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Agriculture Modernization Project

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Sri Lanka Agriculture Sector Modernisation Project (ASMP)

ENVIRONMENTAL SCREENING REPORT

FOR

CLUSTER DEVELOPMENT PLAN FOR HYBRID MAIZE SEED PRODUCTION IN BADULLA (KANDAKETIYA)

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

Submitted: 03 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

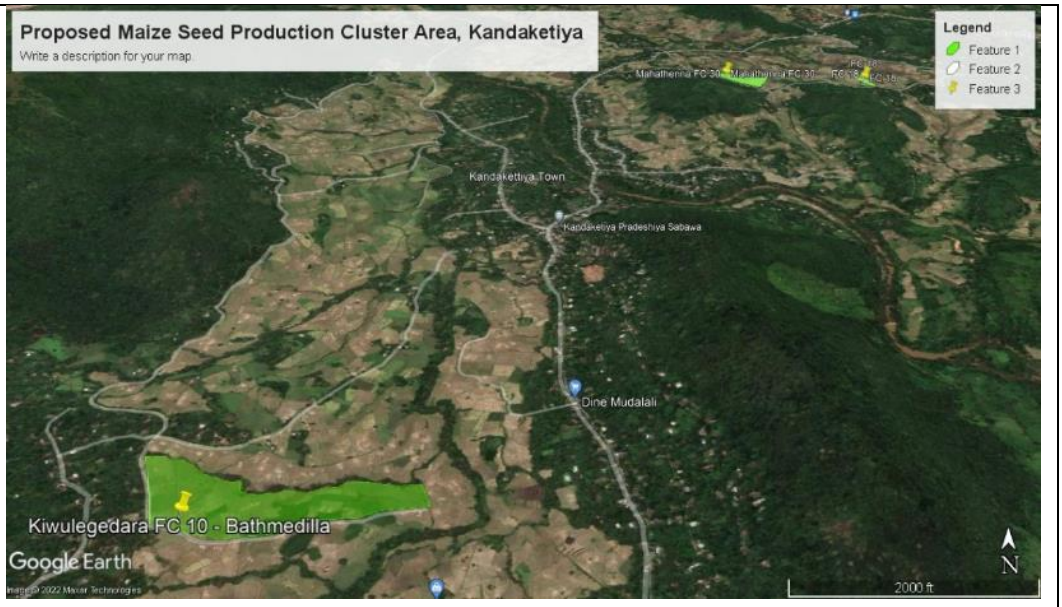
ENVIRONMENTAL SCREENING REPORT

1. PROJECT IDENTIFICATION

Project title	Hybrid Maize Seed Production Cluster in Badulla District (Kandaketiya DSD)
Project proponent	Project Management Unit, ASMP, MoA

2. PROJECT LOCATION

Location *(Relative to the nearest town, highway)*	Hybrid Maize Seed Production Cluster in Badulla district is planned to implement in Kandaketiya and Meegahakiwula DSDs. According to the feasibility study conducted, this area has been recognised as the most feasible areas in Badulla District. In the initial stage cluster will be formed in Mahathenna and Kiwulegedara GNDs (Figure 1) in Kandaketiya and from next season onwards the area will be spread to both Kandaketiya and Meegahakiwula DSDs. 



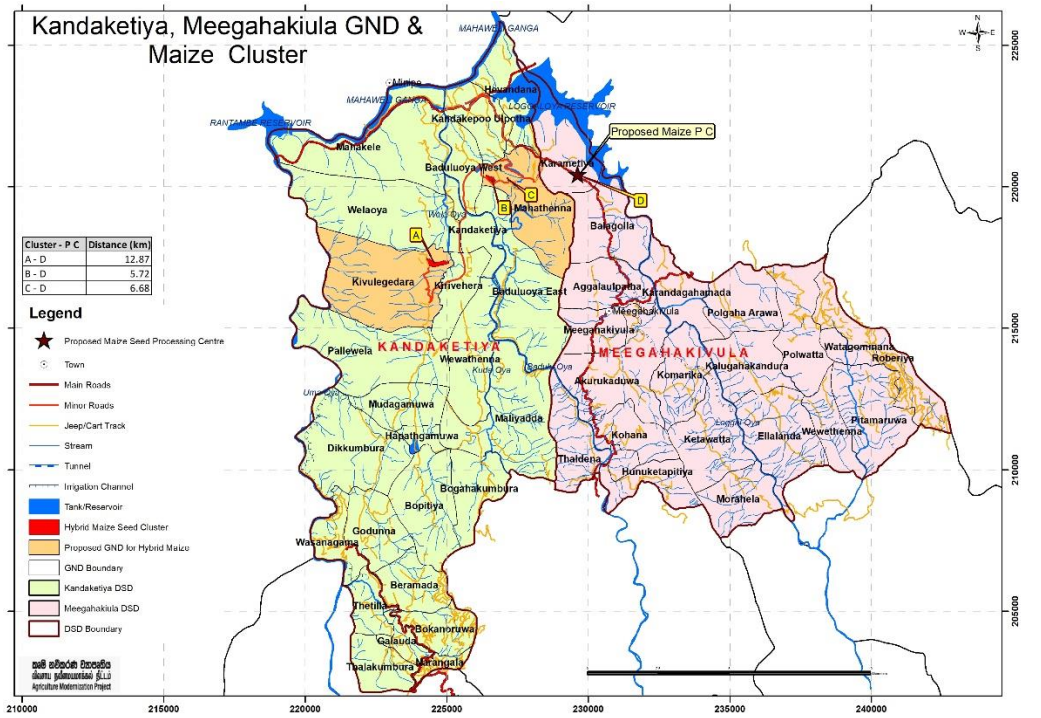


Figure 1: Proposed Maize Seed Production area in Kandaketiya

Particularly these two GNDs are located very closer to Kandaketiya township. However, Kandaketiya and Meegahakiwula DSs can be accessed through B36 Badulla-Mahiyanganaya. Proposed lands in Kandaketiya are located along Kadaketiya-Karametiya road. Both DSs are located about 15-40km away from Mahiyanganaya and Kandaketiya is located about 30km away from Badulla town.

Definition of cluster area

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

Kandaketiya DSD is about 153.42 sq.km with 26 Grama Niladhari Divisions while Meegahakiwula is 105.5 sq.km with 20 GNDs. Out of the area, initial stage 34 Acres in Kiwulegedara and 60 acres in Mahathenna area have been selected for cultivation of Maize Seeds. Kiwulegedara is coming under Bathmedilla project of Uma Oya and Mahathenna is coming under Badulu Oya Project. Though there are more than 300 farmers in Kandaketiya area, due to the limitation of planting material 50 leading farmers with 50 acres have been selected for collective production under the cluster to contribute to the needs of the country in Maha

	season. Most suitable areas with maximum number of farmers in the same area with the size of 1.0 acre each plot have already been chosen. In addition, access road to Kiwulegdara proposed to be imporved to smooth the cluster operations. Further, two building belongs to Paddy Marketing Board proposed to be imporved as to use as processing centres. All infrastructure improvements will be considered separately by a Screening Report.
Adjacent land and features	Kandaketiya and Meegahakiwula Divisional Secretariats are located in Badulla district in Wiyaluwa Electorate adjoining to Lunugala, Rideemaliyadda and Uva-paranagama divisional secretariates. Predominantly these divisions are undulating areas with various features such as hilly areas, slopy areas, rivers, streams, canals, grasslands, wildlife areas, natural forest areas and cultivation areas. Uma Oya, Badulu Oya, Komarika Ela and Thaldena Ela area main irrigation system where these two DSDs are been fed. The more important manifestations are heavy soil losses; high sediment yields; soil fertility decline and reduction in crop yields; marginalization of agricultural land; salinization; landslides and deforestation and forest degradation. Severe erosion takes place in the hill country on sloping lands under market gardens (vegetables and potatoes), tobacco, poorly managed seedling tea and chena cultivation. Soil erosion is also considered a threat to agricultural production in the rain-fed farming areas in the Dry Zone. Relatively high erosivity values are reported from Badulla, Meegahakiula, Kandaketiya and Ridimaaliyadda DS Divisions.

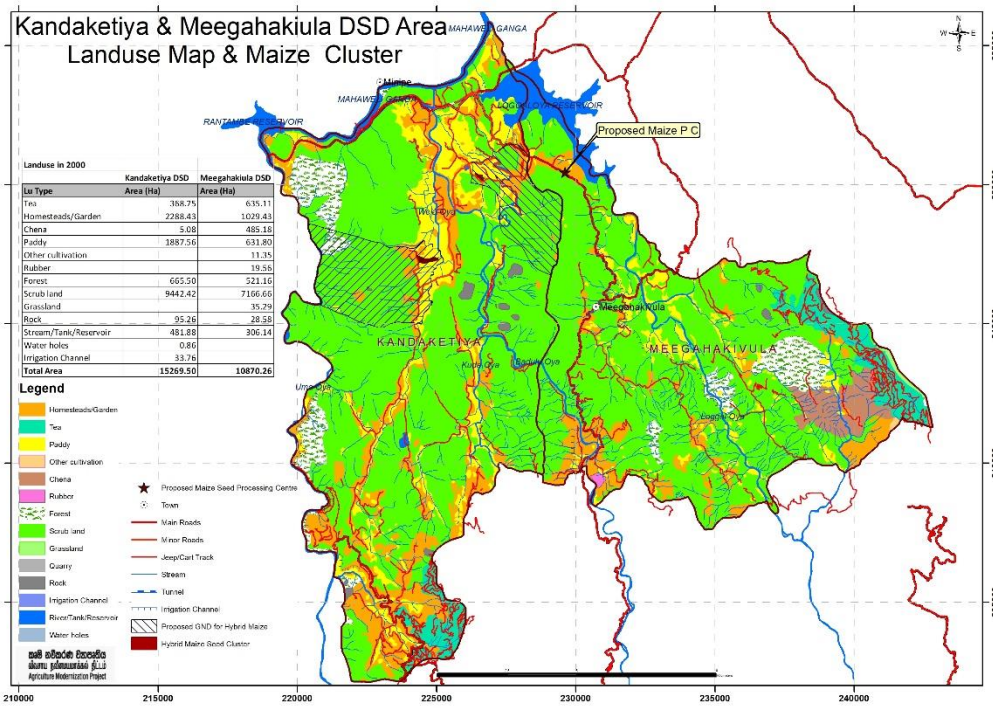


Figure 2: Land Use Pattern of Kandaketiya and Meegahakiwula

Main economic base of the people living in the area is Agriculture and mostly Paddy, Maize, Papper, vegetable, and chena cultivations are prominent. The land use pattern of these two DSDs are given below:

Table 1: Land Use Pattern in selected GNDs

Nature of the land	Kandaketiya Extent (ha)	Meegahakiwula Extent (ha)
Built up lands	225	831.5
Homesteads/ Home gardens	2210	3211

Tea	153	864
Rubber	-	13.5
Coconut	350	24
Paddy	1741	1279
Other Cultivation (Cinnamon, Mango, Pepper, Flowering plant, Banana)	578	2450
Dense Forest	9890	572
Protected areas including reservations of waterbodies	5500.78	980
Waterbodies	842	197
Non-cultivated lands	876.78	78
Total		**10,500**

Source: Resource Profiles 2020, Kandaketiya and Meegahakiwula DSs

Past incidence of landslide was mainly recorded in both **Kandaketiya, and Meegahakivula.** Their occurrence is resulted by both natural causes such as earth movements, rock falls, cracks, creep movement, localized earth slips and partial slides.

In particular to Kiwulegedara and Mahathenna GNDs, all selected lands are paddy lands under Bathmedilla and Badulu Oya schemes. Adjoining to these selected lands are also paddy lands which are being cultivated vegetable, tobacco, etc. All these lands in the area been cultivated Maize during Yala. Badulu Oya and Uma Oya falling within the selected GNDs.

There are field canals and distribution canals in addition to drainage canals adjacent to these lands. Kiriwana Ulpatha (natural springs) observed to be located about 3km away from Kiwulegedara.

The GNDs for cluster are bordered to many nature reserves such as Victoria-Randenigala-Rantembe Sanctuary, and few proposed forest areas falling within Kandaketiya DS and only few proposed forest areas in Meegahakiwula DS. However, selected lands at present not falling within any of the referred protected areas. In particular to Mahathenna GND, Eriyagahaulpotha, Polwatta, and Ilukthenna forest areas can be observed.

3. PROJECT JUSTIFICATION

Need for the project *(What problem is the project going to solve)*	Maize second main important cereal crop which mainly provide essential ingredient to animal feed processing industry while catering to the countable number of value-added human food. Food and nutrition security of the country, especially protein market of the country heavily depends on availability of maize as key feed ingredient. Extent of cultivation and volume production trend shows positive increasing trend over the last decades. Entire industry collapsed due to the recent government policy on organic agriculture along with import ban of fertilizer and agro-chemicals. On the other hand, restrict maize imports as a fiscal management policy badly affected on animal feed production industry of the country. Therefore, re-establish the crippled maize production industry is essential to cater the crying need of the animal feed industry. When hybrid maize production in Badulla, Vavuniya, Ampara and Kilinochchi districts are considered, the Badulla and Ampara districts have recorded higher yield than that of other two districts in Yala and Maha seasons. Maize production in Vavuniya and Kilinochchi districts is not very popular and they cultivate other crops instead of maize. Maize seed requirement of Sri Lanka is largely fulfilled by the imports. Apart from seed imports, maize and related products are also imported to Sri Lanka.

