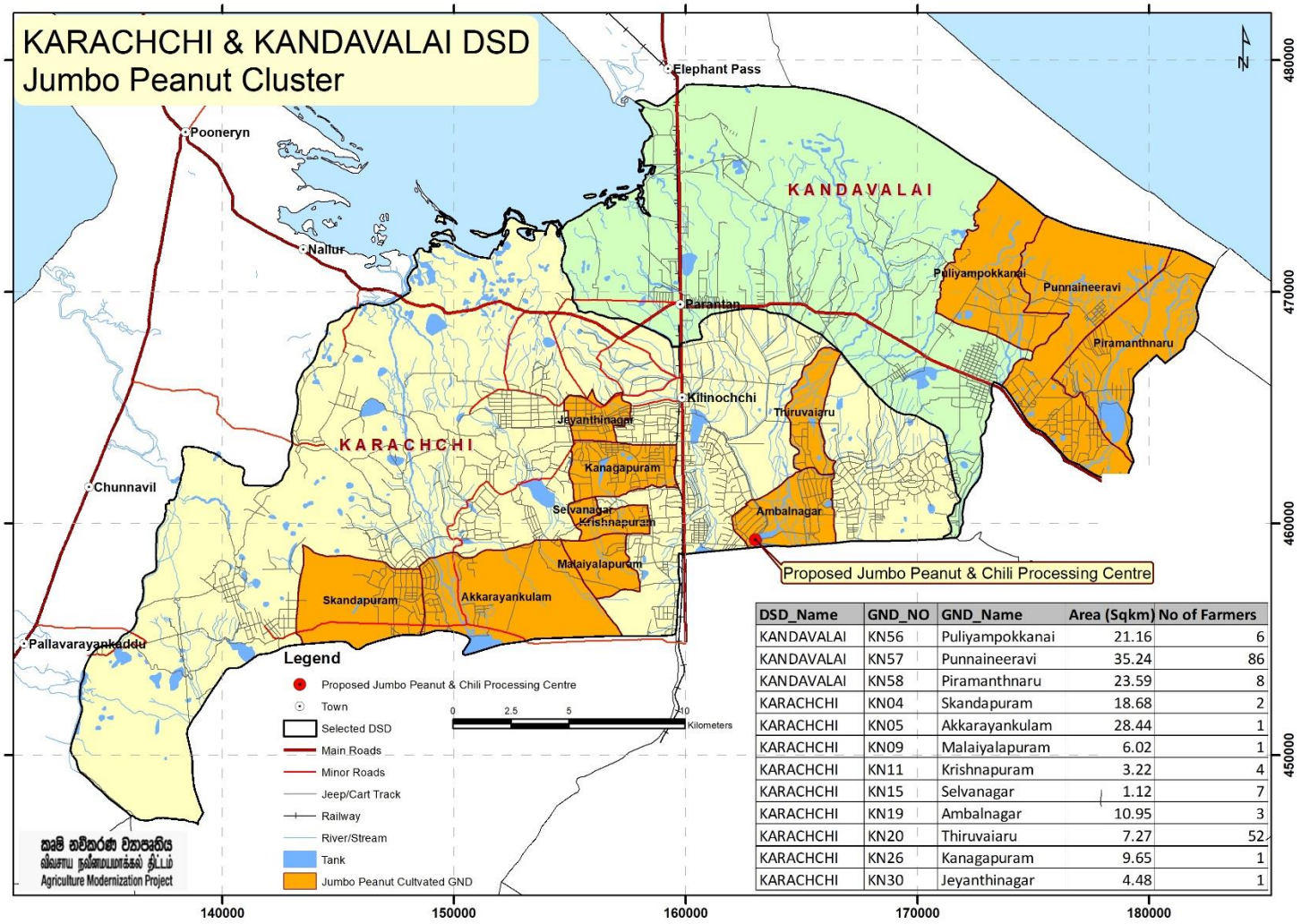
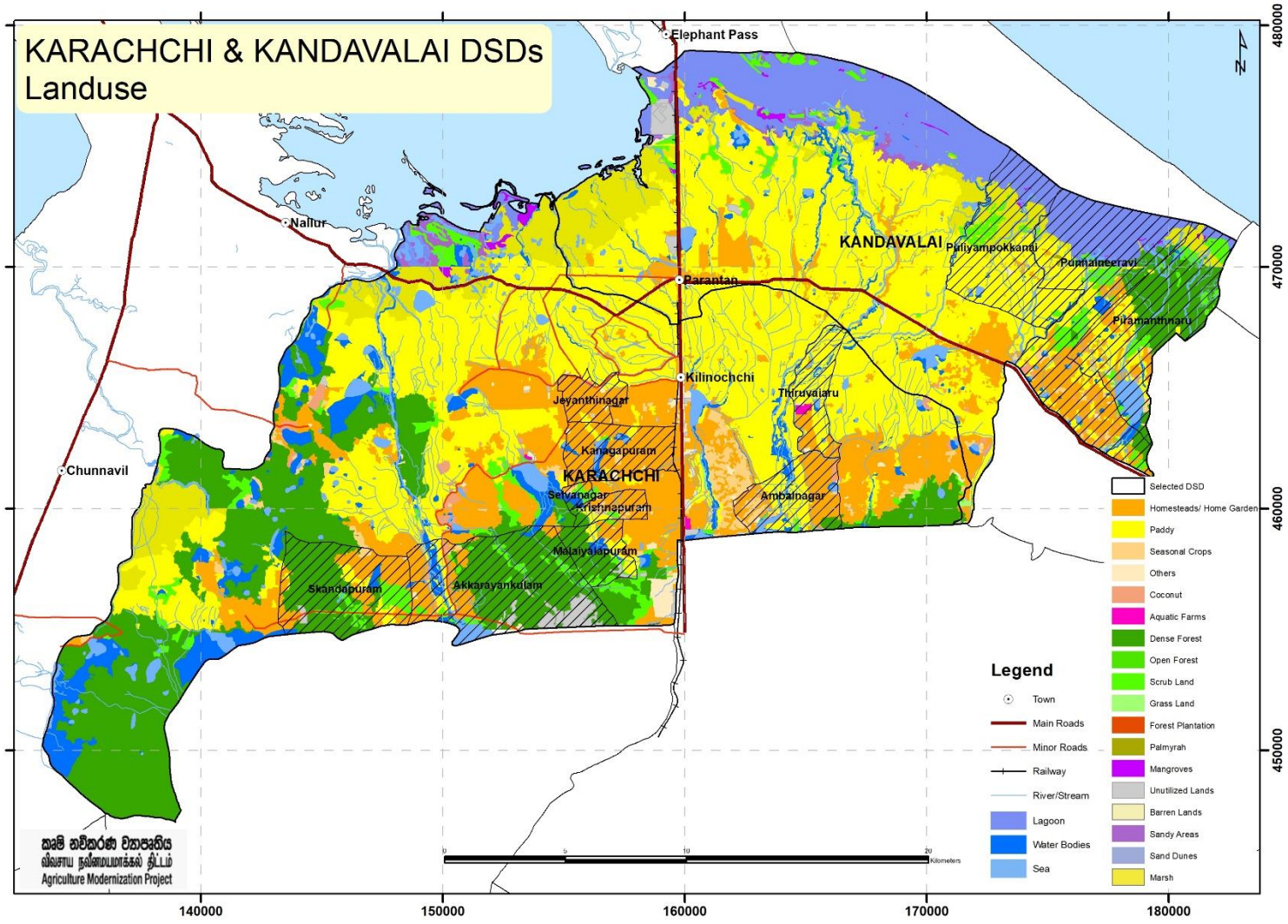
900 ft



DSD_Name	GND_NO	GND_Name	Area (Sqkm)	No of Farmers
KANDAVALAI	KN56	Puliyampokkanai	21.16	6
KANDAVALAI	KN57	Punnaineeravi	35.24	86
KANDAVALAI	KN58	Piramanthnaru	23.59	8
KARACHCHI	KN04	Skandapuram	18.68	2
KARACHCHI	KN05	Akkarayankulam	28.44	1
KARACHCHI	KN09	Malaiyalapuram	6.02	1
KARACHCHI	KN11	Krishnapuram	3.22	4
KARACHCHI	KN15	Selvanagar	1.12	7
KARACHCHI	KN19	Ambalnagar	10.95	3
KARACHCHI	KN20	Thiruvaiaru	7.27	52
KARACHCHI	KN26	Kanagapuram	9.65	1
KARACHCHI	KN30	Jeyanthinagar	4.48	1


KARACHCHI & KANDAVALAI DSDs
Landuse
Elephant Pass
Nallur
Parantan
KANDAVALAI
Puliyampokkanai
Punnaineeravi
Piramanthnaru
Kilinochchi
Tiruvaiaru
Jeyanthinagar
Kanagapuram
KARACHCHI
Selvanagar
Krishnapuram
Ambalnagar
Chunnavil
Malaiyalapuram
Skandapuram
Akkarayankulam
Legend
Town
Main Roads
Minor Roads
Railway
River/Stream
Lagoon
Water Bodies
Sea
Selected DSD
Homesteads/ Home Garden
Paddy
Seasonal Crops
Others
Coconut
Aquatic Farms
Dense Forest
Open Forest
Scrub Land
Grass Land
Forest Plantation
Palmyrah
Mangroves
Unutilized Lands
Barren Lands
Sandy Areas
Sand Dunes
Marsh
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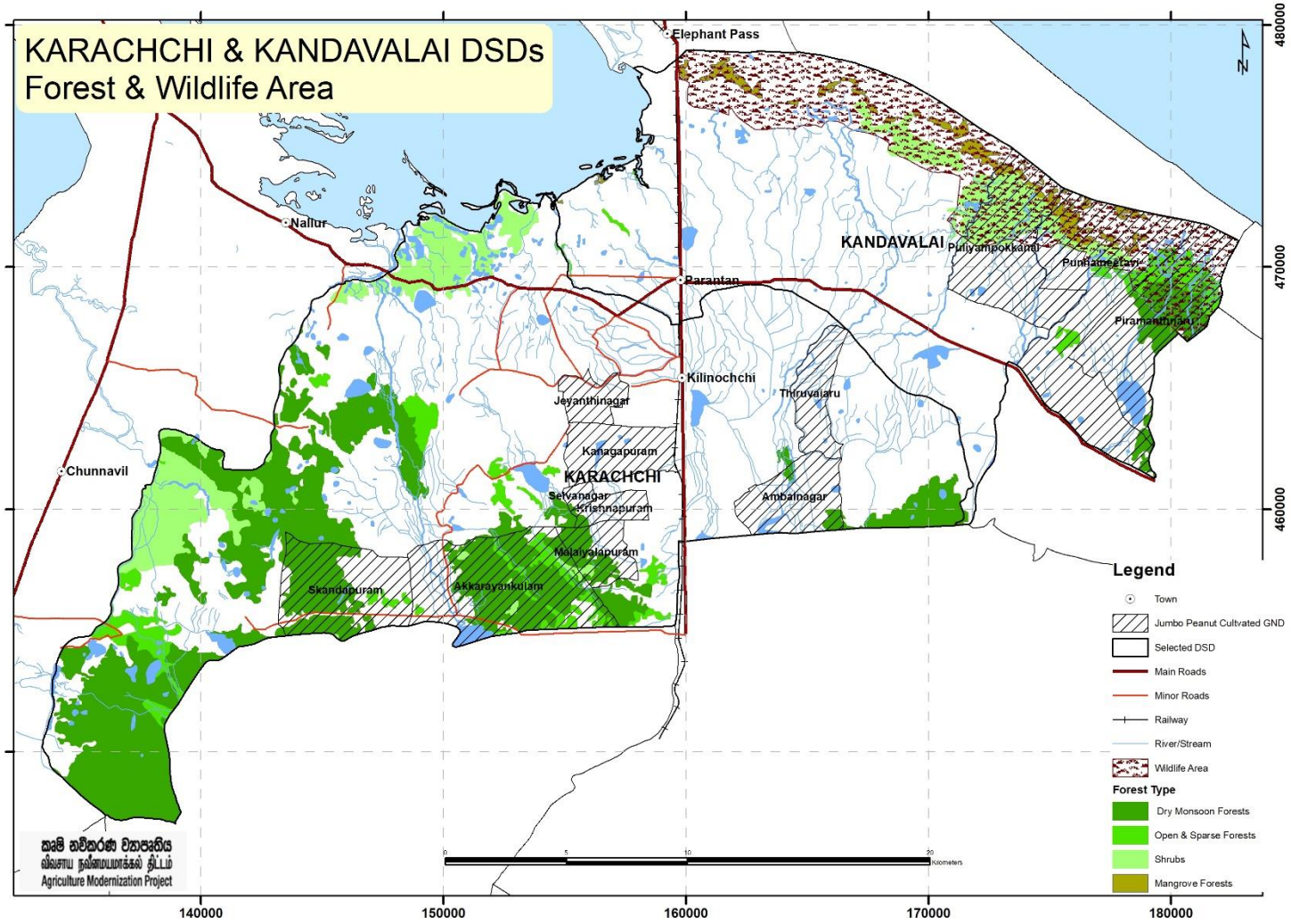
KARACHCHI & KANDAVALAI DSDs
Forest & Wildlife Area
Elephant Pass
Nallur
Parantan
KANDAVALAI
Puliyampokkanai
Punkaneelavi
Piramanthanaru
Kilinochchi
Thiruvaiaru
Jeyanthinagar
Kanagapuram
KARACHCHI
Selvanagar
Krishnapuram
Ambalnagar
Chunnavil
Malaiyalapuram
Skandapuram
Akkarayankulam
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Town
Jumbo Peanut Cultvated GND
Selected DSD
Main Roads
Minor Roads
Railway
River/Stream
Wildlife Area
Forest Type
Dry Monsoon Forests
Open & Sparse Forests
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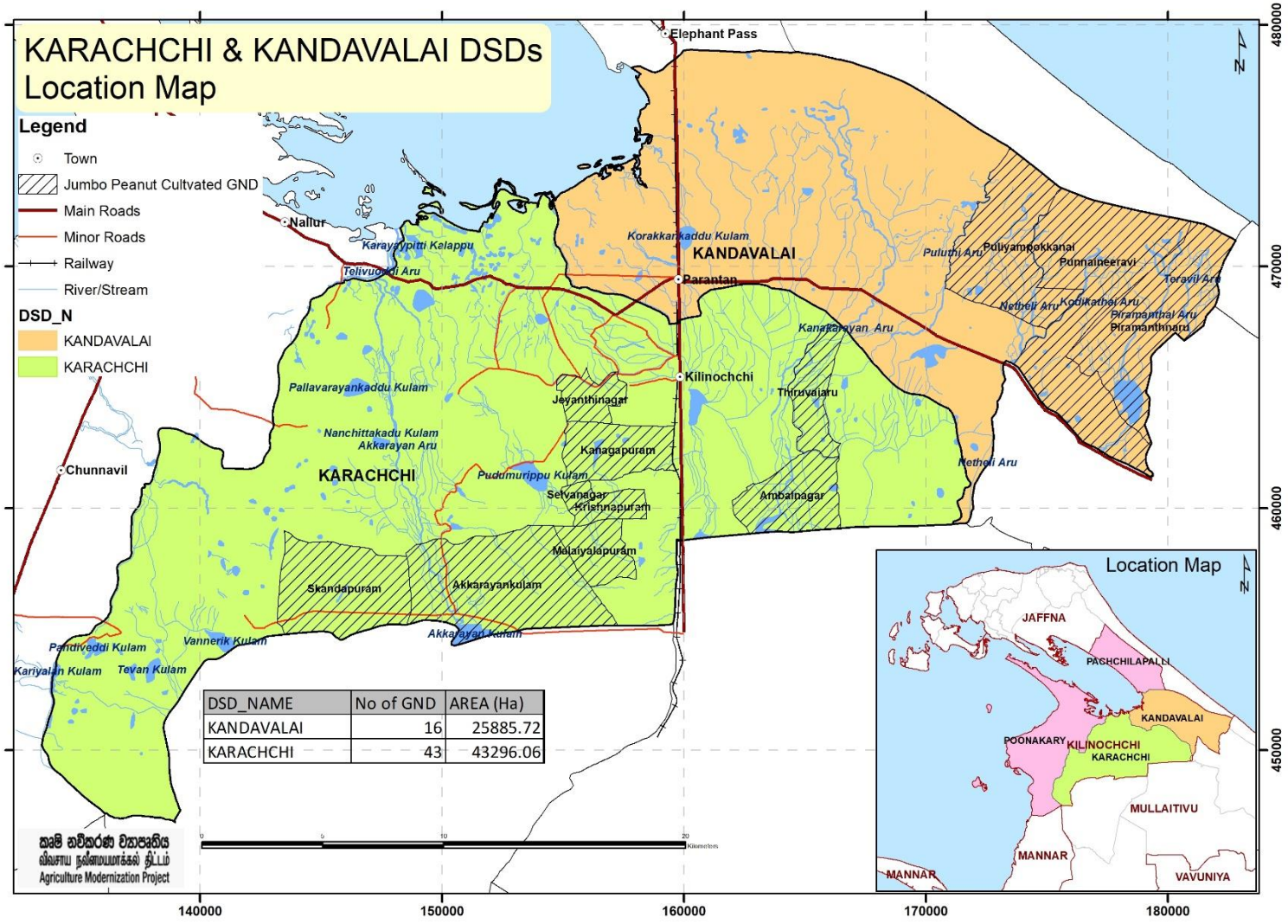
KARACHCHI & KANDAVALAI DSDs
Location Map
Legend
Town
Jumbo Peanut Cultvated GND
Main Roads
Minor Roads
Railway
River/Stream
DSD_N
KANDAVALAI
KARACHCHI
Elephant Pass
Nallur
Parantan
Kilinochchi
Chunnavil
KANDAVALAI
KARACHCHI
Korakkarkaddu Kulam
Karayampitti Kelappu
Telivuoddi Aru
Pallavarayankaddu Kulam
Nanchittakadu Kulam