	Although Sri Lanka imports more than 100000 MT of maize in 2019, it has sharply dropped to 28000 tons in 2020. Surprisingly, in 2020, Sri Lanka allowed importing wheat grains for animal feed and introduced it as an import quota of 185,000 MT of wheat grains. This initiative was made by the government to compensate the local corn production shortfall eventually filling 170,000 MT of the authorized quota volume. Sri Lanka also authorized subsequently an additional import quota of 100,000 MT for the April 15 through July 31, 2021, period. Import quota for wheat grains was said to be introduced as domestic corn production is unlikely to increase quickly enough in the short-term to meet the animal feed milling industry's demand. According to FAO (2021), annual growth rate of maize is around 16.73 percent. However, the overall productivity of maize is not in a satisfactory condition and has not been adequate to meet the increasing local demand. As a result, maize imports have been taking place. FAO (2021) further shows that approximately 98 to 99 percent of the hybrid maize seeds widely used by farmers for cultivation are imported. Although the Department of Agriculture (DoA) has already developed four local hybrids of which characters and yield parameters are comparable with imported hybrids, the use of local hybrid seeds among farmers are low as a result of the non-availability of local hybrid seed materials in required quantities in the local markets. The yield of local hybrid varieties is in par with those of imported varieties and average yield is around 5.5-6.5 metric tons per hectare. And the potential yield has been estimated to be 7.5-8.5 metric tons per hectare. Those hybrid varieties have been named as MI (III), MI (IV) and MI (V). In 2020, Sri Lanka has imported more than 1600 metric tons of maize seeds. Therefore, country like Sri Lanka should now turn to import substitution and save the foreign exchange. In this process, local hybrid seed production has important implications towards Sri Lankan economy. As a result, the Agriculture Sector Modernization Project intends to introduce hybrid maize seed production choosing 150 farmers from **Badulla**, Vavuniya, and Kilinochchi. Through this initiative above 150 acres of land are to be allocated for seed production. The expected seed yield from 150 farmers would be about 100 metric tons. Therefore, ASMP expects to check the feasibility of seed production in these 3 districts through data collected from the relevant stakeholders and secondary sources.
Purpose of the project *(What is going to be achieved by carrying out the project)*	According to the above scenario, government of sri lanka want primarily to substitute importation of maize seed. However, DOA has parental material for 150 acres at the moment. Therefore, ASMP under this cluster plan to start maize seed production cluster initially with 150 Acres and next season with multiplied seeds extend the cluster up to 1500 acres. Accordingly, followings can be achieved through the cluster: 1. Substitution of importation of Maize Seed 2. Save foreign exchange 3. Boost the animal feed industry in Sri Lanka 4. Increase the protein sources of poors and increase access to protein of sri lankans 5. Introduced modern technologies for post-harvest practices with intention of sustainability (water, energy, etc) 6. Capacity build of Maize Farmers specially with deep technical training on seed production and close monitoring 7. Develop the farmers into established business focussing seed production
Justifications and Alternatives considered	Cultivation of Hybrid Maize for seed production will help to upgrade their living standard up to a certain extent. Small land sizes are not enough to sustain. Minimum land extent of one acre needs for seed cultivation, in the same time they have to continue the other vegetable seed production also (about ¼ an acre of land extent). It is essential to shift to higher value crops with value addition to ensure the large-scale income.

(Different ways to meet the project need and achieve the project purpose)

Soil type, Rainfall, Relative Humidity, land availability, farmers' experience and willingness of farmers have been considered as selection criteria. Different soil types in one divisional secretary division available and couldn't find the soil types relevant Grama Niladhari divisions and Rain fall also the same. Farmers' experience and willing ness 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. Kandaketiya, and Meegahakiula are most suitable areas for Hybrid Maize seeds cultivation.

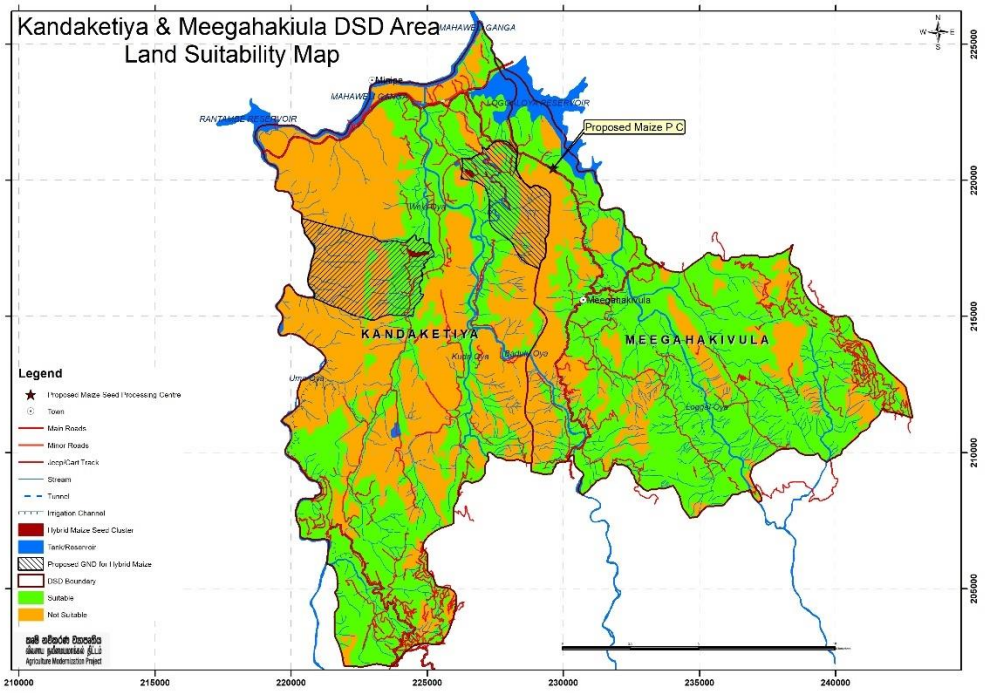


Figure 3: Suitability Map of Kandaketiya and Meegahakiwula

Table 2: Suitability chart

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	
Kandaketiya	√			√			√				√			√		**Most suitable**

Meegahakiula	√				√		√				√			√		Most suitable

Table 3: Comparative Assessment - Available Infrastructure & Processing Facilities for Maize Seed Production

Interested Area	Kandeketiya/ Meegahakiwula
Sample Size - No of farmers	64
Infrastructure Availability	
Field Access Road Condition	4
Availability of national grid Connection	4
Availability of Water Sources	3
Conclusion	Most Favorable
Availability of Own Maize Farming Machineries	
Tractors - 4 Wheel	3
Maize Seeders	3
Weeding Machines	4
Chemical Sprayers	4
Water Pumps	2
Conclusion	Most Favorable
Availability of Hire-out Maize Seed processing machineries and lab testing facilities	
Shelling Machines	3
Grader (Paddy Grader Machine)	1
Seed Coating Machine	4
Lab Facilities	2
Conclusion	Favorable
Availability of abandoned government buildings for processing and storing facilities	Less Favorable
Technical Know-how on Agri Machineries	Most Favorable

Considering environmental and social factors such as proximity to Wildlife Conserve areas and Forest Reserves, Land use, Soil Type, Agro-ecological zones, Topography and terrain, availability of water, willingness of farmers, availability of lands, social capital, etc establishment of maize seed production cluster in Kandaketiya, and Meegahakiwula would be feasible. However, these potential areas are observed to be having high-rate soil erosion as per the literature due to heaving agricultural practices, soil types, and terrain. Therefore, implementing serious/proper erosion control measures from commencement will reduce the erosive forces and impact due to soil erosion can be reduced up to greater extent. Victoria-Randenigala-Rantembe Sanctuary found to be bordered to Kandaketiya area. Therefore, selection of lands and farmers should avoid selecting farmers in the border areas to reduce the edge effects due to Cultivation. In addition, human-elephant conflict and damages to cultivations are higher closer to the boundary areas of Victoria-Randenigala-Rantembe Sanctuary. However, selected lands at present do not have such impact. Hence, precautionary measures should be made. Furthermore, selection of farmers in this area should be carefully and

transparently carried out to reduce the biasness which will lead to issues in social cohesiveness.

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	Agrarian Development Act of No 46 of 2000 and 2011 (Section 32)	√			Even though ASMP not supporting to convert paddy lands, the cluster lands selected area paddy converted to Maize with approval of relavent authorities.
3	Water Resources Board Act No. 29 of 1964	√			In case of ground water extraction, concent from the WRB should be obtained
4	The Fauna & Flora Protection Ordinance Act No. 49 of 1993 & its amendments	√			Victoria-Randenigala-Rantembe Sanctuary is bordered to Kandaketiya. Therefore, selection of farmlands should be avoided such sensitive areas. Where necessary DWLC should be consulted
5	Forest Ordinance including Amendments	√			Few proposed forest areas observed within the selected GNDs and selection of farmland should not disturb such areas.
6	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
7	The Irrigation Ordinance (Chapter 453)	√			Use of water from Badulu Oya and Bathmedilla Schemes should be with the approval of Irrigation Department

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	October 2022
Proposed completion date	December 2024
Estimated total cost	LKR 462,759,000
Present land ownership	Private Lands with Swarnaboomi, Permits Rural Roads – Pradeshiya Sabha Processing Centre – Paddy Marketing Board
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. 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.
	Poor fertilizer usage	
	Poor water usage	
	Poor land preparation practices	
	Poor crop maintenance	
	Poor weed control	
	Poor pest and disease management	
	Poor soil management	

		Introduce organic fertilizer preparation unit. IPM practices.
	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 will be completed before end of October 2022 for Maha Season.

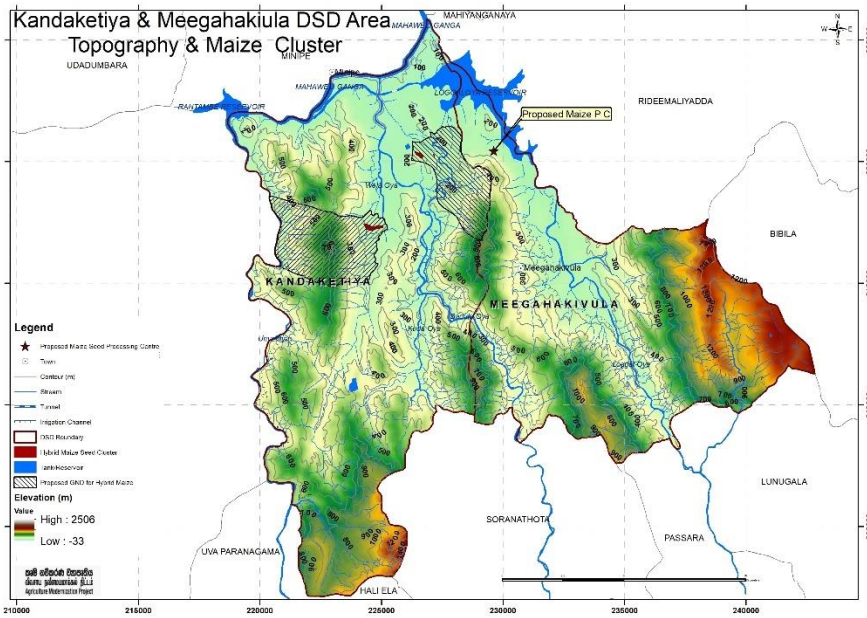
Table 5: Training and Capacity building

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.
	No excavation of ground water wells proposed. 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 maize seed 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 – Uva Province Potuvil Road, Monaragala 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 Consultations had with Resident Project Manager, Irrigation Management Division of ID, Agriculture Instructors of the area and Farmer Organizations' leaders. In terms of developing the Hybrid Maize Seed Production Cluster, required all services and related implications were discussed. Mainly, temporary conversion of paddy lands into maize cultivation and use of water from Badulu Oya and Bathmedilla schemes were discussed and RPM agreed to get the consent during pre-season and season (Kanna Resweema) meeting headed by the District Secretary. In addition, discussed the way of implementing the activities environmentally and socially accepted manner. RPM and Ais were fully appreciated the initiatives and their fullest cooperation agreed to provide.

5. DESCRIPTION OF THE EXISTING ENVIRONMENT

5.1 Physical features	
Topography and terrain	According to DSDs, both these divisions are located at about 2200 feet MSL. There are many terrain types can be observed in the area namely Rolling, Hilly, very steep, steeply dissected and undulating.  Figure 4: Topography of Kandaketiya and Meegahakiwula area Due to this terrain condition, soil erosion is also considered a threat to agricultural production in the rain-fed farming areas in the Dry Zone. Relatively high erosivity values are reported from Badulla, Meegahakiula, Kandaketiya and Ridimaaliyadda DS Divisions.
Soil (type and quality)	Agro-ecologically, Kandaketiya has IL 2, IM 1c, and IM 1a and Meegahakiwula has IL 2, IM 1a, IU 2.

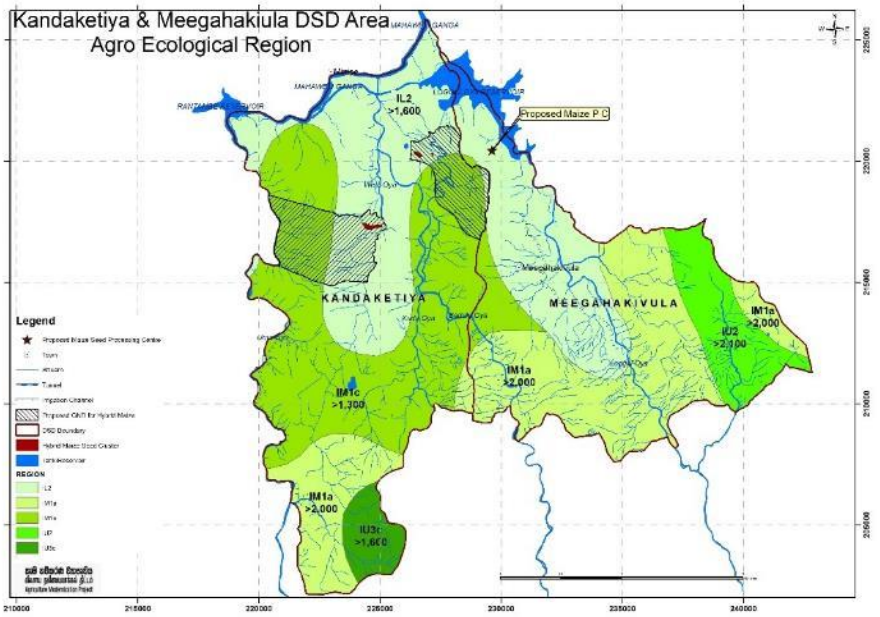


Figure 5: Agro-ecological Regions of Kandaketiya and Meegahakiwula

Following soil types can be recognised in two DSs respectively:
Kandaketiya - Red Yellow Podzolic, Reddish Brown Earths, Low Humic Gley, Immature Brown Loams
Meegahakiwula - Red Yellow Podzolic, Reddish Brown Earths, Low Humic Gley, Mountain Regosols, Immature Brown Loams