Akkarayan Aru
Pudumurippu Kulam
Skandapuram
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Akkarayan Kulam
Pandiveddi Kulam
Vannerik Kulam
Kariyalai Kulam
Tevan Kulam
Jeyanthinagar
Kanagapuram
Selvanagar
Krishnapuram
Malaiyalapuram
Ambalnagar
Thiruvaiaru
Kanakarayan Aru
Puluthi Aru
Puliyampokkanai
Punnaineeravi
Teravil Aru
Netheli Aru
Kodikathai Aru
Piramanthai Aru
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DSD_NAME | No of GND | AREA (Ha)
KANDAVALAI | 16 | 25885.72
KARACHCHI | 43 | 43296.06
Location Map
JAFFNA
PASHCHILAPALLI
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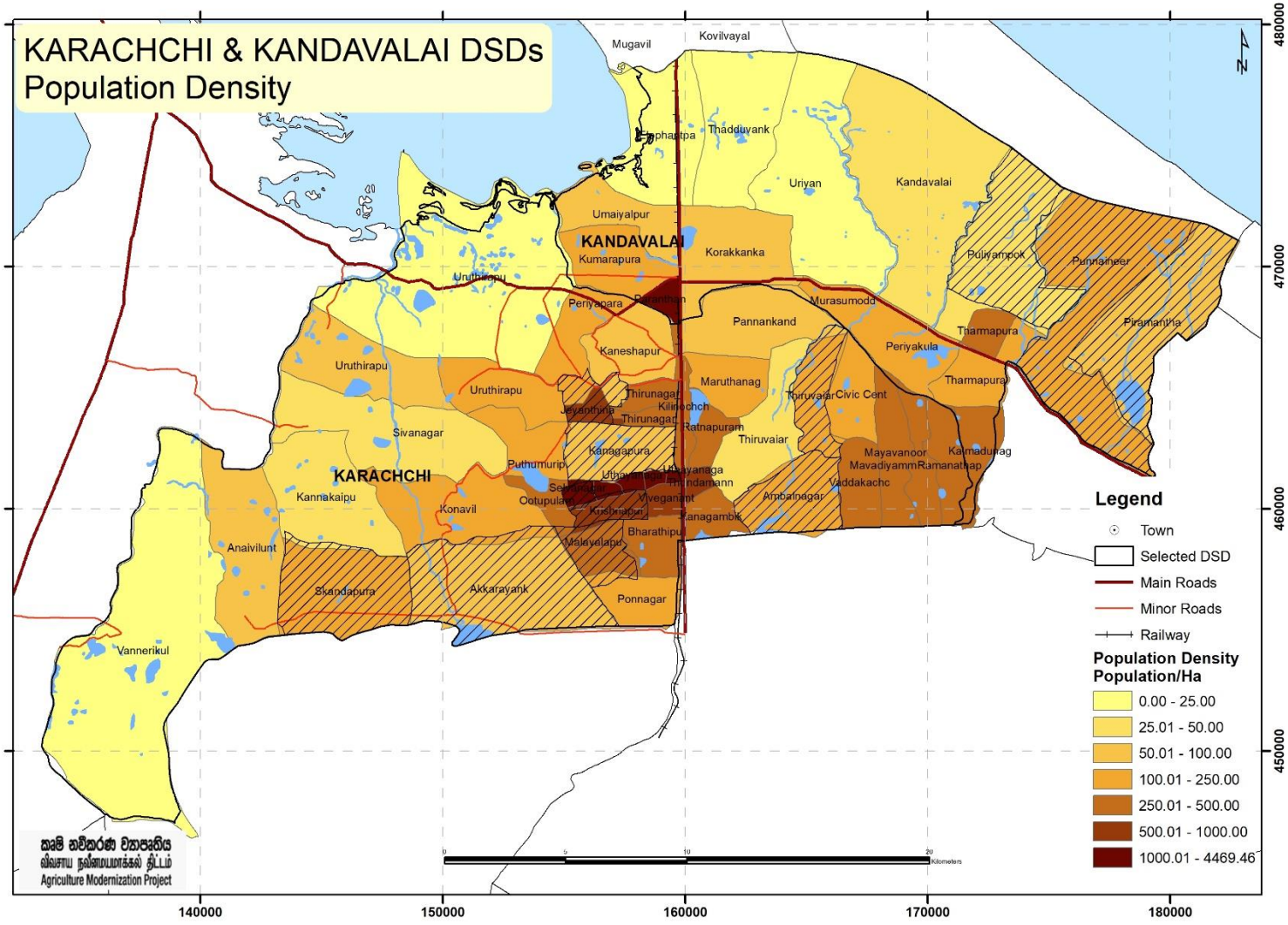
KARACHCHI & KANDAVALAI DSDs
Population Density
KANDAVALAI
KARACHCHI
Mugavil
Kovilvayal
Thadduvank
Uriyan
Kandavalai
Umaiyalpur
Kumarapura
Korakkanka
Uruthirapu
Periyapara
Pannankand
Murasumodd
Kaneshapur
Maruthanag
Thirunagar
Kilinochch
Ratnapuram
Thiruvaiar
Sivanagar
Kanagapura
Puthumurip
Kannakaipu
Konavil
Ootupulav
Vivekanant
Krishnapuri
Kanagambik
Bharathipu
Malayalapu
Anaivilunt
Skandapura
Akkarayank
Ponnagar
Vannerikul
Tharmapura
Periyakula
Civic Cent
Mayavanoor
Mavadiyamm
Vaddakachc
Ambalnagar
Kalmadunag
Ramanathap
Puliyampok
Punnaineer
Piramanth
Legend
Town
Selected DSD
Main Roads
Minor Roads
Railway
Population Density
Population/Ha
0.00 - 25.00
25.01 - 50.00
50.01 - 100.00
100.01 - 250.00
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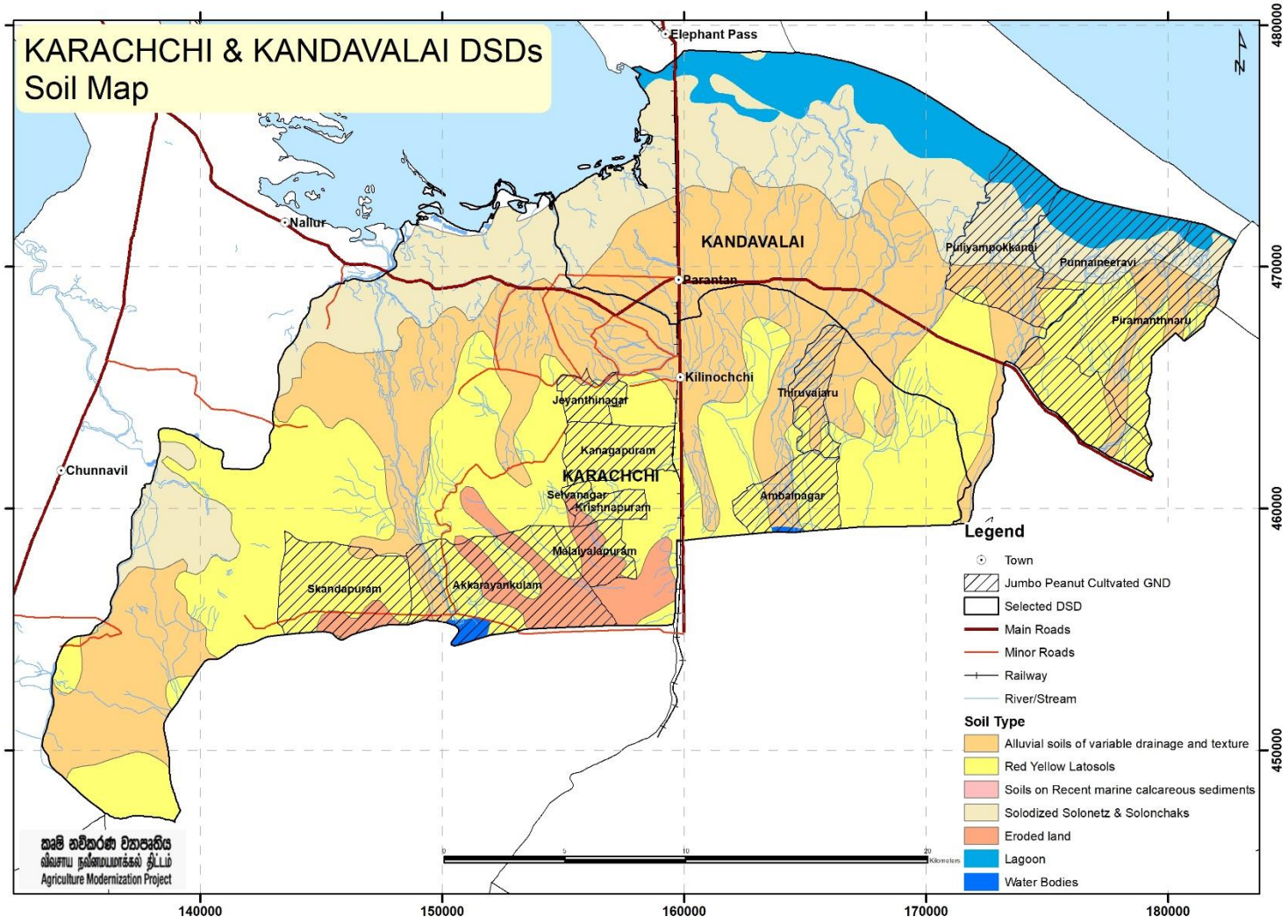
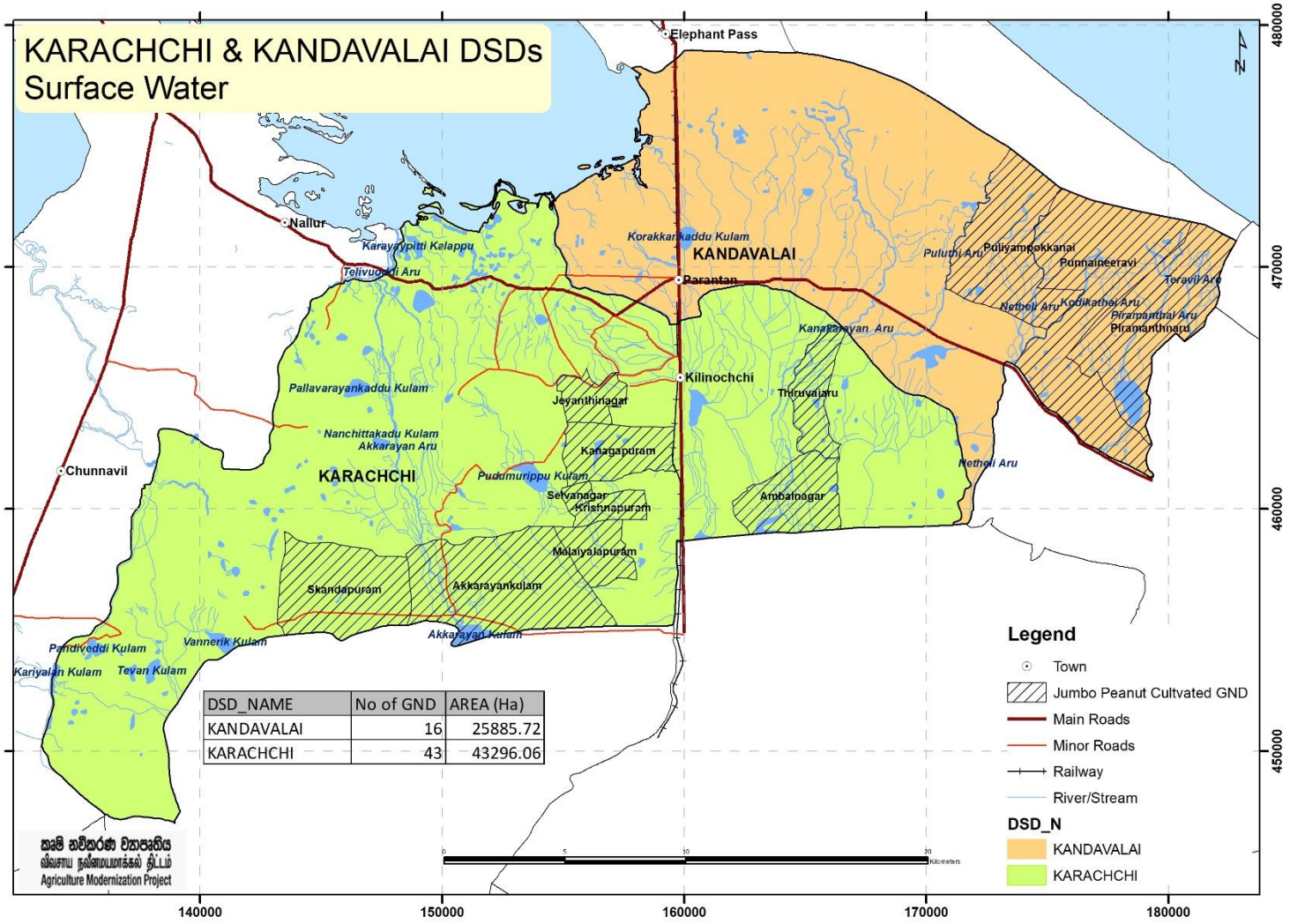
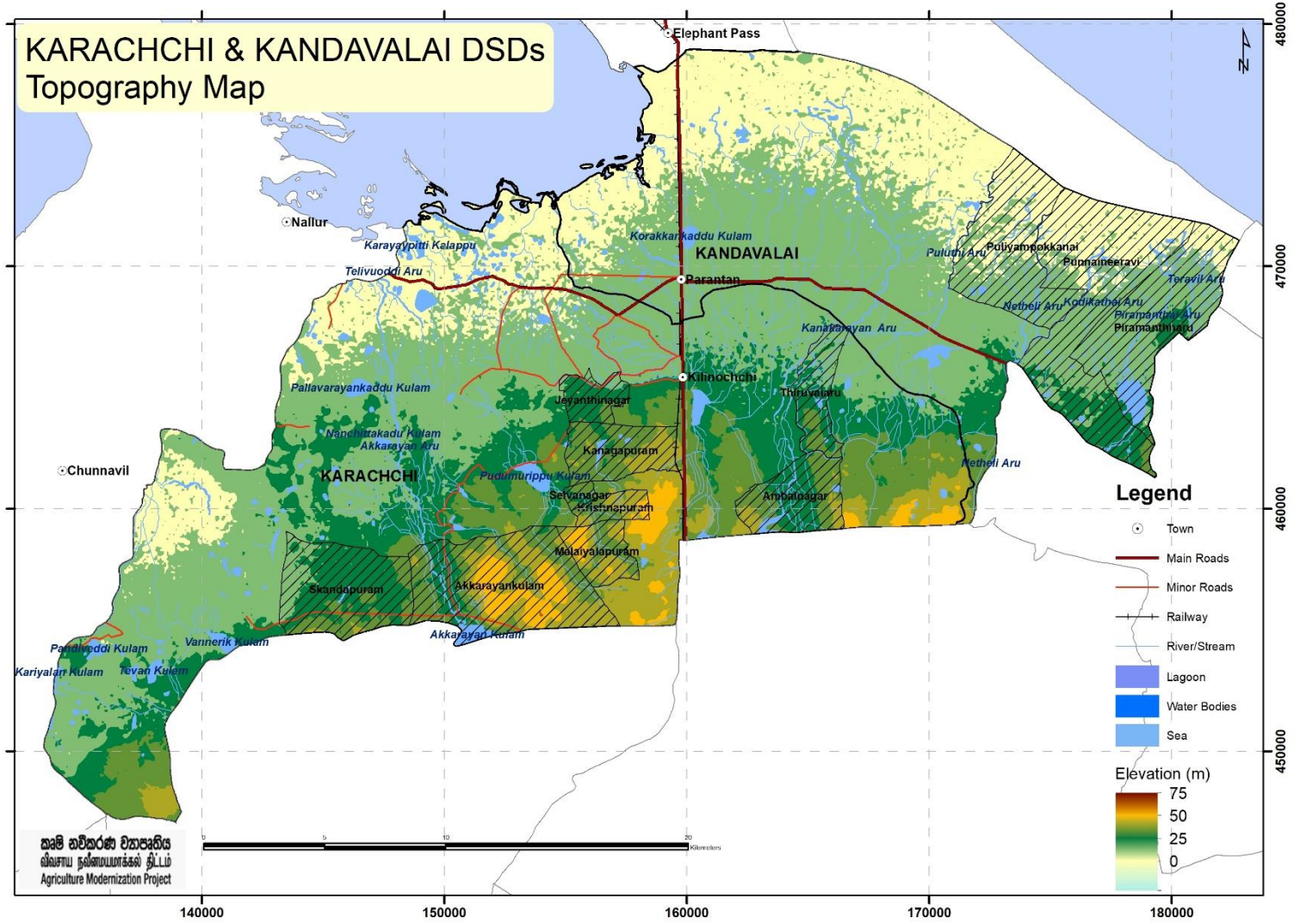
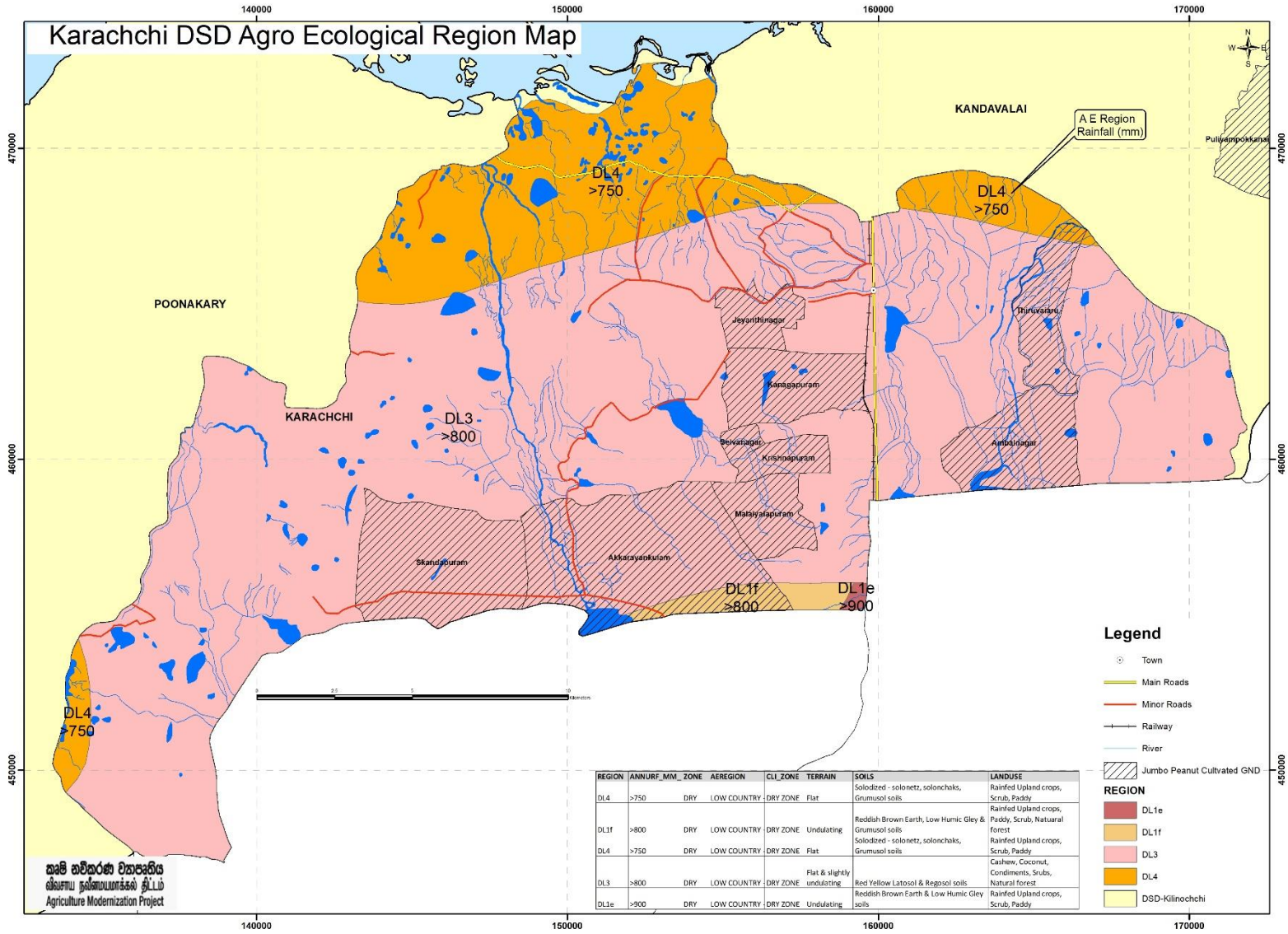
450000


KARACHCHI & KANDAVALAI DSDs
Soil Map
Elephant Pass
Nallur
KANDAVALAI
Puliyampokkanai
Punnaineeravi
Parantan
Piramanthnaru
Kilinochchi
Thiruvaiaru
Jeyanthinagar
Kanagapuram
KARACHCHI
Chunnavil
Selvanagar
Krishnapuram
Ambalnagar
Malaiyalapuram
Skandapuram
Akkarayankulam
Legend
Town
Jumbo Peanut Cultvated GND
Selected DSD
Main Roads
Minor Roads
Railway
River/Stream
Soil Type
Alluvial soils of variable drainage and texture
Red Yellow Latosols
Soils on Recent marine calcareous sediments
Solodized Solonetz & Solonchaks
Eroded land
Lagoon
Water Bodies
Kilometers
Agriculture Modernization Project
140000
150000
160000
170000
180000
480000
470000
460000
450000


KARACHCHI & KANDAVALAI DSDs
Surface Water
Elephant Pass
Nallur
Karayarpitti Kelappu
Telivuppidi Aru
Korakkankaddu Kulam
KANDAVALAI
Parantan
Puluthi Aru
Puliyampokkanai
Punnaineeravi
Teravil Aru
Netheli Aru
Kodikathoi Aru
Piramanthal Aru
Piramanthnaru
Kanakaraayan Aru
Kilinochchi
Thiruvaiaru
Pallavarayankaddu Kulam
Jeyanthinagar
Nanchittakadu Kulam
Akkarayan Aru
Kanagapuram
Chunnavil
KARACHCHI
Pudumurippu Kulam
Selvanagar
Krishnapuram
Ambalnagar
Malaiyalapuram
Skandapuram
Akkarayankulam
Akkarayan Kulam
Vannerik Kulam
Pandiveddi Kulam
Kariyalan Kulam
Tevan Kulam
DSD_NAME | No of GND | AREA (Ha)
KANDAVALAI | 16 | 25885.72
KARACHCHI | 43 | 43296.06
Legend
Town
Jumbo Peanut Cultvated GND
Main Roads
Minor Roads
Railway
River/Stream
DSD_N
KANDAVALAI
KARACHCHI
කෘෂි නවීකරණ ව්‍යාපෘතිය
விவசாய நவீனமயமாக்கல் திட்டம்
Agriculture Modernization Project
Kilometers
480000
470000
460000
450000
140000
150000
160000
170000
180000