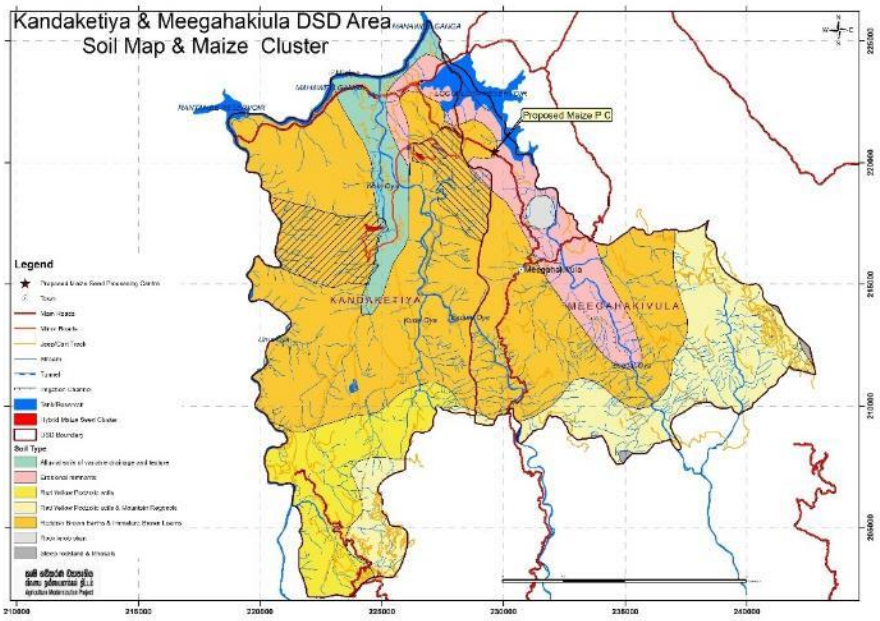


Figure 6: Soil Map of Kandaketiya

Climate and Meteorology

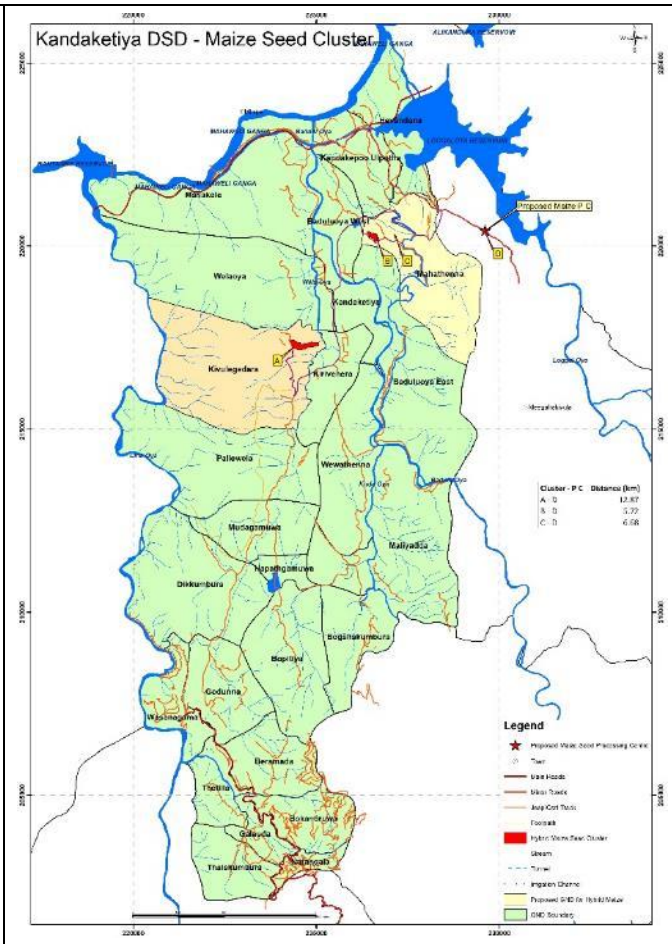
In addition to that daily averages of Minimum temperature, maximum temperature, sunshine hours and Rain fall are 15.4 – 17.7 Celsius, 27.6 – 25.1 Celsius, 3.4 – 7.5 hrs and 2.4 – 11.8 mm respectively.

Monthly average rainfall on daily basis in Badulla district.

Month	**2017**	**2018**	**2019**	**2020**	**2021**
Jan	4.35	1.28	1.37	1.08	4.29

	Feb	2.65	0.64	5.82	0.59	1.62
	Mar	6.77	6.00	0.85	0.86	7.19
	Apr	2.74	4.84	4.11	3.28	2.74
	May	4.30	12.45	0.97	6.69	3.86
	Jun	1.98	0.02	2.61	2.37	2.29
	Jul	1.42	1.11	3.32	2.33	1.79
	Aug	3.33	3.60	1.43	3.18	3.23
	Sep	3.05	6.20	12.11	4.51	5.25
	Oct	11.68	17.35	18.31	1.95	8.04
	Nov	9.57	8.58	10.37	11.77	9.20
	Dec	7.53	2.68	9.45	4.09	3.81
	Monthly average maximum temperature on daily basis in Badulla					
	Month	**2017**	**2018**	**2019**	**2020**	**2021**
	Jan	23.33	24.24	24.11	25.28	25.05
	Feb	24.78	25.28	25.11	26.57	25.59
	Mar	26.04	25.74	27.15	28.11	26.48
	Apr	27.90	26.85	27.56	28.14	27.39
	May	28.07	26.49	27.91	27.58	27.57
	Jun	27.63	27.21	28.11	28.04	27.53
	Jul	28.55	27.02	27.46	27.20	27.56
	Aug	26.97	26.83	26.51	27.67	27.44
	Sep	26.80	26.62	26.06	26.66	27.64
	Oct	26.52	25.52	24.94	27.31	26.60
	Nov	24.71	32.12	25.03	25.70	26.30
	Dec	23.87	24.37	22.72	25.02	25.92
	Monthly average minimum temperatures on daily basis in Badulla district					
	Month	**2017**	**2018**	**2019**	**2020**	**2021**
	Jan	14.11	14.10	14.61	14.85	16.47
	Feb	13.48	14.65	15.96	15.72	14.86
	Mar	14.56	15.61	14.45	14.45	15.44
	Apr	15.18	16.57	16.88	15.52	15.96
	May	17.15	17.55	16.72	18.30	17.69
	Jun	16.72	17.17	17.25	16.82	15.42
	Jul	16.58	17.10	16.33	16.96	17.03
	Aug	16.69	16.83	18.75	16.78	16.95
	Sep	16.66	15.92	17.41	17.15	16.40

	Oct 17.00 17.28 17.30 16.17 17.25 Nov 16.33 16.45 16.82 17.06 17.16 Dec 16.17 14.96 16.05 16.16 15.50 **Monthly average of Sunshine hours daily basis in Badulla district** **Month 2017 2018 2019 2020 2021** Jan 4.9 5.0 6.2 7.1 3.4 Feb 5.5 6.5 6.3 6.7 5.4 Mar 5.8 5.6 7.3 7.7 5.6 Apr 7.2 6.3 6.1 7.0 6.2 May 6.1 4.9 6.2 5.1 5.4 Jun 6.4 6.1 6.8 7.5 Jul 7.1 6.6 5.0 5.8 Aug 6.7 5.2 5.9 5.7 Sep 6.3 5.0 3.6 4.6 Oct 3.7 3.9 6.6 5.0 Nov 5.0 5.2 3.7 3.7 Dec 5.4 3.4 4.6 5.7
Surface water *(*Sources, distance from the site, local uses and quality*)*	Predominantly these divisions are undulating areas with various features such as hilly areas, slopy areas, rivers, streams, canals, grasslands, wildlife areas, natural forest areas and cultivation areas. Uma Oya, Badulu Oya, Komarika Ela and Thaldena Ela area main irrigation system where these two DSDs are been fed.

	 Figure 7: Surface Water Resources in Kandaketiya Mainly, Badulu Oya and Uma Oya flowing through Kandaketiya DS. Mahathenna GND is feb by Badulu Oya while Kiwulegedara is fed by Uma Oya – Bathmedilla. In addition to these major irrigation schemes, there are many distribution canals, field canals and drainage canals adjoining to these selected areas.
Ground water *(*Sources, distance from the site, local uses and quality*)*	There are wells in the household level. But use of agro wells and tube wells can be seen rarely as surface water sources are there. However, Kiriwanaulpatha observed to be located about 3km away from Kiwulegedara. Water levels in the wells available is high as ground water table in the area is very high.
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 Kandaketiya, Sri Lanka - BreezoMeter shows that the Air Quality Index (AQI) of Kandaketiya and Meegahakiwula is 52/500 and $PM_{2.5}$ is the dominant pollutant while O_3, PM_{10} and CO are having lower concentration than $PM_{2.5}$.[1]

[1] Check the Air Quality in Kandaketiya, Sri Lanka - BreezoMeter

5.2 Ecological features – Ecosystem components

Vegetation

(Trees, ground cover, aquatic vegetation)

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

Table 6: List of Flora Species recorded within cluster lands

Common Sinhala Name	Scientific Name	Conservation status according to the National red list 2020
1. Hik	*Lannea coromandelica*	LC
2. Bora damuna	*Grewia helicterifolia*	-
3. Bulu	*Terminalia bellirica*	LC
4. Yakinaran	*Atalantia ceylanica*	LC
5. Indi	*Phoenix pusilla*	LC
6. Maila	*Piliostigma racemosum*	LC
7. Kon	*Schleichera oleosa*	LC
8. Ipil ipil	*Leucaena leucocephala*	-
9. Kohomba	*Brucea javanica*	LC
10. Welan	*Pterospermum suberifolium*	LC
11. Seru	*Aidia gardneri*	NT
12. Kalu-kuratiya	*Psychotria gardneri*	NT
13. Wa	*Cassia siamea*	LC
14. Eraminiya	*Ziziphus lucida*	CR
15. Turpentine	*Pinus palustris*	-
16. Gliricidia	*Gliricidia sepium*	-
17. Pila	*Tephrosia purpurea*	LC
18. Mana	*Cymbopogon nardus*	LC
19. Welan	*Pterospermum suberifolium*	LC
20. Wal-ehatu	*Ficus heterophylla*	EN
21. Gadumba	*Trema orientale*	LC
22. Heen-karamba	*Carissa spinarum*	LC
23. Wara	*Calotropis gigantea*	LC
24. Katu pila	*Flueggea leucopyrus*	LC
25. Divul	*Limonia acidissima*	LC
26. Kahata	*Careya arborea*	LC
27. Ehela	*Cassia fistula*	LC

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

Presence of wetlands

There are no wetlands within Kandaketiya and Meegahakiwula DSs. However, there are abandoned paddy fields here and there. These even most of the time, seasonal. In addition, there reservations of Badulu Oya, Uma Oya and Drainage Canals associated areas.

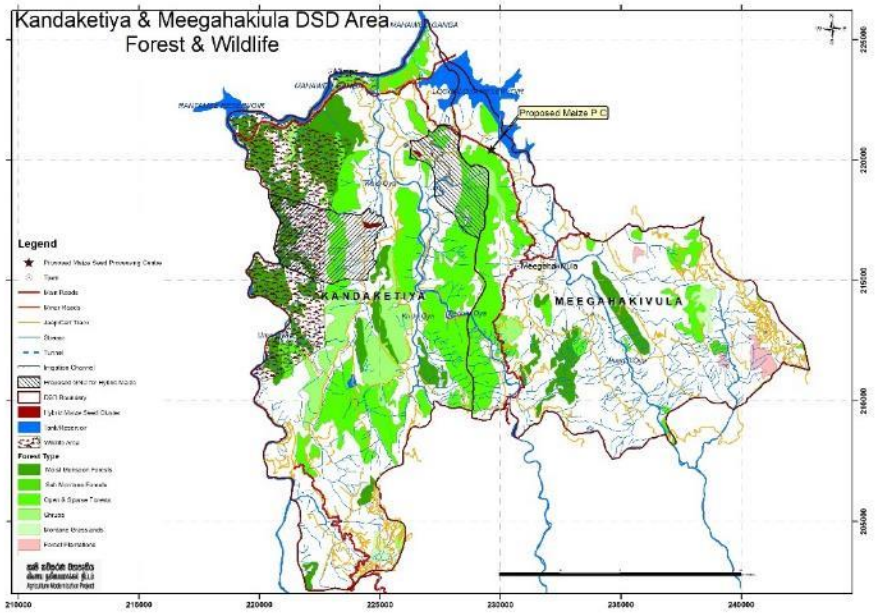
Fish and fish habitats

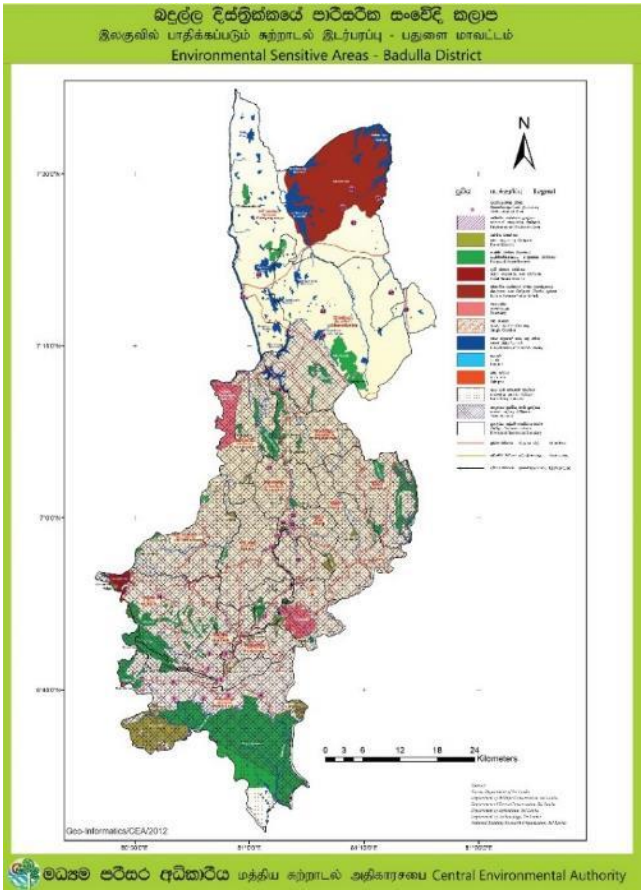
There are many freshwater fish habitats such as Badulu Oya, Uma Oya, Drainage Canals and distribution canals of Badulu Oya and Bathmedilla.