KARACHCHI & KANDAVALAI DSDs
Topography Map
Elephant Pass
Nallur
Karayagpitti Kalappu
Telivuoddi Aru
Korakkarkaddu Kulam
KANDAVALAI
Parantan
Puluchi Aru
Puliyampokkanai
Punnaineeravi
Teravil Aru
Netheli Aru
Kodikaththai Aru
Piramanthai Aru
Piramanthiland
Kanakarayan Aru
Kilinochchi
Thiruvaiaru
Pallavarayankaddu Kulam
Jeyanthinagar
Nanchuttakadu Kulam
Akkarayan Aru
Kanagapuram
Chunnavil
KARACHCHI
Pudumurippu Kulam
Selvanagar
Krishnapuram
Ambalnagar
Netheli Aru
Malaiyalapuram
Skandapuram
Akkarayankulam
Akkarayan Kulam
Vannerik Kulam
Pandivpodi Kulam
Kariyalai Kulam
Tevan Kulam
Legend
Town
Main Roads
Minor Roads
Railway
River/Stream
Lagoon
Water Bodies
Sea
Elevation (m)
75
50
25
0
N
480000
470000
460000
450000
140000
150000
160000
170000
180000
Kilometers
කෘෂි නවීකරණ ව්‍යාපෘතිය
விவசாய நவீனமயமாக்கல் திட்டம்
Agriculture Modernization Project


Karachchi DSD Agro Ecological Region Map
140000
150000
160000
170000
470000
460000
450000
KANDAVALAI
A E Region Rainfall (mm)
Pullaampokkanai
DL4 >750
DL4 >750
POONAKARY
Jeyanthinagar
Thiruvaiaru
Kanagapuram
KARACHCHI
DL3 >800
Selvanagar
Krishnapuram
Ampalnagar
Malaiyalapuram
Skandapuram
Akkarayankulam
DL1f >800
DL1e >900
DL4 >750
Legend
Town
Main Roads
Minor Roads
Railway
River
Jumbo Peanut Cultvated GND
REGION
DL1e
DL1f
DL3
DL4
DSD-Kilinochchi
REGION | ANNURF_MM_ ZONE | AEREGION | CLI_ZONE | TERRAIN | SOILS | LANDUSE
DL4 | >750 | DRY | LOW COUNTRY | DRY ZONE | Flat | Solodized - solonetz, solonchaks, Grumusol soils | Rainfed Upland crops, Scrub, Paddy
DL1f | >800 | DRY | LOW COUNTRY | DRY ZONE | Undulating | Reddish Brown Earth, Low Humic Gley & Grumusol soils | Rainfed Upland crops, Paddy, Scrub, Natuaral forest
DL4 | >750 | DRY | LOW COUNTRY | DRY ZONE | Flat | Solodized - solonetz, solonchaks, Grumusol soils | Rainfed Upland crops, Scrub, Paddy
DL3 | >800 | DRY | LOW COUNTRY | DRY ZONE | Flat & slightly undulating | Red Yellow Latosol & Regosol soils | Cashew, Coconut, Condiments, Srubs, Natural forest
DL1e | >900 | DRY | LOW COUNTRY | DRY ZONE | Undulating | Reddish Brown Earth & Low Humic Gley soils | Rainfed Upland crops, Scrub, Paddy
කෘෂි නවීකරණ ව්‍යාපෘතිය
விவசாய நவீனமயமாக்கல் திட்டம்
Agriculture Modernization Project

ANNEX 3: BENEFICIARY LIST FOR JUMNBO PEANUT CLUSTER, KILINOCHCHI

Karachchi DSD

No	Name	Contact No	N.I.C Number	Address	Extent	Gender	Land Ownership	Water source	GN Division	GN Number	DS Division	ADC	AI Range
1	M.Rajakobal	77 765 6403	580773125V	No 379, Selvanagar	0.50	Male	Deed Owner	Tubewell	Selvanagar	KN-05	Karaichchi	Kilinochchi	Selvanagar
2	S.Santhirakumar	76 661 8197	7674345683V	Krishnapuram	0.50	Male	Permit Owner	Tubewell	Krishnapuram	KN-09	Karaichchi	Kilinochchi	Krishnapuram
3	R.Ramajeyam	77 591 6532	195829502680	Krishnapuram	0.50	Male	Permit Owner	Tubewell	Krishnapuram	KN-11	Karaichchi	Kilinochchi	Krishnapuram
4	S.Nantharoopan	77 696 0528	922202753V	Krishnapuram	0.50	Male	Permit Owner	Tubewell	Krishnapuram	KN-11	Karaichchi	Kilinochchi	Krishnapuram
5	R.Mukunthan	77 792 9535	911043830V	No 310, Selvanagar	0.50	Male	Permit Owner	Tubewell	Selvanagar	KN-11	Karaichchi	Kilinochchi	Selvanagar
6	S.Ravikumar	77 502 4515	832262447V	No 106, Ambalnagar	0.50	Male	Deed Owner	Tubewell	Ambalnagar	KN-11	Karaichchi	Kilinochchi	Ambalnagar
7	S.Vinothan	77 125 7152	972662194V	No 35, Thiruvaiyaru	0.50	Male	Deed Owner	Agro-well	Thiruvaiyaru	KN-15	Karaichchi	Kilinochchi	Thiruvaiyaru
8	A.Pathmajothi	77 945 6700	848494348V	8th Lane, Santhapuram	0.50	Female	Permit Owner	Tubewell	Santhapuram	KN-15	Karaichchi	Kilinochchi	Santhapuram
9	P.Sureshkumar	76 658 8608	197705601485	Kanakapuram	0.50	Male	Permit Owner	Tubewell	Kanakapuram	KN-15	Karaichchi	Kilinochchi	Kanakapuram
10	K.Suventhiran	77 767 6899	872670890V	Thiruvaiyaru	0.50	Male	Permit Owner	Tubewell	Thiruvaiyaru	KN-15	Karaichchi	Kilinochchi	Thiruvaiyaru
11	I.Jesuthasan	77 836 3879	611265492V	Thiruvaiyaru	0.50	Male	Deed Owner	Tubewell	Thiruvaiyaru	KN-15	Karaichchi	Kilinochchi	Thiruvaiyaru
12	S.Kabilan	77 318 2951	960220978V	Thiruvaiyaru	0.50	Male	Permit Owner	Tubewell	Thiruvaiyaru	KN-19	Karaichchi	Kilinochchi	Thiruvaiyaru
13	Kavivarman	77 074 6823	933102092V	Thiruvaiyaru	0.50	Male	Deed Owner	Agro-well	Thiruvaiyaru	KN-19	Karaichchi	Kilinochchi	Thiruvaiyaru
14	K.Murukamoorthy	77 689 8543	561123039V	Thiruvaiyaru	0.50	Male	Deed Owner	Tubewell	Thiruvaiyaru	KN-19	Karaichchi	Kilinochchi	Thiruvaiyaru
15	T.Sivajini	77 908 3945	756143547V	Thiruvaiyaru	0.50	Female	Permit Owner	Agro-well	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
16	S.Nadesappillai	77 069 1689	570442856V	Thiruvaiyaru	0.50	Male	Deed Owner	Tubewell	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
17	K.Kirupakaran	77 547 2245	820645170V	Thiruvaiyaru	0.50	Male	Permit Owner	Tubewell	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
18	R.Muththuraja	77 908 6138	712764759V	Kirushnapuram	0.50	Male	Permit Owner	Tubewell	Kirushnapuram	KN-20	Karaichchi	Kilinochchi	Kirushnapuram
19	A.Nirojan	77 418 6012	923492054V	Thiruvaiyaru	0.50	Male	Permit Owner	Agro-well	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
20	K.Gowri	77 473 4409	705894434V	Thiruvaiyaru	0.50	Female	Permit Owner	Tubewell	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
21	S.Karunainathan	77 844 4877	600124510V	Thiruvaiyaru	0.50	Male	Permit Owner	Tubewell	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
22	I.Nadarasa	77 762 9386	750280853V	Thiruvaiyaru	0.50	Male	Permit Owner	Tubewell	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
23	K.Pandiyaraj	77 968 3577	670493830V	Thiruvaiyaru	0.50	Male	Permit Owner	Tubewell	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
24	Thavamalar	77 745 8132	777123513V	Thiruvaiyaru	0.50	Female	Permit Owner	Tubewell	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
25	S.Mokanavaseekaran	76 407 4182	822344283V	Thiruvaiyaru	0.50	Male	Permit Owner	Tubewell	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
26	A.Jeyaraj	77 901 2137	630812879V	Thiruvaiyaru	0.50	Male	Permit Owner	Tubewell	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru

27	N.Sasananth	77 069 1689	883314859V	Thiruvaiyaru	0.50	Male	Deed Owner	Tubewell	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
28	M.Pirasalini	77 151 6789	978383114V	Thiruvaiyaru	0.50	Female	Deed Owner	Tubewell	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
29	S.Yokalingam	77 582 1296	620724106V	Thiruvaiyaru	0.50	Male	Permit Owner	Tubewell	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
30	K.Kajeevan	77 840 5384	931464345V	No 53/3, Ampalnagar	0.50	Male	Deed Owner	Tubewell	Ampalnagar	KN-20	Karaichchi	Kilinochchi	Ampalnagar
31	S.Selvarupan	77 561 2342	692153103V	No 40/2, Thiruvaiyaru	0.50	Male	Deed Owner	Tubewell	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
32	A.Uchamalihithan	77 376 5854	621923633V	No 81/2, Thiruvaiyaru	0.50	Male	Deed Owner	Tubewell	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
33	V.Baskaran	76 571 6038	792925006V	No 83/2, Thiruvaiyaru	0.50	Male	Deed Owner	Tubewell	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
34	S.Sivaloganathan	76 833 2216	531094263V	No 84/2, Thiruvaiyaru	0.50	Male	Deed Owner	Agro-well	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
35	A.Jeyaraj	77 337 7060	843301460V	No 62/2, Thiruvaiyaru	0.50	Male	Permit Owner	Tubewell	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
36	T.Puvanarajan	74 196 5091	200008103422	Thiruvaiyaru	0.50	Male	Permit Owner	Tubewell	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
37	A.Arohananathan	76 089 6198	692282507V	Malayalapuram	0.50	Male	Permit Owner	Agro-well	Malayalapuram	KN-20	Karaichchi	Kilinochchi	Malayalapuram
38	S.Jasotharan	77 348 9680	199035901838	No 240/2 Thiruvaiyaru	0.50	Male	Deed Owner	Agro-well	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
39	M.Ushanthi	77 983 7793	976024133V	154, Jeyanthinagar	0.50	Female	Permit Owner	Tubewell	Jeyanthinagar	KN-20	Karaichchi	Kilinochchi	Jeyanthinagar
40	M.Sivapalan	77 470 2993	573593227V	Selvanagar	0.50	Male	Permit Owner	Tubewell	Selvanagar	KN-20	Karaichchi	Kilinochchi	Selvanagar
41	I.Navaradnam	77 622 5428	682443685V	80, Uttruppulam	0.50	Male	Permit Owner	Tubewell	Selvanagar	KN-20	Karaichchi	Kilinochchi	Selvanagar
42	S.Jeyabavani	77 205 7709	797201197V	235/2 Thiruvaiyaru	0.50	Female	Deed Owner	Tubewell	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
43	M.Rajithan	77 790 6383	893575030V	215/2, Thiruvaiyaru	0.50	Male	Permit Owner	Tubewell	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
44	V.Ingaran	77 624 0570	200215201170	209/2, Thiruvaiyaru	0.50	Male	Deed Owner	Tubewell	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
45	S.Kuberan	77 422 5158	960230159V	No 89/2, Thiruvaiyaru	0.50	Male	Permit Owner	Agro-well	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
46	T.Kularasa	77 023 7746	603381955V	311, Selvanagar	0.50	Male	Permit Owner	Tubewell	Selvanagar	KN-20	Karaichchi	Kilinochchi	Selvanagar
47	N.Thevaseelan	77 052 3107	764532452V	Thiruvaiyaru	0.50	Male	Permit Owner	Tubewell	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
48	I.Vjinthan	71 709 6601	922353050V	Thiruvaiyaru	0.50	Male	Permit Owner	Tubewell	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
49	K.Kaviyarththanan	71 121 2151	200033700556	No 25/2, Thiruvaiyaru	0.50	Male	Permit Owner	Tubewell	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
50	V.Ketheeswaran	77 158 7278	941363733V	No 32/3, Thiruvaiyaru	0.50	Male	Leased	Tubewell	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
51	A.J.D.Roshan	77 212 1152	933233154V	No 139/3, Thiruvaiyaru	0.50	Male	Permit Owner	Tubewell	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
52	K.Akalyan	77 288 1576	902042180V	No 10/3, Thiruvaiyaru	0.50	Male	Permit Owner	Tubewell	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
53	P.Sadakopan	77 398 9671	762914565V	No 36/1, Thiruvaiyaru	0.50	Male	Permit Owner	Tubewell	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
54	S.Thasavaran	77 007 3935	692233050V	No 78/2, Thiruvaiyaru	0.50	Male	Permit Owner	Tubewell	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
55	T.Sajanthan	77 228 6858	882364127V	Thiruvaiyaru	0.50	Male	Permit Owner	Tubewell	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru

56	K.Mousigan	76 257 4009	951570710V	No 154/3, Ampalnagar	0.50	Male	Permit Owner	Tubewell	Ampalnagar	KN-20	Karaichchi	Kilinochchi	Ampalnagar
57	R.Rajinthan	77 634 5348	901240535V	Akkarayankulam	0.50	Male	Permit Owner	Tubewell	Akkarayankulam	KN-20	Karaichchi	Kilinochchi	Akkarayankulam
58	K.Kathirkamar	76 886 7789	657655412V	Thiruvaiyaru	0.5	Male	Permit Owner	Tubewell	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
59	K.Bavani	77 671 9806	828183508V	199/2, Thiruvaiyaru	0.50	Female	Permit Owner	Tubewell	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
60	S.Sasikala	77 171 8911	855624915V	92/3, Thiruvaiyaru	0.50	Female	Permit Owner	Tubewell	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
61	M.Piratheepa	76 407 4182	867042229V	18/2, Thiruvaiyaru	0.50	Female	Deed Owner	Agro-well	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
62	N.Srimohan	77 215 6476	777800388V	4/3, Thiruvaiyaru	0.50	Male	Permit Owner	Tubewell	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
63	S.Thurairasa	76 537 1417	583142924V	Skanthapuram	0.50	Male	Permit Owner	Tubewell	Skanthapuram	KN-20	Karaichchi	Kilinochchi	Skanthapuram
64	J.Jeyasri	77 835 9605	19776101970	Thiruvaiyaru	0.50	Male	Permit Owner	Tubewell	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
65	R.Vithusa	76 542 8204	957601030V	Thiruvaiyaru	0.50	Female	Permit Owner	Agro-well	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
66	I.Sathasivam	77 975 9829	511593409V	Thiruvaiyaru	0.50	Male	Permit Owner	Tubewell	Thiruvaiyaru	KN-26	Karaichchi	Kilinochchi	Thiruvaiyaru
67	M.Sutharsini	77 923 5497	199066103087	330, selvanagar	0.50	Female	Permit Owner	Tubewell	selvanagar	KN-30	Karaichchi	Kilinochchi	selvanagar
68	S.Yasothini	77 075 5510	198770902380	330, selvanagar	0.50	Female	Permit Owner	Tubewell	selvanagar	KN-04	Karaichchi	Kilinochchi	selvanagar
69	S.Saththiyaseelan	77 162 8512	795680683V	18/2, Thiruvaiyaaru	0.50	Male	Deed Owner	Agro-well	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
70	T.Inpakumar	77 653 3423	803384118V	36/3A, Thiruvaiyaaru	0.50	Male	Deed Owner	Tubewell	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
71	K.Kopinathan	77 651 1040	831813040V	159/3, Thiruvaiyaaru	0.50	Male	Permit Owner	Tubewell	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru
72	V.Maathulan	77 036 3514	197511201229	99/1, Thiruvaiyaaru	0.50	Male	Permit Owner	Tubewell	Thiruvaiyaru	KN-20	Karaichchi	Kilinochchi	Thiruvaiyaru

CLUSTER NAME: Kandawalai Jumbo peanut

												Land		Water source	
IndexNo	**Mrs/ Mr/ Miss**	**Name of the Farmer**	**Gender (M/F)**	**NIC**	**AI Range**	**GN Division**	**GN No**	**Residential Address**	**Contact No**	**Land Extent ac**	**Land Ownership (Deed/ Permit/ Lease/ etc)**	**Well**	**Easting**	**Northing**	**Easting**	**Northing**
1	Mr	K. Kumarathevan	Male	195200570V	Kumarasamipuram	Piramanthanaru	KN/57	Kumarasamipuram	773405316	0.5	permit	open well	80.46	9.01	80.46	9.01
2	Mr	S. Piratheepan	Male	910693816V	Punnaineeravi	Piramanthanaru	KN/56	Punnaineeravi	778388481	0.5	permit	open well	80.27	9.89	80.27	9.89
3	Mr	K. Thangavelu	Male	741836310V	Punnaineeravi	Piramanthanaru	KN/56	Punnaineeravi	776220030	0.5	permit	open well	80.32	9.41	80.32	9.41
4	Mrs	T. Mariyanayagi	Female	656803843V	Kumarasamipuram	Piramanthanaru	KN/57	Kumarasamipuram	776500312	0.5	permit	open well	80.27	9.53	80.27	9.53
5	Mr	S. Uthayakumar	Male	196166210054.00	Kumarasamipuram	Piramanthanaru	KN/57	Kumarasamipuram	778291488	0.5	permit	open well	80.81	9.73	80.81	9.73
6	Mr	S. Nanthakumar	Male	823204900V	Kumarasamipuram	Piramanthanaru	KN/57	Kumarasamipuram	775086775	0.5	permit	open well	80.58	9.36	80.58	9.36

7	Mr	S. Viyayaradnam	Male	197932005147.00	Kumarasamipuram	Piramanthanaru	KN/57	Kumarasamipuram	772223044	0.5	permit	open well	80.74	9.81	80.74	9.81
8	Mr	T.Vithusan	Male	963313527V	Kumarasamipuram	Piramanthanaru	KN/57	Kumarasamipuram	763537250	0.5	permit	open well	80.59	9.71	80.59	9.71
9	Mrs	N. Silampuchchelvi	Female	198662304000.00	Kumarasamipuram	Puliyanpokkanai	KN/57	Kumarasamipuram	779260679	0.5	permit	open well	80.59	9.45	80.59	9.45
10	Mrs	N. Krishnamohana	Female	725304730V	Kumarasamipuram	Puliyanpokkanai	KN/57	Kumarasamipuram	772855172	0.5	permit	open well	80.61	9.46	80.61	9.46
11	Mr	S. Lalithkumar	Male	197823504807.00	Kumarasamipuram	Puliyanpokkanai	KN/57	Kumarasamipuram	770656838	0.5	permit	open well	80.60	9.20	80.60	9.20
12	Mrs	S. Santhamalar	Female	756594111V	Kumarasamipuram	Puliyanpokkanai	KN/57	Kumarasamipuram	770246098	0.5	permit	open well	80.50	9.30	80.50	9.30
13	Mr	P. Yogarasa	Male	581823410V	Punnaineeravi	Puliyanpokkanai	KN/56	Punnaineeravi	773044672	0.5	permit	open well	80.62	9.14	80.62	9.14
14	Mrs	T. Viyayakumari	Female	875744429V	Kumarasamipuram	Puliyanpokkanai	KN/57	Kumarasamipuram	779457830	0.5	permit	open well	80.23	9.40	80.23	9.40
15	Mr	M. Thavalingam	Male	793304595V	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	771657945	0.5	permit	open well	80.17	9.74	80.17	9.74
16	Mrs	S. Ratheeswari	Female	716134765V	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	771657945	0.5	permit	open well	80.28	9.54	80.28	9.54
17	Mrs	T. Suganthini	Female	197879700940.00	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	779870397	0.5	permit	open well	80.22	9.88	80.22	9.88
18	Mr	E. Srikanthan	Male	681171541V	Karukkaikkulam	Punnaineeravi	KN/57	Karukkaikkulam	775277301	0.5	permit	open well	80.94	9.57	80.94	9.57
19	Mr	E.Selaththurai	Male	623203659V	Karukkaikkulam	Punnaineeravi	KN/57	Karukkaikkulam	773064239	0.5	permit	open well	80.44	9.70	80.44	9.70
20	Mr	R. Akalraj	Male	923424997V	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	770714118	0.5	permit	open well	80.26	9.46	80.26	9.46
21	Mrs	E. Sasikala	Female	827525480V	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	778826558	0.5	permit	open well	80.66	9.70	80.66	9.70
22	Mrs	J. Indrani	Female	197562103997.00	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	776021932	0.5	permit	open well	80.63	9.99	80.63	9.99
23	Mrs	M. Loganayagi	Female	806224944V	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	774866386	0.5	permit	open well	80.80	9.66	80.80	9.66
24	Mrs	V. Theivamalar	Female	747854173V	Karukkaikkulam	Punnaineeravi	KN/57	Karukkaikkulam	773638212	0.5	permit	open well	80.27	9.31	80.27	9.31
25	Mr	T. Lingam	Male	196615864866.00	Karukkaikkulam	Punnaineeravi	KN/57	Karukkaikkulam	779936312	0.5	permit	open well	80.75	9.09	80.75	9.09
26	Mr	S. Jegatheeswaran	Male	683371866V	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	778365885	0.5	permit	open well	80.09	9.98	80.09	9.98
27	Mrs	R. Jeyarani	Female	788503164V	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	778040471	0.5	permit	open well	80.07	9.06	80.07	9.06
28	Mr	T. Sajeevkanth	Male	902112495V	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	776936763	0.5	permit	open well	80.29	9.13	80.29	9.13
29	Mr	T. Surenthiran	Male	891449416V	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	767605430	0.5	permit	open well	80.19	9.42	80.19	9.42
30	Mrs	M.Merilucia	Female	717702000V	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	770533562	0.5	permit	open well	80.62	9.29	80.62	9.29
31	Mrs	P. Sasirega	Female	540633543V	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	778353241	0.5	permit	open well	80.07	9.30	80.07	9.30
32	Mrs	S. Sivajinithevi	Female	735382640V	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	774924113	0.5	permit	open well	80.34	9.24	80.34	9.24
33	Mrs	D. Sajeeva	Female	846014489V	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	776982841	0.5	permit	open well	80.35	9.26	80.35	9.26
34	Mr	K. Viyayatharan	Male	940502829V	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	768391137	0.5	permit	open well	80.57	9.37	80.57	9.37
35	Mr	S. Sanseevan	Male	200131102512.00	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	770519076	0.5	permit	open well	80.51	9.32	80.51	9.32

36	Mr	S.Sasikaran	Male	921694296V	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	742279131	0.5	permit	open well	80.29	9.21	80.29	9.21
37	Miss	P.Yalisai	Female	200377410681.00	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	761910328	0.5	permit	open well	80.57	9.39	80.57	9.39
38	Mr	S. Kirijesh	Male	199435700787.00	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	779170162	0.5	permit	open well	80.56	9.43	80.56	9.43
39	Mrs	S. Mathaneshvari	Female	565302272V	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	767651073	0.5	permit	open well	80.57	9.36	80.57	9.36
40	Mr	N. Vijayakumar	Male	197722103506.00	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	767979672	0.5	permit	open well	80.55	9.38	80.55	9.38
41	Mr	R. Lingeshvaran	Male	992177861V	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	768481988	0.5	permit	open well	80.54	9.24	80.54	9.24
42	Mr	N.Kajenthiran	Male	803353719V	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	760509639	0.5	permit	open well	80.57	9.42	80.57	9.42
43	Mrs	N. Ladsumi	Female	195966303226.00	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	770869935	0.5	permit	open well	80.31	9.11	80.31	9.11
44	Mr	S. Yogalingam	Male	198306804530.00	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	777288790	0.5	permit	open well	80.52	9.12	80.52	9.12
45	Mr	S. Thirumaran	Male	970204431V	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	776979224	0.5	permit	open well	80.49	9.09	80.49	9.09
46	Mr	K. Kajenthiran	Male	750173136V	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	779085897	0.5	permit	open well	80.48	9.58	80.48	9.58
47	Mrs	N. Jegatheeswari	Female	761347681V	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	778568045	0.5	permit	open well	80.51	9.33	80.51	9.33
48	Mr	E. Sivasubramanium	Male	621114506V	Punnaineeravi	Punnaineeravi	KN/56	Punnaineeravi	770080576	0.5	permit	open well	80.59	9.38	80.59	9.38
49	Mrs	K. Krishnaveni	Female	916953014V	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	770523541	0.5	permit	open well	80.72	9.65	80.72	9.65
50	Mrs	S. Rajina	Female	947954261V	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	775153601	0.5	permit	open well	80.55	9.07	80.55	9.07
51	Mrs	A. Maruthaji	Female	606574258V	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	778738520	0.5	permit	open well	80.56	9.04	80.56	9.04
52	Mr	S. Uthayakumar	Male	651172741V	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	771167248	0.5	permit	open well	80.46	9.01	80.46	9.01
53	Mr	P. Naguleswaran	Male	791893640V	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	774452459	0.5	permit	open well	80.27	9.89	80.27	9.89
54	Mr	P. Ingaran	Male	880912291V	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	765617440	0.5	permit	open well	80.32	9.41	80.32	9.41
55	Mr	S. Kartheepan	Male	362542112V	Punnaineeravi	Punnaineeravi	KN/56	Punnaineeravi	778388481	0.5	permit	open well	80.77	9.25	80.77	9.25
56	Mr	S. Senthurselvan	Male	791804620V	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	775909552	0.5	permit	open well	80.09	9.90	80.09	9.90
57	Mr	S. Jermilan	Male	832494410V	Punnaineeravi	Punnaineeravi	KN/56	Punnaineeravi	765757146	0.5	permit	open well	80.49	9.08	80.49	9.08
58	Mr	S. Thamilmani	Male	196140487V	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	768539403	0.5	permit	open well	80.59	9.04	80.59	9.04
59	Mr	M.Jenthan	Male	973372033V	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	778291448	0.5	permit	open well	80.07	9.77	80.07	9.77
60	Mr	S. Sivakumar	Male	863121841V	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	777206946	0.5	permit	open well	80.22	9.20	80.22	9.20
61	Mr	S. Uthayakumar	Male	590291536V	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	771233927	0.5	permit	open well	80.33	9.27	80.33	9.27
62	Mr	K. Sivananthan	Male	701520998V	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	775167015	0.5	permit	open well	80.94	9.79	80.94	9.79
63	Mr	T. Jeyakaran	Male	840833984V	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	777206057	0.5	permit	open well	80.45	9.08	80.45	9.08
64	Mr	K.Thineshkaran	Male	910484320V	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	778985963	0.5	permit	open well	80.23	9.38	80.23	9.38