Birds

(Waterfowl, migratory birds, others)

The selected GNDs are bordering to many nature reserves such as Victoria-Randenigala-Rantembe Sanctuary, forest areas, surface bodies such as Loggal Oya, Badulu Oya, Uma Oya, paddy fields

	including abandoned paddy fields, etc which are habitats for birds. According to literature, Lesser adjutant, Woolly necked stork, Openbill, Painted stork, Racket tailed drongo, Yellow-fronted barbet, Sri Lanka jungle fowl and spur fowl and over 100 species of birds found within the park.
Presence of special habitat areas *(special designations and identified sensitive zones)*	The entire area designated as landslid prone area with high-rate erosive forces. Victoria-Randenigala-Rantembe Sanctuary and few proposed forest areas falling within Kandaketiya DS and only few proposed forest areas in Meegahakiwula DS. Other than that, no any environmental sensitive areas recognized in the cluster area. Figure 9 provides more details of sensitive areas identified by CEA.  Figure 8: Wildlife and Forest Protected Areas in Kandaketiya and Meegahakiwula

	 Source: CEA Figure 9: Environmental Sensitive Areas in Badulla District In particular to Mahathenna GND, Eriyagahaulpotha, Polwatta, and Ilukthenna forest areas can be observed.
Other features	
Residential/sensitive areas *(*E.g., Hospitals, Schools*)*	In terms of sensitive locations in and around the selected GNDs in Kandaketiya and Meegahakiwula, there are 24 schools, 4 Piriven, 35 pre-schools in Kandaketiya and 22 schools, 2 piriven and 29 pre-schools in Meegahakiwula. Closest school for both Kiwulegedara and Mahathenna is about 2km away. There are 8 health centres including a district hospital in Kandaketiya which is about 1.5km to both Kiwulegedara and Mahathenna. There are 3 hospitals in Meegahakiwula including a district hospital.
Traditional, economic and cultural activities	Maize Seed Production Cluster in Badulla District will be implemented in Kandaketiya and Meegahakiwula Divisional Secretariat areas. However, due to unavailability of Parental materials for Seed cluster, initially the cluster will start with 50 Farmers (50 Acres) in Kiwulegedara and Mahathenna GNDs in Kandaketiya. Kandaketiya DS division is consisted of 26 GN Divisions and accounts to a total population of 28,741 whereas Meegahakiwula DSD has 20 GNDs and accounts for 25,266. The extent of Kandaketiya DSD is about 153.42 sq.km while Meegahakiwula is 105.5 sq.km. There are 8805 families in Kandaketiya DS division whereas Meegahakiwula DS division has 7759.

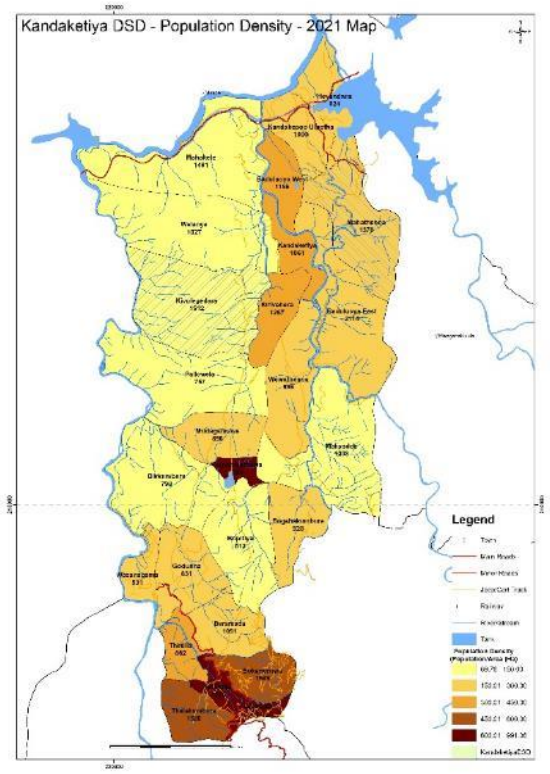


Figure 10: Population Density of Kandaketiya DS

Table 7: Employment level in the Area

DSD	Unemployment		Employed	
	Male	Female	Male	Female
Kandaketiya	2,071	2,670	8,577	6,383
Meegahakivula	2,796	2,544	6,080	5,447
Total	**4,867**	**5,214**	**14,657**	**11,830**

Source : Resource Profiles, Divisional Secretariats, 20201

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 Badulla district is about LKR 66,413 whereas mean household monthly income of Sri Lanka is LKR 76,414. The mean household expenditure per month of Badulla district was LKR 46,971 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 32.3 in Badulla District and 28% of population in Badulla are under poverty line. More than 56% of families in Meegahakivula are receiving *Samurdhi* which indicates the level of poverty in the division. However, in Kandaketiya DS division, only 37.3% of are *Samurdhi* beneficiaries. In addition, people in these DS Divisions get different types of benefits from government i.e for aid for diseases, disability aid, public assistance, Elderly allowances Farmers pension etc.

Table 8: No of Samurdhi Recipients

DSD	Samurdhi	
	No of Families	%
Kandaketiya	4,938	37.3
Meegahakivula	2,896	56.1

Source : Resource Profiles, Divisional Secretariats, 2021

Table xx gives the aggregated results of the reported major economic activities involved in GN Division. One GN Division may engage in few economic activities. The majority of GN Divisions in both Kandaketiya and Meegahakivula DS Divisions engage in agricultural activities.

Five GN Divisions in Kandaketiya and three GN Divisions in Meegahakivula engage in livestock as a main economic activity. Fisheries Industry was reported only from three DS Divisions in Badulla district and Kandakatiya is one among three DSDs.

Table 9: Number of Grama Niladhari (GN) Divisions in selected DS Divisions by type of economic activities involved

Industry group	Agriculture	Livestock	Fisheries Industry	Non-agriculture
Kandaketiya	26	5	1	3
Meegahakivula	18	3	-	5

Source: Census and Statistics, 2021

Archaeological resources

(Recorded or potential to exist)

There are archaeologically important locations in Kiriwehera, Bogahakumbura, Galauda, Narangala, Mudagamuwa, and Godunna GNDs in Kandaketiya and Balagolla, Akurukaduwa and Karandagahamada GNDs in Meegahakiwula. However, so far there are no archaeologically important locations observed or recognized in selected GNDs in Kandaketiya. Proposed mitigation measures in EMP will avoid such locations or impact due to cluster activities on archaeological places.

6. DESCRIPTION OF PROPOSED AGRICULTURAL ACTIVITIES

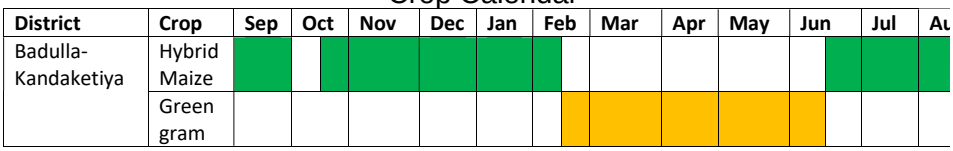
6.1 CULTIVATION

Existing condition of the crop

Maize is a very important cereal crop cultivated in many districts in Sri Lanka. Due to its high yield potential and variety of uses, it has become popular among farmers. It has further gained its popularity due to availability of hybrid seeds which produce higher yield than other cereals. Maize occupies around 6% of cereal cropped area in Sri Lanka. As a result of hybrid maize varieties, the total area under maize has increased by 73% while its production has increased by 258% (FAOSTAT, 2014). Maize is considered to be one of the most important inputs in poultry industry in Sri Lanka while it is used for producing food items such as Samaphosha and Thriposha. Boiled popcorn and fried popcorn also have been popular among Sri Lankans.

Maize seed requirement of Sri Lanka is largely fulfilled by the imports. Apart from seed imports, maize and related products are also imported to Sri Lanka. Although Sri Lanka imports more than 100000 MT of maize in 2019,

	it has sharply dropped to 28000 tons in 2020. Surprisingly, in 2020, Sri Lanka allowed importing wheat grains for animal feed and introduced it as an import quota of 185,000 MT of wheat grains. This initiative was made by the government to compensate the local corn production shortfall eventually filling 170,000 MT of the authorized quota volume. Sri Lanka also authorized subsequently an additional import quota of 100,000 MT for the April 15 through July 31, 2021, period. Import quota for wheat grains was said to be introduced as domestic corn production is unlikely to increase quickly enough in the short-term to meet the animal feed milling industry's demand. According to FAO (2021), annual growth rate of maize is around 16.73 percent. However, the overall productivity of maize is not in a satisfactory condition and has not been adequate to meet the increasing local demand. As a result, maize imports have been taking place. FAO (2021) further shows that approximately 98 to 99 percent of the hybrid maize seeds widely used by farmers for cultivation are imported. Although the Department of Agriculture (DoA) has already developed four local hybrids of which characters and yield parameters are comparable with imported hybrids, the use of local hybrid seeds among farmers are low as a result of the non-availability of local hybrid seed materials in required quantities in the local markets. The yield of local hybrid varieties is in par with those of imported varieties and average yield is around 5.5-6.5 metric tons per hectare. And the potential yield has been estimated to be 7.5-8.5 metric tons per hectare. Those hybrid varieties have been named as MI (III), MI (IV) and MI (V). In 2020, Sri Lanka has imported more than 1600 metric tons of maize seeds. Therefore, country like Sri Lanka should now turn to import substitution and save the foreign exchange. In this process, local hybrid seed production has important implications towards Sri Lankan economy.
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	Land preparation can be either by minimum tillage or conventional tillage. Herbicide use is necessary for minimum tillage. In the case of conventional tillage, land preparation may start after a good rain. Either ridge or flat land prepation can be used. In water logged soils, maize should be planted on ridge tops as maize is very susceptible to water logging. We recommend to maintain the tillage up to 9 inches. Follow the ridge and furrow system. • Isolation – the field must be sufficiently isolated from contaminant maize crops by the required distance or time. Minimum of isolation requirement of 600m radius will be maintained. Isolation radius minimum600 m and time isolation is 3 weeks before or after. **Planting** Date of fermile and male planting should be followed according to specific instructions provided by the seed production specialist. Both parents can be either planted at the same date or at different dates. Planting after 2days of basal fertilizer application. Not recommend rain fed cultivation. After two good rains in the rainy season, planting can start. Spacing: 75 x 20 crn (flat) or 90 x 17 cm (ridge); marked rope lines can be used for manual planting. One seed/ hill will be dropped (5-7cm depth), and seed should be covered well with soil and pressed. Soil should not be pressed when moisture ishigh. The seed parent (female) and the pollen

	parent (male) should be planted in a regular alternating pattern with 2 rows female and I row male. Plant alternating 4 female and two male. All land must be covered by 2male rows. One male row is planted after 3days of the other plantings. **NB:** Additional male rows could be planted along the end of the field to protect the female from foreign pollen and also to provide more pollen to the female seed parent. It is also advisable to plant additional male seeds (about 2% of total male seeds) in about 5-7 days after first male p'an tin g. *Bird protection may be necessary in the bird-prone areas (during seedling emergence). **Detasseling**: Detasseling is the removal of tassel from female parent. Detasseling is done when the tassel emerged out of the boot leaf, but before anthesis has shed pollen. Anthers take 2-4 days to dehisce after complete emergence. Only in few cases, the anthers start dehisces before its complete emergence. In such case detasseling should be done earlier. Detasseling is done daily till all the seed parents get detaselled. **Roguing**: should be done periodically based on position of cob, colour of silk, arrangements of seeds in cob, leaves etc. Shedding tassels are to be removed in roguing. It refers to the tassels in female parents' rows, shedding pollen or that has shed pollen in hybrid maize plots. During field inspection a tassel whose main spike or any side branch or both have shed pollen or shedding pollen in more than 5 cm of branch length is counted as a shedding tassel during inspection the shedding tassels are taken into count for acceptance or rejection of production plot Crop Calendar 
Water requirement	Hybrid Maize produces very high yields under irrigation. It is therefore one of the most efficient grain crops in terms of water utilization. It is strongly recommended that maize hybrid seed be produced under full irrigation in order to obtain the highest yields. Maize grows best where total seasonal rainfall exceeds 500 mm. All areas which have been selected get more than 800 mm rain fall annually. Maize is susceptible to both drought and waterlogging. Drought during the four-week period spanning flowering (silking and tasseling) can cause serious yield losses, especially in the drier areas. Maize needs 500 to 800 mm of water per growing period, depending on the maturity period in the Forest and Transitional agro-ecological zones. In the Savannahs in the north, maize needs 600 – 900 mm of water per growing period.
Use of fertiliser and pesticides and weedicides	Fertilizer levels are variable depending on the soil fertility of site selected. General dosage of fertilizers are approximately 150 kg Nitrogen(N) 100 kg Phosphate (P205) and 70 kg Potassium(K) per hectare. About 60% of N, and all Phosphate and Potassium fertilizer should be broadcast during land preparation. Ten bags of 15-15-15 (NPK) compound fertilizers (500 kg) can be applied at land preparation. Additional 6 bags (300 kg) of Calcium Amonium Nitrate (CAN) should be applied near the maize plants (at least 5 cm apart) at knee-high stage (side dressing). A total of 3D to 50 kg of (MgSO4) and 5 kg of zinc (ZnSO4) can be applied in Magnesium and Zinc deficient areas. Depends on the current nutrient availability. In addition to the soil application, folio one is recommended especially for micro nutrient.

	NE: Fertilizer Deficiency Symptoms Nitrogen: Yellow middle at the tip anid along the of leaves, Phosphate: Reddish purple leaves particularly on young plants. Potash: Appears as a firing or during along the tip and edges of lowest leaves. Magiesium: Whitish stripes along the veins and often a purplish colour in the underside of the lower leaves. **Weed Control** a. Hand weeding method could be adopted if conventional tillage ispractised. First weeding takes place 2-3 weeks after planting. Second weeding isaccomplished 6 weeks aftxer planting. b. Herbicide application - adequate level of soil moisture isprerequisite for herbicide spraying. Gramoxone plus primextra are used as pre-mergence herbicides at the rate of 5 litres each per hectare. Pre-emergence herbicides cannot be sprayed later than two days after planting. Post-emergence herbicides such as Gramoxone may also be sprayed, between the maize rows around 6 weeks after planting (4 lit./ha). Never spray Gramoxone onto the maize plants. N.B. Too much weed can affect maize seed yield significantly. The seed production field should be clean from weeds up to flowering time.
Harvesting	Seed germination rate and vigor (i.e., viability), improves from fertilization of the embryo to physiological maturity, when it will reach a maximum. The absolute or maximum quality of the seed at physiological maturity will have been determined by the growing conditions during seed development, but whatever this quality is at physiological maturity, it will be the maximum the seed can attain. From this point onwards, no improvement is possible in seed viability. All operations from harvesting onwards therefore have to be done so as to cause the least deterioration in seed viability, while ensuring that the healthy seed is separated from inferior seed and impurities (extraneous matter and weed seeds) to achieve a specified standard of seed purity. At physiological maturity of the crop, seed moisture content is between 30 and 35% and the crop will still have some vestiges of green in the stems and leaves. From physiological maturity onwards, the seed dries as the environment allows. The drier and warmer the environment and the greater the exposure of the seed to the air, the faster seed moisture will decrease. The rate of field dry-down will also be increased in cases where the cobs have few husk leaves, the cobs are poorly covered by loose husks or the cob diameter is small. Seed quality will remain relatively high and only decrease slightly, as long as environmental conditions are favorable and grain-eating pests are absent. Generally, in Maha seasons harvesting is done at 110 days of age (optimum maturity) but in Yala seasons at the age of 95 days (keeping quality is poor, therefore use in following Maha season) to protect from rains.
Postharvest storage and transportation	**Shelling** For maintenance of high seed quality, hand shelling is ideal but not always economically feasible. Many types of mechanical shellers are available for crop seeds, but these vary in their impact on seed quality. Aggressive, high-speed shellers or combines will chip or break seed. Mechanical damage to seed is due to abrasion and impact. Abrasion damage mainly affects the seed coat and results from seed rubbing against rough surfaces. Impact damage may affect the entire seed and is a function of the force applied to the seed. Thus, mechanical shellers need to be operated at low speeds and adjusted to minimize seed damage. Contact edges in the threshing drum should be rounded off and smoothed to minimize pounding of the grain. The seed should preferably be rubbed off the cobs to reduce

	damage. If possible, mechanical shellers should also be used to separate the seed from extraneous matter, such as cobs and sheaths. Proposed to do Machine shelling. **Drying** Seeds are dried to 12% moisture content. Brings down to 10%. **Grading** Grade the seeds using 18/64" (7.28 mm) sieve. **Seed treatment** Maize seed should be treated with a fungicide or a combination of fungicide and insecticide to protect the seed and developing seedlings from diseases and to give short-term protection against storage insects. Fungicides are particularly helpful when sowing in conditions where soils are clayey, crusted and/or cold and wet at sowing. Seed treatment chemicals may also help offset vulnerability to disease in seeds that have been chipped or cracked during harvest or conditioning operations. The fungicides and insecticides are commonly mixed into a slurry and applied to the seed using a seed treater device. Colored dye is often added to the slurry to impart a distinctive color and thereby clearly identify treated seed. A uniform coverage of the seed with the correct dosage of chemical(s) is critical in the treatment operation. Different fungicides and insecticides are available for seed treatment. The locally registered chemicals can be used. Recommend to do here for maintaining high quality standards of seeds. **Seed storage** Once shelled, the raw seed may be stored until delivery to the seed company factory. Raw seed may be stored in bags or bulk but no seed should be stored unless it is at a moisture content low enough to maintain seed quality, which is less than 13%. However, the length of time that seed may be safely stored even at low moisture content depends on the air temperature and relative humidity. The lower the air temperature and relative humidity, the longer the seed can be stored with minimal deterioration. As a rule, if the relative humidity of the air is above 60%, seed deterioration is likely to be rapid; such conditions will increase the moisture content of the seed and foster the development of diseases and storage pests. Ideally, seed should be stored in a shed to protect it from rain and heat, while providing security.
Other factors	
Solid waste	The solid organic waste is generated as crop residuals and at postharvest period and all are biodegradable. However, compost production unit (See Annexure 5: Compost Plant Proposal) will be implemented to produce compost using solid waste generated from post harvesting processing centre and these organic fertilisers will be used at land preparation stage. 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. Recommend to commence Compost manufacturing in every clusters.
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 10. Water supply is controlled by micro irrigation system. So, the wastages will be minimized.

Table 10: Application of IPM for the development of CDP for Hybrid Maize Seed Production

Stage	IPM Practices	Impacts of Implementation	Benefit for farmers
Pre land preparation	Remove all crop debri and burn. Introduce proper training package on IPM.	Destroy all stages of insects. Wipe out all the stages of all pathogens.	Improve the sanitation of new crop. Minimize the risk of infestation of Pathogens.
		• Identification of pests / beneficial organisms in the field. • Knowledge of the damage and life cycles of pests. • Suitable & possible management techniques. • Manipulation of pest management techniques for the success of crop. Farmers can easily distinguish Insect attack and Diseases. • Easy identification of Insects and their natural enemies.	Improve the natural enemy's population means there is a proper natural control of insects. Save the pesticide cost as well as the environment.
Soil testing	Micro nutrient requirement can be identified.	Plant vigour can be improved.	Vigorous plant gives higher yields with minimum pest and disease attacks.
Land preparation	First plough up to minimum9 inches by using Disc plough or Mould board plough. Compost application.	Destroy all aerobic and non aerobic pathogens due to converting the soil up side down. All weeds get destroy. Improve soil structure and add micronutrient as well as the microorganism to the soil.	Minimize the risk of pathogens and reduce the cost for pesticides. Weeding cost can be delayed for the period of two weeks. Effect of Pathogens may decrease due to Microorganism and micronutrients (increase the pland vigour)
Pre seeding.	Seed treatment with fungicides and Insecticides.	For the period of minimum two weeks, the crop can be secured from different pest and diseases.	Time and labour can be saved for the period of two weeks. For the seed treatment, agro chemical requirement is very low. That also a huge benefit. Less harm to environment.
Weeding	Use inter cultivator.	Removing weeds and earthing up happened simultanously.	Labour and cash for weedicides are saved. Negative impact to the environment also minimized.

Vegetative phase of the crop.	Apply neem extraction in 14 days interval.	Neem extraction is very good insect repellent.	Minimum insect problems and cost for insecticde can be minimized. Safe environment can be assured.
Reproductive phase and Harvesting	Introduce Biological controls and minimum usage usage of Pesticide application.	Close supervision and biologically remove pathogens. Chemical application only to borders (neem application) or spot application. Colour traps and Pheromone traps.	Significant reduce of agro chemical cost. Remarkably protect the environment. Chemical residuals can be minimized.

7. PUBLIC CONSULTATION

Consultations conducted with potential farmers of the selected areas in Kiwulegedara and Mahathenna, Agriculture Instructor, Resident Project Manager of Irrigation Department, District and Cluster Coordinators. Community Mapping carried out during the Focus Groups Discussions held with Farmers and Key Informant Interviews carried out with Key Officials. Outcomes of the discussions are summarised below:








Figure 11: Public Consultations with Farmers in the Cluster

- Existing crop related issues

Kandaketiya area is a well-established maize cultivation area specially during Yala. During Maha season also there are some farmers cultivate maize but majority farmers will cultivate Paddy during Maha. During Yala, most of them cultivate Maize for commercial scale. Commercial scale maize cultivation has started since 2000 in both Bathmedilla and Badulu Oya major irrigation schemes. In Kandaketiya area, mainly paddy cultivated in Maha season and same paddy lands will be used for Maize cultivation during Yala season with the water released from both above-mentioned schemes with the consent of ID. Maize cultivation in paddy lands and use of water from Bathmedilla and Badulu Oya are agreed at the *'Kanna resweema'* headed by the Government Agent of Badulla. There are existing Farmers' Organizations mainly established by the Irrigation Management Division of ID. Agricultire Instructors of DOA are also cordially working with the same FOs. All FOs are registered with Agrarian Services Department as well. All these lands have Swarnaboomi Deeds or Permits issued by the Divisional Secretariat, Kandaketiya. In general, minimum of 3 acres of paddy and 1 acres of uplands available for each farmer who settled in 1958.

Home gardens are almost well managed with perennial or commercial crops such as Coconut, Fruit trees, Papper, etc

Following concerns were raised by the farmers during the consultations:

1. Threats from Wild animal such as Elephants and destructions by Monkey, Toque Macaque and Peacock as Victoria-Randenigala-Rantembe Sanctuary and few more forest areas are located in the area
2. Pest attacks such as Sena Catapillar, Birds, etc
3. Low quality of products due to small size, shape etc.
4. Low productivity of lands, labour and other inputs
5. High soil erosion due to undulation terrains
6. Excessive flood irrigation creates many problems such as waterlogged conditions, poor crop performances, high disease incidence and waste of water
7. Poor crop management practices and poor sanitation
8. Fertiliser application is not practised by based on soil and foliar analyses
9. No attention for micronutrient fertilisers
10. Poor primary post- harvest handling and high wastage
11. Low quality standards for marketing
12. High technical know-how requires for Maize Seed production where farmers are lack with and isolation requirements to be adhered
13. Continuity of Seed Clusters as business entity
14. Establishment of irrigation system due to site conditions and prevailing conditions in the country
15. Stable market for production and price

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

Even though the farmers are well experienced in commercial maize cultivation, no experience in Hybrid Maize Seed production. However, understading basics of maize cultivation, availability of lands with sufficient isolation requirements, availability of water throughout the year, farmers willingness, etc can be recognised as positives in establishing the cluster. Required technical know-how specially on Hybrid Maize Seed Production will be given very initially to all potential farmers before starting even land preparation. As this is a Hybrid Maize Seed Production cluster, adhering to the technical requirements are very much essential to ensure the quality of the seeds produced and for certification purpose. Seed certification team will be following up with farmers continuously to ensure the required standard is maintained. First season will be somewhat difficult but later on with the experience, farmers will be able to go ahead.

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.

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

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

- Infrastructure development

Mainly, irrigation system for each farmer with required water sources improvement, market access road improvements, improvements to drainage canals, establishment of sump, etc will be provided. Further, 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.

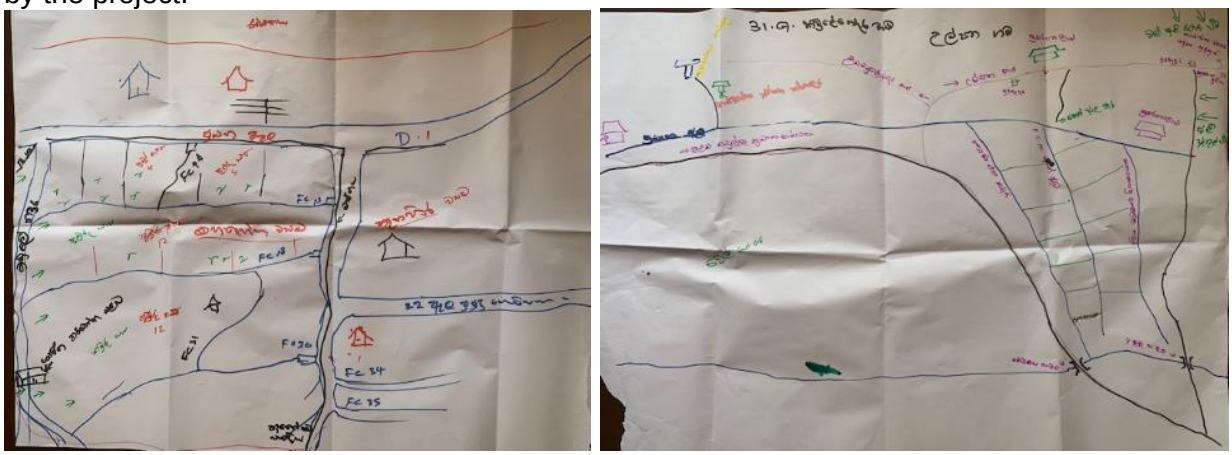


Figure 12: Community mapping activities

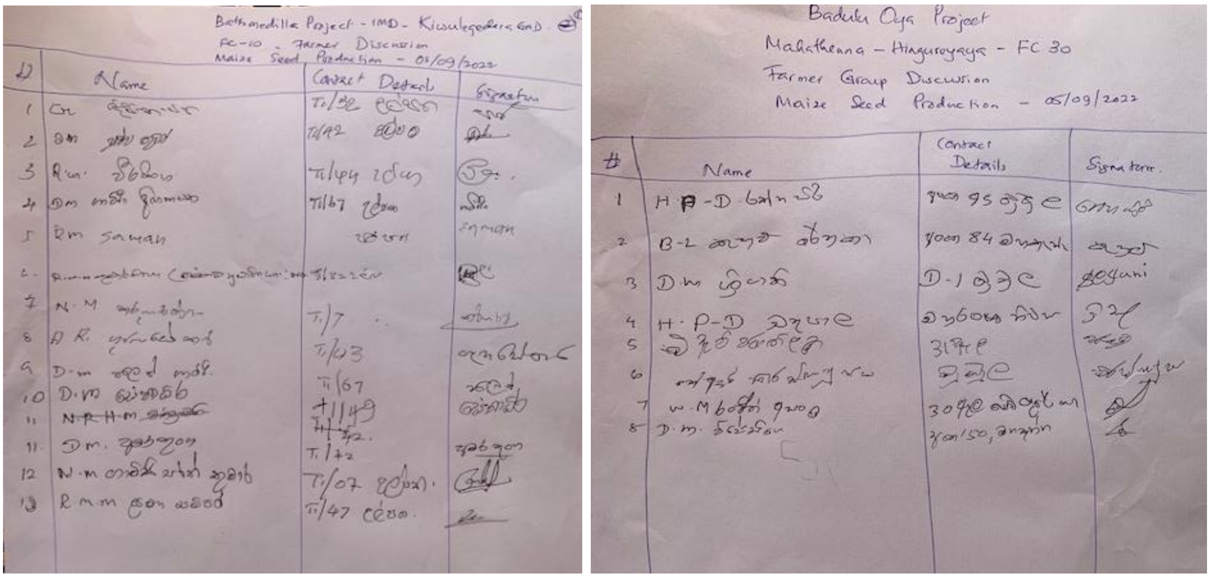


Figure 13: Attendance sheet of community mapping

Figure 14: Existing Condition of the Selected Land at Kiwulegedara

Figure 15: Existing condition of the selected land at Mahathenna

Figure 16: Existing Irrigation System of both from Bathmedilla and Badulu Oya

8. ENVIRONMENTAL EFFECTS AND MITIGATION MEASURES

8A. SCREENING FOR POTENTIAL ENVIRONMENTAL IMPACTS

Table 11: Checklist for screening for possible environmental impact (Infrastructure development 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-moderate	Existing land preparation and flood irrigation system will be changed. 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
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. Most parts of the Maize crop residue will be able to use as animal feed or any other including cob
4	Will the Project release pollutants or any hazardous, toxic or noxious substances to air?	√		Moderate	Pesticides, weedicides will be used and released to the air. Possibility to have significant impacts to other flora and fauna.
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?	√		Moderate	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?		√		Flooding locations were not identified during the visit and the project will not cause localised flooding. Predominantly, the area is undulating. No possibility for localised flooding
8	Will there be any risks and vulnerabilities to public safety due to physical hazards during construction or operation of the Project?	√		Low	No medium and large-scale infrastructure development envisaged and hence, no severe health and safety hazard identified. Better hazard identification and prevention and corrective measures during construction will eliminate the risk associate. Snake bike bites and exposure to chemicals are possible hazards during agriculture activities.