65	Mr	S. Murukaia	Male	513383509V	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	774866386	0.5	permit	open well	80.39	9.67	80.39	9.67
66	Mr	K. Subhaskaran	Male	197620304457.00	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	775011106	0.5	permit	open well	80.23	9.48	80.23	9.48
67	Mr	S. Selvaruban	Male	773194645V	Kumarasamipuram	Punnaineeravi	KN/57	Kumarasamipuram	771177339	0.5	permit	open well	80.77	9.51	80.77	9.51
68	Mrs	J. Thilakarani	Female	192581009211.00	Karukkaikkulam	Punnaineeravi	KN/57	Karukkaikkulam	775612652	0.5	permit	open well	80.11	9.77	80.11	9.77
69	Mrs	T. Santhirakumari	Female	748084428V	Karukkaikkulam	Punnaineeravi	KN/57	Karukkaikkulam	778576478	0.5	permit	open well	80.66	9.66	80.66	9.66
70	Mrs	T. Sujoppiruntha	Female	818534825V	Karukkaikkulam	Punnaineeravi	KN/57	Karukkaikkulam	761038749	0.5	permit	open well	80.52	9.65	80.52	9.65
71	Mrs	N. Santhirakala	Female	197362904208.00	Karukkaikkulam	Punnaineeravi	KN/57	Karukkaikkulam	762015954	0.5	permit	open well	80.27	9.34	80.27	9.34
72	Mr	S.Muniyandi	Male	522173567V	Karukkaikkulam	Punnaineeravi	KN/57	Karukkaikkulam	760394912	0.5	permit	open well	80.28	9.33	80.28	9.33
73	Mr	A. Sundaram	Male	731095051V	Karukkaikkulam	Punnaineeravi	KN/57	Karukkaikkulam	761565493	0.5	permit	open well	80.81	9.79	80.81	9.79
74	Mrs	M.Nagarani	Female	196482703424.00	Karukkaikkulam	Punnaineeravi	KN/57	Karukkaikkulam	768605782	0.5	permit	open well	80.39	9.20	80.39	9.20
75	Mr	V. Nagenthiram	Male	612804893V	Karukkaikkulam	Punnaineeravi	KN/57	Karukkaikkulam	776529225	0.5	permit	open well	80.34	9.81	80.34	9.81
76	Mr	P.Uthayachchandran	Male	740354582V	Karukkaikkulam	Punnaineeravi	KN/57	Karukkaikkulam	774538157	0.5	permit	open well	80.37	9.78	80.37	9.78
77	Mr	T. Sivachchelvam	Male	621742884V	Karukkaikkulam	Punnaineeravi	KN/57	Karukkaikkulam	778676453	0.5	permit	open well	80.91	9.91	80.91	9.91
78	Mr	R. Paramananthan	Male	712484357V	Karukkaikkulam	Punnaineeravi	KN/57	Karukkaikkulam	775421639	0.5	permit	open well	80.59	9.25	80.59	9.25
79	Mrs	V. Santhirakala	Female	798205536V	Karukkaikkulam	Punnaineeravi	KN/57	Karukkaikkulam	767741518	0.5	permit	open well	80.46	9.35	80.46	9.35
80	Mrs	K. Sivaganamalar	Female	678343463V	Karukkaikkulam	Punnaineeravi	KN/57	Karukkaikkulam	774375215	0.5	permit	open well	80.47	9.39	80.47	9.39
81	Mr	K. Paransothi	Male	807894614V	Karukkaikkulam	Punnaineeravi	KN/57	Karukkaikkulam	773198325	0.5	permit	open well	80.55	9.41	80.55	9.41
82	Mrs	K. Thayalini	Female	198750629481.00	Karukkaikkulam	Punnaineeravi	KN/57	Karukkaikkulam	764744225	0.5	permit	open well	80.54	9.40	80.54	9.40
83	Mrs	T. Thamilslvi	Female	906414023V	Karukkaikkulam	Punnaineeravi	KN/57	Karukkaikkulam	765636845	0.5	permit	open well	80.04	9.60	80.04	9.60
84	Mrs	K.Kriyavathani	Female	815655052V	Karukkaikkulam	Punnaineeravi	KN/57	Karukkaikkulam	770232595	0.5	permit	open well	80.34	9.70	80.34	9.70
85	Mrs	P. Thayananthini	Female	786244889V	Karukkaikkulam	Punnaineeravi	KN/57	Karukkaikkulam	770489734	0.5	permit	open well	80.61	9.79	80.61	9.79
86	Mr	T. Selvaparan	Male	851213350V	Karukkaikkulam	Punnaineeravi	KN/57	Karukkaikkulam	775939771	0.5	permit	open well	80.26	9.31	80.26	9.31
87	Mrs	N. Kalaimathi	Female	878084136V	Karukkaikkulam	Punnaineeravi	KN/57	Karukkaikkulam	767058498	0.5	permit	open well	80.33	9.37	80.33	9.37
88	Miss	J. Thayalini	Female	935813840V	Karukkaikkulam	Punnaineeravi	KN/57	Karukkaikkulam	766486036	0.5	permit	open well	80.36	9.57	80.36	9.57
89	Mr	S.Naajin	Male	766944280V	Karukkaikkulam	Punnaineeravi	KN/57	Karukkaikkulam	768877043	0.5	permit	open well	80.32	9.41	80.32	9.41
90	Miss	N. Niluya	Female	975290751V	Karukkaikkulam	Punnaineeravi	KN/57	Karukkaikkulam	774512896	0.5	permit	open well	80.27	9.53	80.27	9.53
91	Mrs	R. Mangaleswari	Female	197473803880.00	Karukkaikkulam	Punnaineeravi	KN/57	Karukkaikkulam	741747389	0.5	permit	open well	80.33	9.66	80.33	9.66
92	Mr	V. Rayaradnam	Male	197633404354.00	Karukkaikkulam	Punnaineeravi	KN/57	Karukkaikkulam	772988185	0.5	permit	open well	80.22	9.32	80.22	9.32
93	Mr	S. Selvarasa	Male	610454867V	Piramanthanaru	Punnaineeravi	KN/58	Piramanthanaru	774795799	0.5	permit	open well	80.74	9.68	80.74	9.68

94	Mrs	J. Malarkodi	Female	788325800V	Piramanthanaru	Punnaineeravi	KN/58	Piramanthanaru	775425279	0.5	permit	open well	80.17	9.08	80.17	9.08
95	Mrs	K. Deisimeri	Female	198150404932.00	Piramanthanaru	Punnaineeravi	KN/58	Piramanthanaru	768407156	0.5	permit	open well	80.76	9.19	80.76	9.19
96	Mrs	K. Puvaneswari	Female	745133894V	Piramanthanaru	Punnaineeravi	KN/58	Piramanthanaru	775499988	0.5	permit	open well	80.27	9.04	80.27	9.04
97	Mr	S. Ajantha	Male	847224813V	Piramanthanaru	Punnaineeravi	KN/58	Piramanthanaru	770579568	0.5	permit	open well	80.27	9.58	80.27	9.58
98	Mr	K. Sritharan	Male	710084334V	Piramanthanaru	Punnaineeravi	KN/58	Piramanthanaru	779115412	0.5	permit	open well	80.57	9.67	80.57	9.67
99	Mrs	K. Siyamila	Female	797032190V	Piramanthanaru	Punnaineeravi	KN/58	Piramanthanaru	767615610	0.5	permit	open well	80.64	9.63	80.64	9.63
100	Mrs	K .Darmila	Female	199177401948.00	Piramanthanaru	Punnaineeravi	KN/58	Piramanthanaru	778624287	0.5	permit	open well	80.27	9.32	80.27	9.32

ANNEX 4: ESTABLISHMENT OF COMPOST PRODUCTION UNIT

Compost Processing Unit establishment

Ancient farmers in Sri Lanka have been using different organic fertilizers until early 1960s.There was no proper fertilizer application system, what they did was, convert the top soil by ploughing or using a mamoty and keep for the period of one month to decay all grasses etc.. Then only they do the pulverizing and levelling. Latter part of the 1960s, new improved short term high yielding varieties came up and highly sensitive for new chemical compared to organic fertilizer. Attractive results (greenish colour) of the cultivation can be seen about three days after applying chemical fertilizer especially with high "N" element. Gradually farmers were directed towards chemical fertilizer with high yielding varieties. Prices of chemical fertilizers also gone up with the time but unfortunately a political decision was taken to subsidise the chemical fertilizers. Then farmers used to apply chemical fertilizer without any control. Ultimately the Sri Lankan government has to face a foreign currency crisis and high prices of chemical fertilizer in the international market. Then the real problem came up and Sri Lanka doesn't have either chemical or organic fertilizer. So, this is the good time to start compost preparation at farmer level and train farmers to use organic fertilizer with chemical fertilizer.

Further the proposed compost production plant unit envisaged to establish a bio gas production unit focused to compliment the energy requirement at the APH and increased supply of organic materials for on farm applications incorporated with permitted plant growth substances based on soil analysis reports for diverse locations.

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In view of the above the modernization project proposes to establish a commercially viable compost making unit focused to produce soil application as well as the folio application nutrients that would help to improve the soil fertility and soil structure/chemical/biological properties (especially Cation Exchange Capacity (CEC), Water Holding Capacity (WHC), solarization, enhance presence of soil rhizobial organisms etc.).

Raw materials, Yard equipment, Tools Machinery and building requirement for 200 Mts of Compost per season.

Item number	Item	Quantity
1	Cow dung	90M
2	Poultry litter	45 Mts
3	Strew	37.5 M
4	Green leaves	37.5
5	Dry leaves	37.5
6	Eppawala Rock Phosphate (5%)	10 Mts
Yard equipment		
7	Wheel barrows	04
8	Mammoties	04

9	Knife (large)	01
10	Fork	04
11	Shovel	05
12	Weighing machine (250 Kgs)	01
13	Measuring tape (30M)	01
14	Black Polythene (3.5 ft., 750 guage)	300 Kgs
15	Coir twine	75 Kgs
16	Boots	7 pairs
Packing materials		
17	Poly sack bags (40Kgs)	5000 nos
18	Inner bags (large)	5000 nos
Machinery		
19	Water pump 1”	01
20	Chopping machine	01
21	Sieving machine	01
22	Processing, drying and sieving hut 300sqm	01
23	Storage building with office room and basic facilities for staff. 800sqm	01

Although the raw material requirement is like the above table, farmers should be encouraged to utilise freely available organic materials like crop waste. Especially the Banana cultivation gives so much materials for compost preparation. Due to the recycling of organic wastes favourable environment can be created. Organic fertilizer usage can be popularised while increasing the chemical fertilizer use efficiency. Good market for quality compost can be initiated as a viable business.

Site selection for this plant is very crucial because sometimes bad odour as well as the leachate may be taken place. Shadier place is better than the fully opened place because un necessary drying can be prevented. Availability of water source, Electricity, access roads, loading and unloading spaces are must.

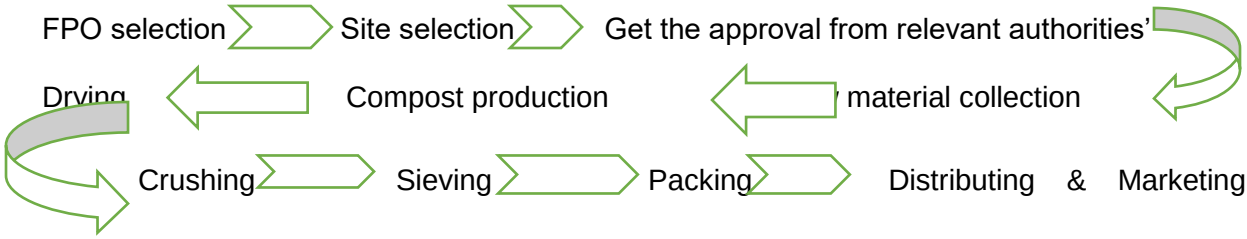
DoA has given different raw material combination for compost preparation in 2021.

Combination 01: Raw plant parts, dried plant parts (equal to 3 raw plant parts), ERP and Old compost.

Combination 02: Cow dung or poultry litter, raw plant parts, dried plant parts (equal to 3 raw plant parts), ERP and old compost.

Figure 1 Compost processing centre.

Compost production process



Proper management and training are very important factors of the compost production. Management includes approvals from relevant authorities, environment friendliness and good quality production. Proper awareness and skilfulness are the other crucial factors of the compost production.