№	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?	√		Low	Hybrid Maize Seed transportation from cultivated lands to post harvest storages and transportation from post harvesting storages to shipments/or any other location will be taken place. 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	Victoria-Randenigala-Rantembe Sanctuary, Few Forest Areas, Ground water springs, Badulu Oya and Uma Oya are in the close proximity which will have direct and indirect impact due to proposed cultivation activities
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?	√		Low - Moderate	Victoria-Randenigala-Rantembe Sanctuary falling within Kiwulegedara in Kandaketiya area. However, project will only consider paddy lands.
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 in all places selected for cultivation in different scales.
16	Are there any areas or features of historic or cultural importance on or around the location which could be affected by the project?		√		No features of historic importance have been identified within the study area
17	Are there existing land uses on or around the location e.g. home gardens, other private property, industry, commerce, recreation, public open space, community facilities, agriculture, forestry, tourism, mining or quarrying which could be affected by the project?	√		Low - Moderate	Victoria-Randenigala-Rantembe Sanctuary falling within Kiwulegedara in Kandaketiya area. However, project will only consider paddy lands.
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.

№	Screening question	Yes	No	Significance of the effect (Low, moderate, high)	Remarks
19	Are there any areas on or around the location which are occupied by sensitive land uses e.g. hospitals, schools, places of worship, community facilities, which could be affected by the project		√		
20	Are there any areas on or around the location which contain important, high quality or scarce resources e.g. groundwater, surface waters, forestry, agriculture, fisheries, tourism, minerals, which could be affected by the project?		√		Existing agricultural practices will be improved by the subproject activities and no negative impacts are anticipated.
21	Are there any areas on or around the location which are already subject to pollution or environmental damage e.g. where existing legal environmental standards are exceeded, which could be affected by the project?		√		There are no areas around the location where legal environmental standards have been exceeded or has been environmentally polluted.

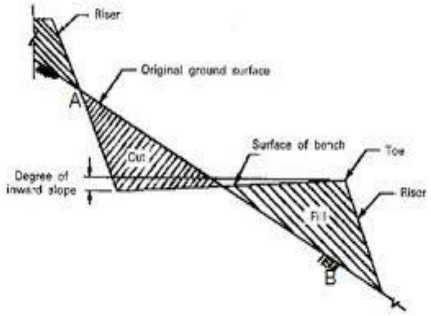
8B. ENVIRONMENTAL MANAGEMENT PLANS

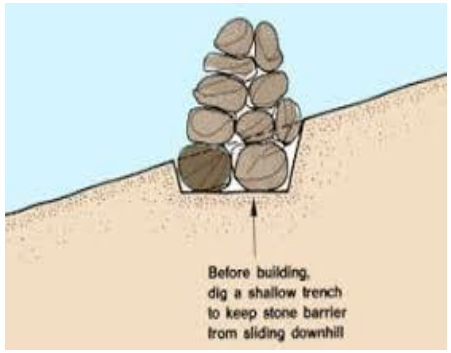
Table 12: Contractor's responsibility for mitigating adverse environmental issues raised during agricultural activities

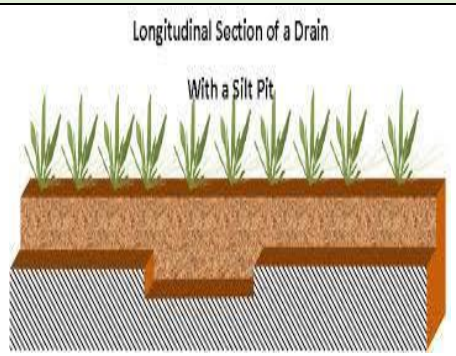
№	Potential environmental impacts and risk level	Key project activities causing the impact	Mitigation measures proposed and action to be implemented by the contractor
1	Public complaints and lack of community support for the project implementation	Information Disclosure among Stakeholders Community Outreach activities including training Institutional development based on farmer organisations	• Strengthen institutional development component and proper awareness and community leadership • Obtain continuous institutional support from RPM-IMD-ID and AIs in the area • Obtain consent for use of Badulu Oya and Bathmedilla water and Paddy land conversion for maize at the Kanna Resweema headed by the GA • Discussions should be conducted with the beneficiary farmers including women, and youth • The beneficiary farmers selection based on the criteria which were developed at stakeholders meeting and identifying of beneficiary farmers were undertaken transparently • Residents in the area will be briefed of the project, purpose and design and outcomes with comprehensive discussion • Communication and training activities focusing women, youth and farmers who are poor in communication

№	Potential environmental impacts and risk level	Key project activities causing the impact	Mitigation measures proposed and action to be implemented by the contractor
			• 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 Seeding Use of harvesting crates Mechanical scarring and bruising quality defects Shelling, and Drying Sorting and packaging Storing the harvested product before delivery to the packing facility Better use of parts of the Maize plant such as tree, cob, etc	• Initial technical training on Seed production to all Farmers and Officers • Maintain good hygiene and good housekeeping • Practical training for the selected farmers on basic harvest and postharvest practices to protect the quality of the product and to assure the packing facility receives only clean and viable product • Use of Discarded poor-quality ones and other waste organic materials in the field to leave as organic fertiliser or use for compost production • Avoiding mechanical scarring and bruising quality defects • Provide packaging materials and storage facilities • Establishment of temporary packing facilities • Introduce methods of using bi-products
3	Activities related to installation of irrigation systems (Adustable 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

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

№	Potential environmental impacts and risk level	Key project activities causing the impact	Mitigation measures proposed and action to be implemented by the contractor
			• An evaluation of the finding will be performed by the Department of Archaeology who may decide to either remove the PCR deemed to be of significance, further excavate within a specified distance of the discovery point and conserve 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
5	Spreading of Invasive Alien Species	Vegetation clearing Planting of Maize	• 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
6	Soil erosion due to lossen of topsoil and undulating terrain which will lead to many drainage issues and siltation of waterbodies	Land preparation	• Establish a proper dranage system during land preration • Construct catchpits, silt-traps at appropriate places on the cultivation area to avoid silt been carried outside the lands • Regular cleaning of catch pits, sil-traps and drains • Follow below guidelines to ensure soil erosion potetials are obstructed at site itself Few soil conservation measures that are suitable for the identified lands are given below; **1. Soil terraces**- Terraces are earthen embankments built across the dominant slope partitioning the field in uniform and parallel segments. Generally, these structures are combined with channels to convey runoff into the main outlet at reduced velocities. It reduces the degree and length of slope and thus reduced runoff velocity, soil erosion and improves water infiltration. It is recommended for the lands having a slope of up to 33% but can be adopted for lands having up to 50–60% slope, based on soil condition  ***Sketch of a Soil Terrace***  ***Well developed soil terraces***

№	Potential environmental impacts and risk level	Key project activities causing the impact	Mitigation measures proposed and action to be implemented by the contractor
			2. Stone walls- Stone walls are effective for preventing runoff rate and severe erosion in steep land, and most suitable for high elevation areas of the catchment. Stone walls are used to stabilize the steep slopes of >40%. These structures are cheap, having a long life, and fewer maintenance requirements. The depth of stone walls base is about o.3 m and flat stones of 20–30 cm size are used for the construction of walls. A spillway is provided in the middle of the wall to allow the safe discharge of runoff water. These structures are suitable for sedimentation, control erosion, and to conserve soil moisture  ***Cross section of a stone wall***  ***A field conserved with stone walls*** **3. Lock and Spill drains**- Lock and spill drains are constructed at the contour line to reduce the runoff velocity for soil moisture conservation in the areas having <30% slope. Bunds are formed on the downstream side of trenches for the conservation of rainwater. Lock and spill drains are constructed based on the size and the slope of the field. The space between two drains varies based on the sloppiness, low space is for steep areas, and high space for low slope land. The width of the drain is about 30-45cm and the length is depending on the size of the field. The lock structures are constructed at the bottom of the drain to enhance the sedimentation and keep the soil moisture. Comparatively, these structures are cheaper in construction. After each rainy season, deposited silt is removed and incorporated into the field. Cultivation of a grass hedge on the upper edge of the drain additionally helps to control the erosion as it acts as a silt trap. For the grass hedges, it is recommended to cultivate 'Savandara' (Botanical name- ***Chrysopogon zizanioides***) as it has a good root system and controls soil erosion, and keep the soil moisture too

№	Potential environmental impacts and risk level	Key project activities causing the impact	Mitigation measures proposed and action to be implemented by the contractor
			 ***Longitudinal section of a lock and spill drain***  ***Newly constructed lock and spill drain***
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 • Guidance on suitable time for the usage of chemicals • Promote organic fertilisers • Formulation of fertiliser regimes based on complete soil tests and foliar analysis • Introduction of proper drainage system including catch-pits and silt-traps to avoid silt and other particles been carried by the drainage water out of the site
8	Impaired water quality	Cultivation of Maize	• Excess water extraction is to be cut down to preserve water from main Badulu Oya and Bathmedilla schemes to ensure water rights of the downstream • Proper introduction of drip irrigation practices instead of flood irrigation to preserve water and use of modern techniques as discussed in the CDP for reduce water consumption
9	Solid Waste Disposal	Discarding poor quality organic materials in the field Waste from weed control activities	• Burnt to maintain the farmlands' hygienic condition • Use postharvest waste for compost production • Use organic waste generating from the Maize plants for compost, animal feed, mushroom making, etc
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
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

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

9. COST OF MITIGATION

Table 13: 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
3	Safety equipment's including COVID-19	1,050,000	Gum boots, Gloves and masks for all farmers
4	Soil erosion control measures	500,000	Wherever necessary EMP mitigation measures can be implemented
5	Provision of overall kit for farmers	1,050,000	3500*300
6	Monitoring of surface water quality at selected locations covering both Badulu Oya and Bathmedilla Systems	500,000	About 4 locations. Baseline and end of two seasons
	Total	**4,100,000**	

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

10. CONCLUSION AND SCREENING DECISION

Table 14: 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	Soil erosion Solid waste generation	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 supervised by the PMU while the cluster level supporting staffs and contractors will be responsible for implementing the provisions in the EMP. In addition, the 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 in-house staff of the PMU supported by the Provincial Deputy Project Director who is responsible for the overall supervision of the proposed project. Any consequent design modification will be reflected in the project cost.

Environmental monitoring will be carried out mainly through visual observations and compliance monitoring using the checklist provided in the Environmental 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 contractor 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 improvements 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. However, it should be noted that establishment of Processing Centre and Infrastructure development related activities are excluded from this report and those project activities will be separately investigated and reported. Main activity wise recommendations are given below for better clarity:

Selection of Lands and Water Sources: Obtain written consent during Kanna resweema headed by the Government Agent of Badulla. Victoria-Randenigala-Rantembe Sanctuary and Proposed Forest areas should be avoided including its buffer zones during farmer selection in the next season.

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.

Watering: Upon receiving consent from the Kanna Resweem, required infrastructures should be established and provide sprinkler irrigation as it will lead to save water resources seriously than flood irrigation

Table 15: Screening Recommendations for each activity

Key recommendations	Actions / Approvals to be attended	Time period to attend each action	Responsibility / Remarks
Land Selection	Obtain written consent from Kanna Resweema for paddy land conversion to Maize Victoria-Randenigala-Rantembe Sanctuary and	Before land preparation	PPMU RPM-ID AI-ASD EU Consultants PMU

	Proposed Forest areas should be avoided including its buffer zones		
Drainage within cultivation sites	Construct silt-traps, catch pits and other proposed methods to control soil erosion	During land preparation for cultivation	EU Consultants PPMU RPM-ID
Use of Badulu Oya and Bathmedilla water	Obtain consent during Kanna Resweema for use of water for Maize Seed cultivation	Thrugh out the project	EU Consultants PPMU RPM-ID
Integrated Pest Management Practices	Implement IPM activities proposed above at each stage	From land preparation onwards	Agronomist – EU team Agronomist – PPMU AIs- ASD

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, 2016

Resource profile of Kandaketiya DS Division, 2021

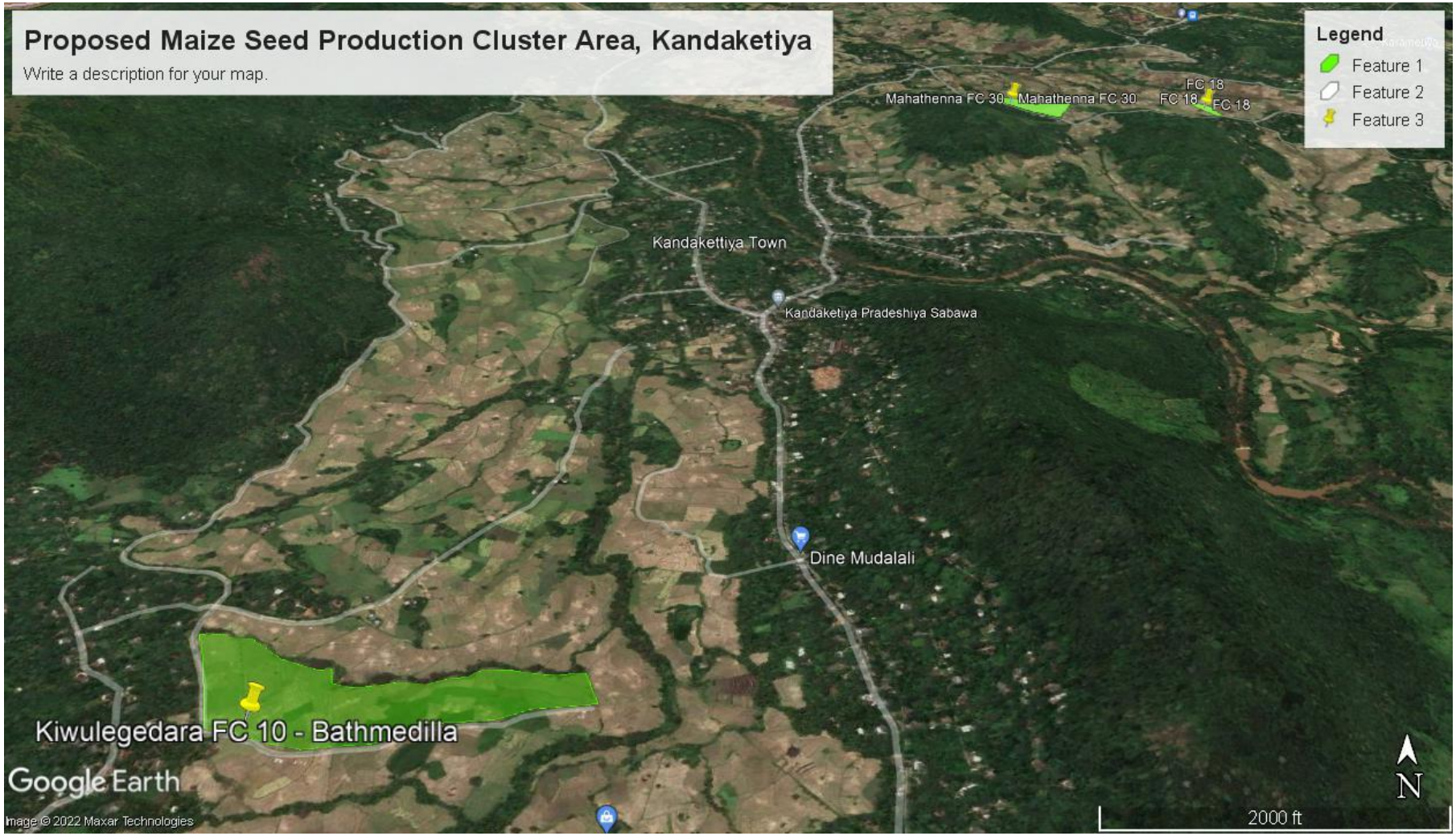
Resource Profile of Meegahakiwula DS Division, 2021

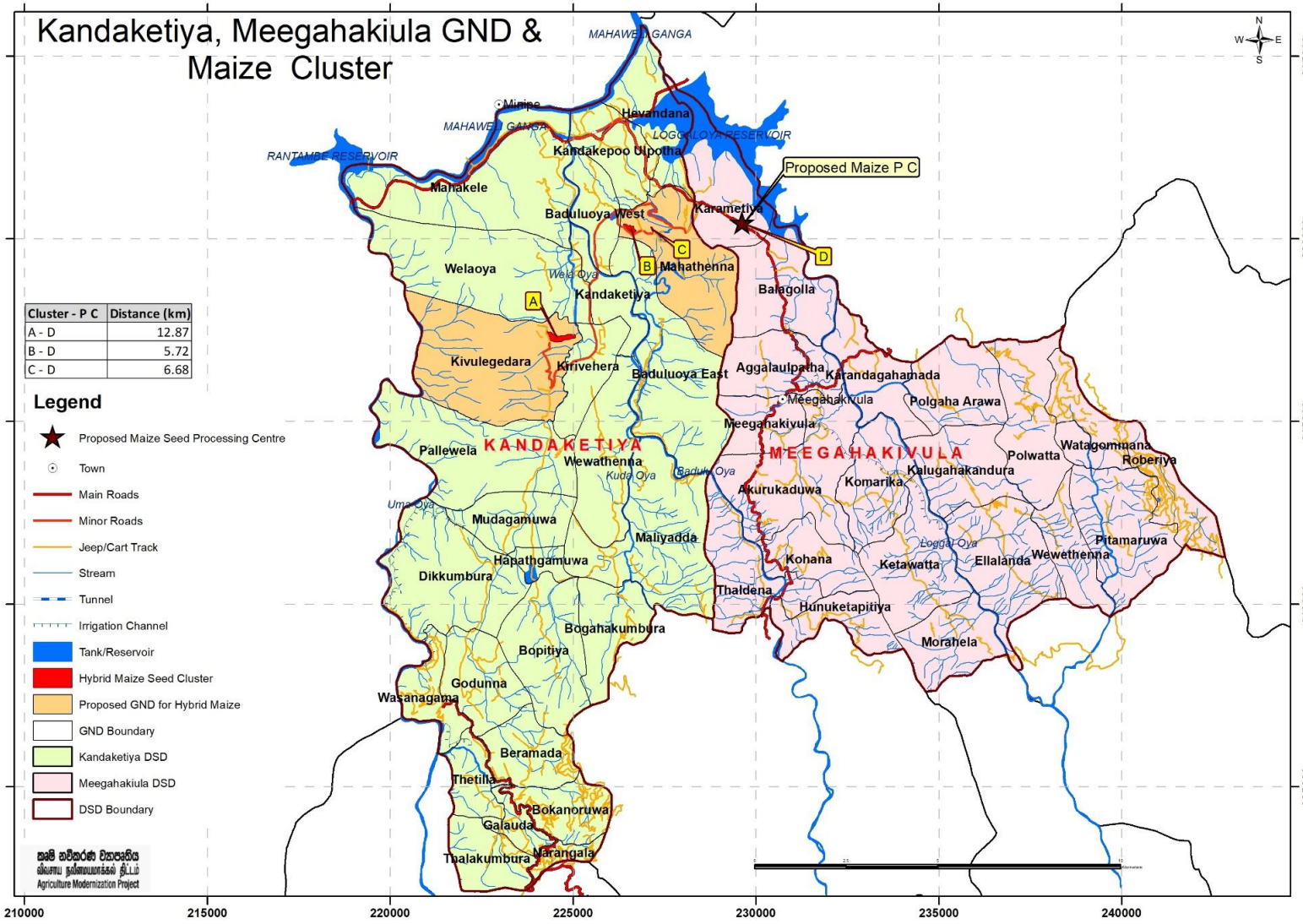
Census of Population and Housing, 2016

Environmental Assessment and Management Framework, ASMP

Feasibility Report for Maize Seed Production in Badulla, Ampara, Vavuniya and Kilinochchi, 2022

ANNEX 2: PROJECT AREA MAP




Kandaketiya, Meegahakiula GND & Maize Cluster
MAHAWELI GANGA
RANTAMBE RESERVOIR
LOGGAL OYA RESERVOIR
Proposed Maize P C
Cluster - P C | Distance (km)
A - D | 12.87
B - D | 5.72
C - D | 6.68
Legend
Proposed Maize Seed Processing Centre
Town
Main Roads
Minor Roads
Jeep/Cart Track
Stream
Tunnel
Irrigation Channel
Tank/Reservoir
Hybrid Maize Seed Cluster
Proposed GND for Hybrid Maize
GND Boundary
Kandaketiya DSD
Meegahakiula DSD
DSD Boundary
Agriculture Modernization Project
KANDAKETIYA
MEEGAHAKIVULA
Mahakele
Kandakepoo Uthotha
Hevandana
Karametiya
Baduluoya West
Mahathenna
Welaoya
Kandaketiya
Kivulegedara
Kirivehera
Baduluoya East
Balagolla
Aggalaulpatha
Karandagahamada
Meegahakivula
Polgaha Arawa
Pallewela
Wewathenna
Mudagamuwa
Maliyadda
Hapathgamuwa
Dikkumbura
Bogahakumbura
Bopitiya
Godunna
Wasanagama
Beramada
Thetilla
Bokanoruwa
Galauda
Thalakumbura
Narangala
Akurukaduwa
Komarika
Kalugahakandura
Polwatta
Watagomiana
Roberiya
Pitamaruwa
Wewethenna
Ellalanda
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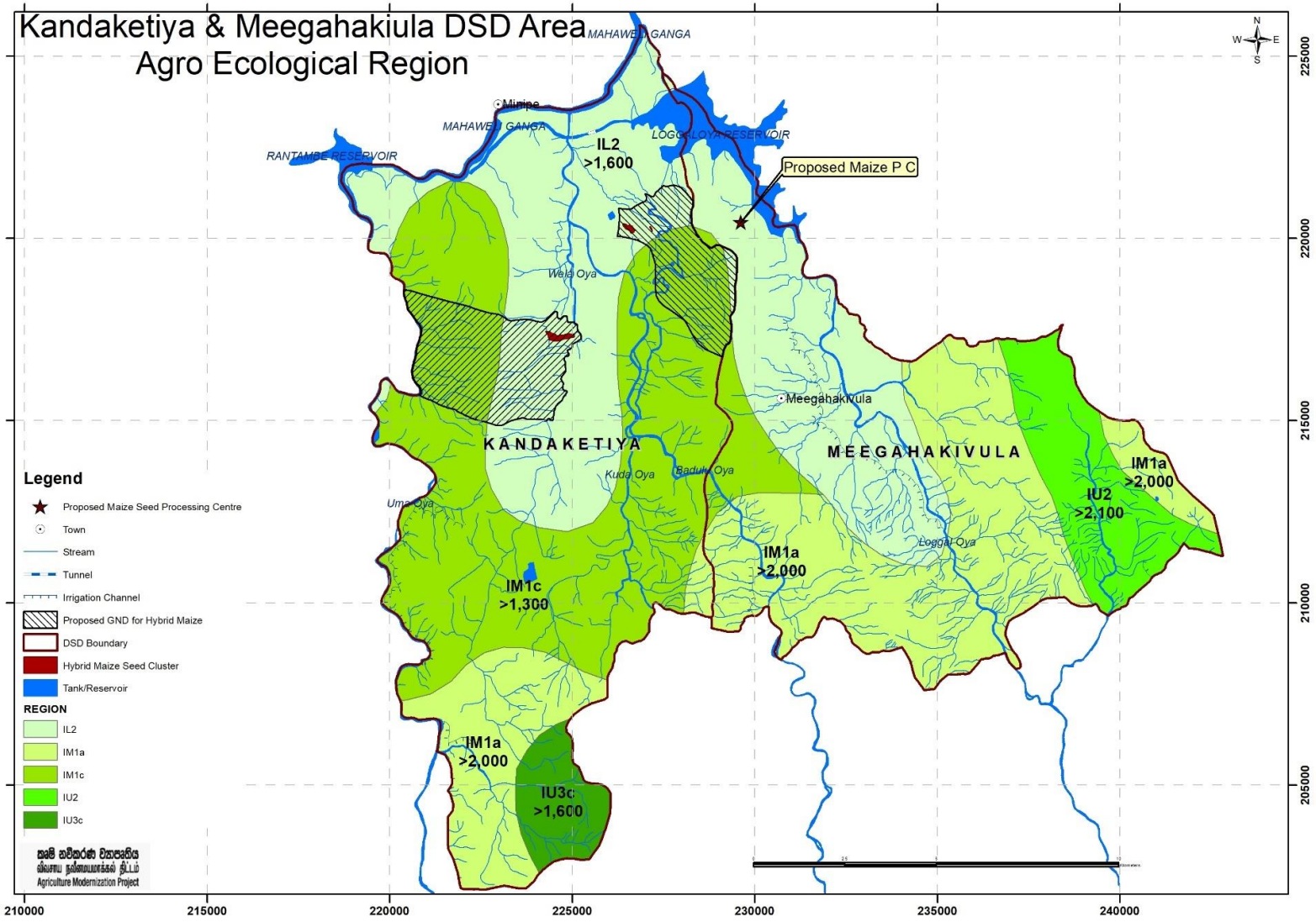
Kandaketiya & Meegahakiula DSD Area
Agro Ecological Region
MAHAWELI GANGA
Mupine
MAHAWELI GANGA
RANTAMBE RESERVOIR
LOGGALOYA RESERVOIR
IL2
>1,600
Proposed Maize P C
Wela Oya
Meegahakiula
KANDAKETIYA
MEEGAHAKIVULA
Kuda Oya
Badulu Oya
Uma Oya
Loggal Oya
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IM1a
>2,000
IM1c
>1,300
IM1a
>2,000
IU3c
>1,600
Legend
Proposed Maize Seed Processing Centre
Town
Stream
Tunnel
Irrigation Channel
Proposed GND for Hybrid Maize
DSD Boundary
Hybrid Maize Seed Cluster
Tank/Reservoir
REGION
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IM1c
IU2
IU3c
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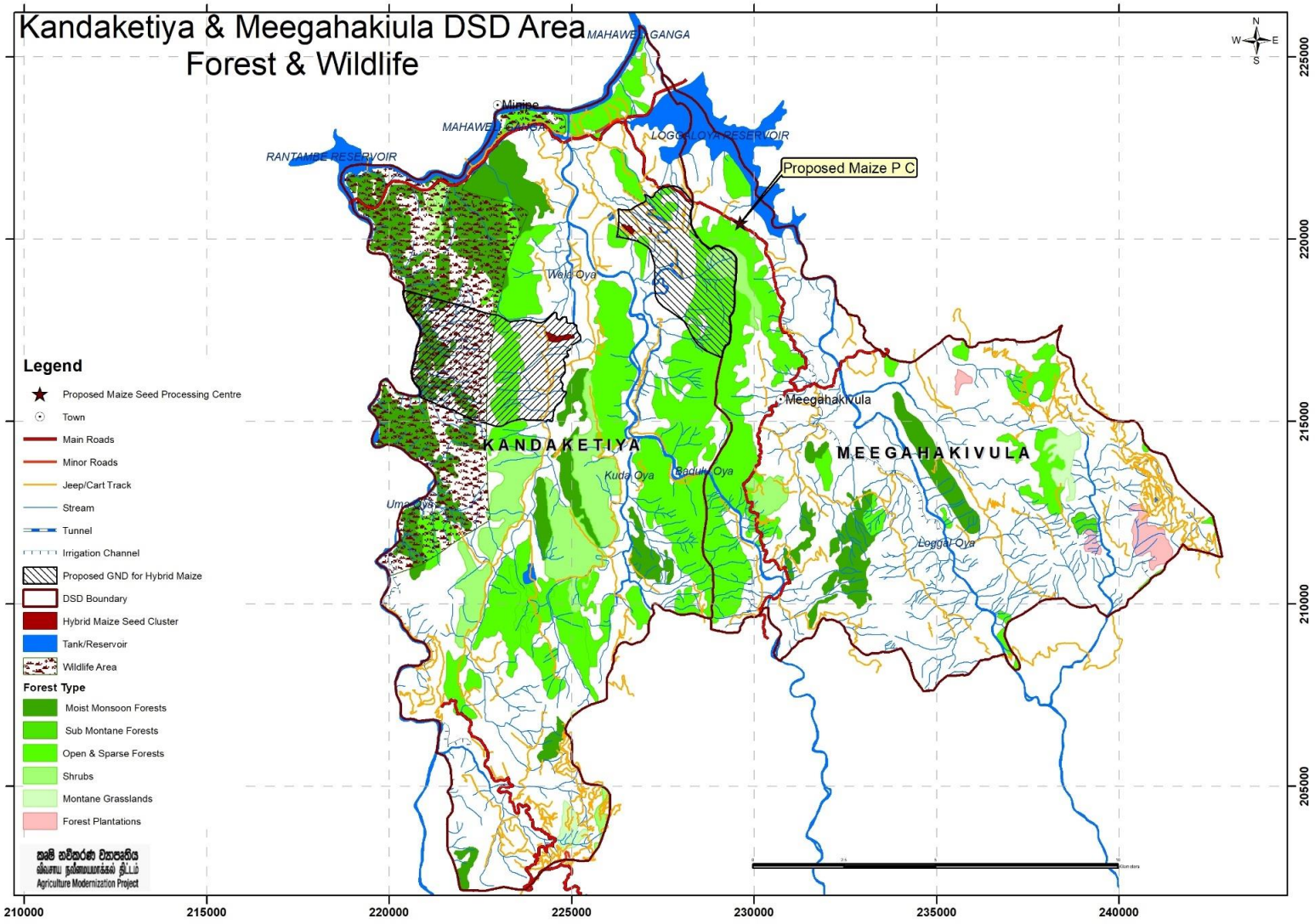
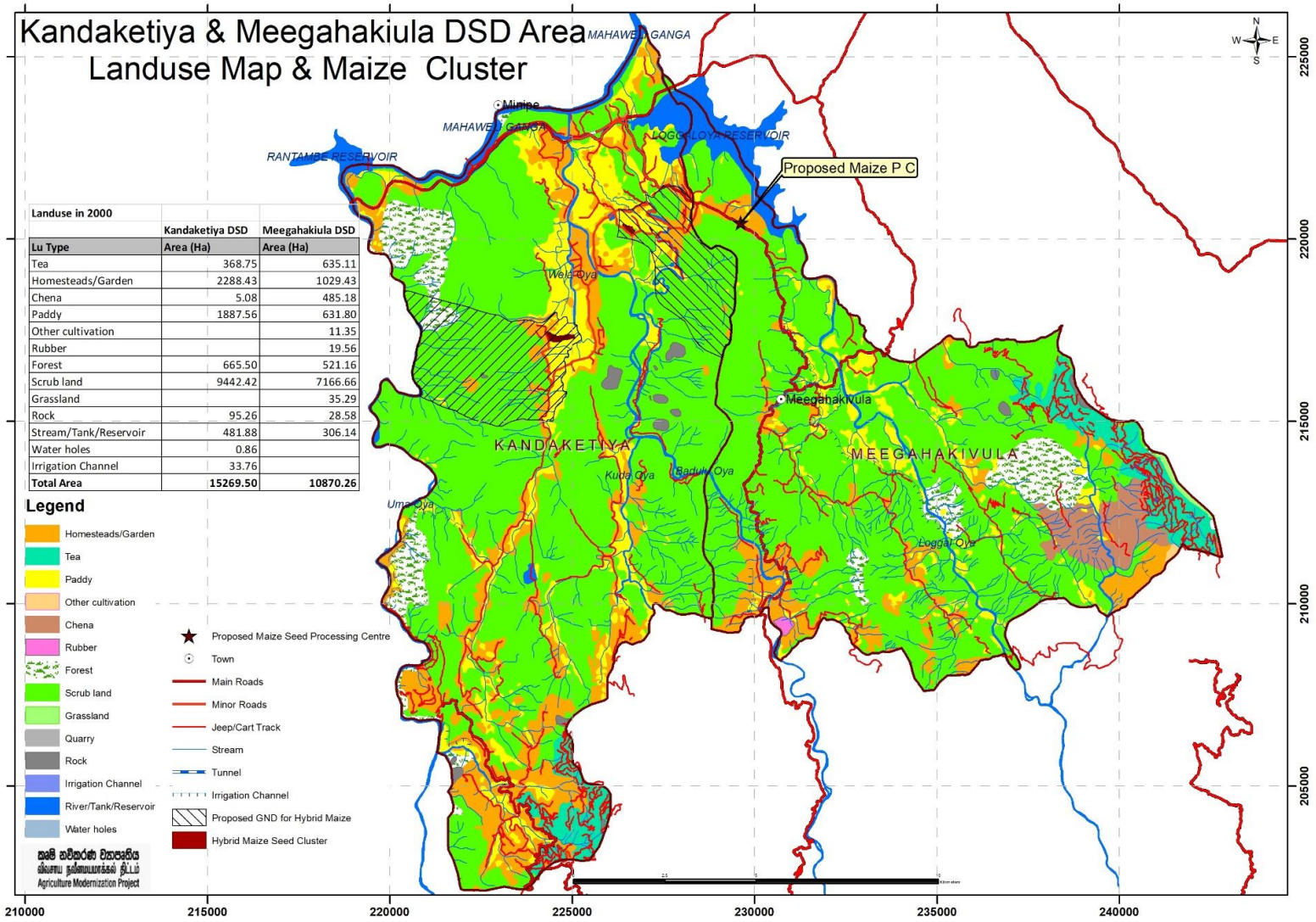
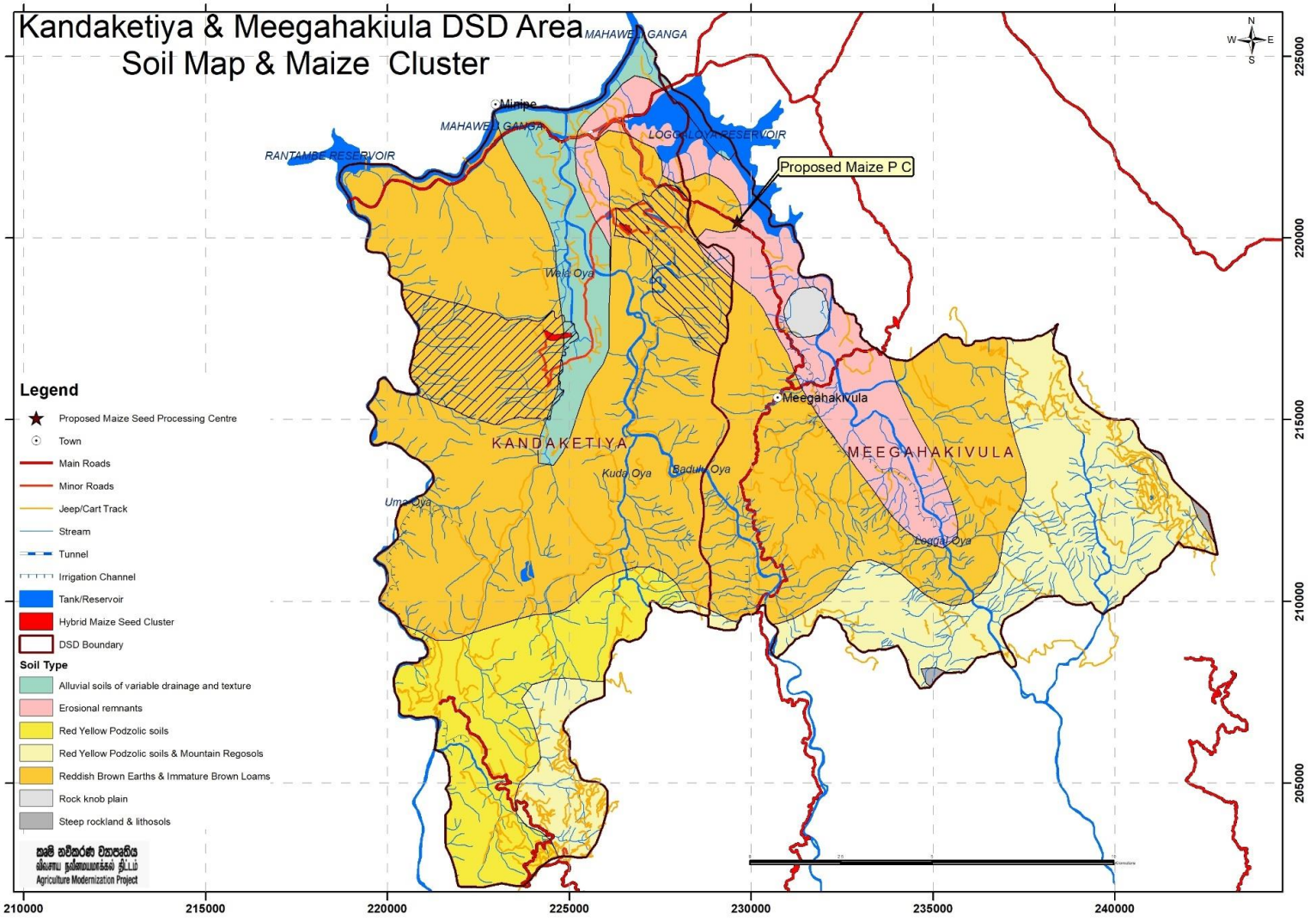
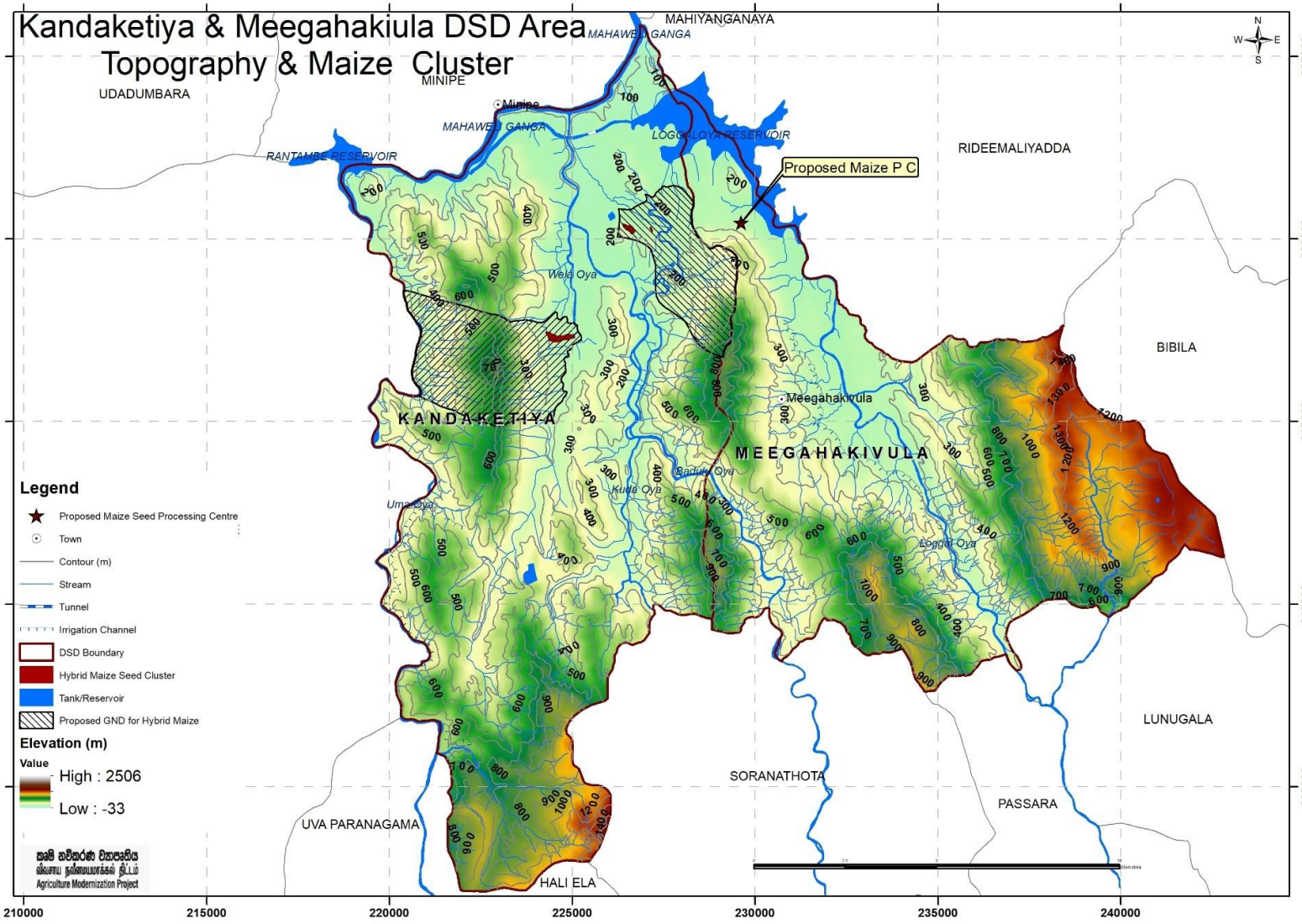
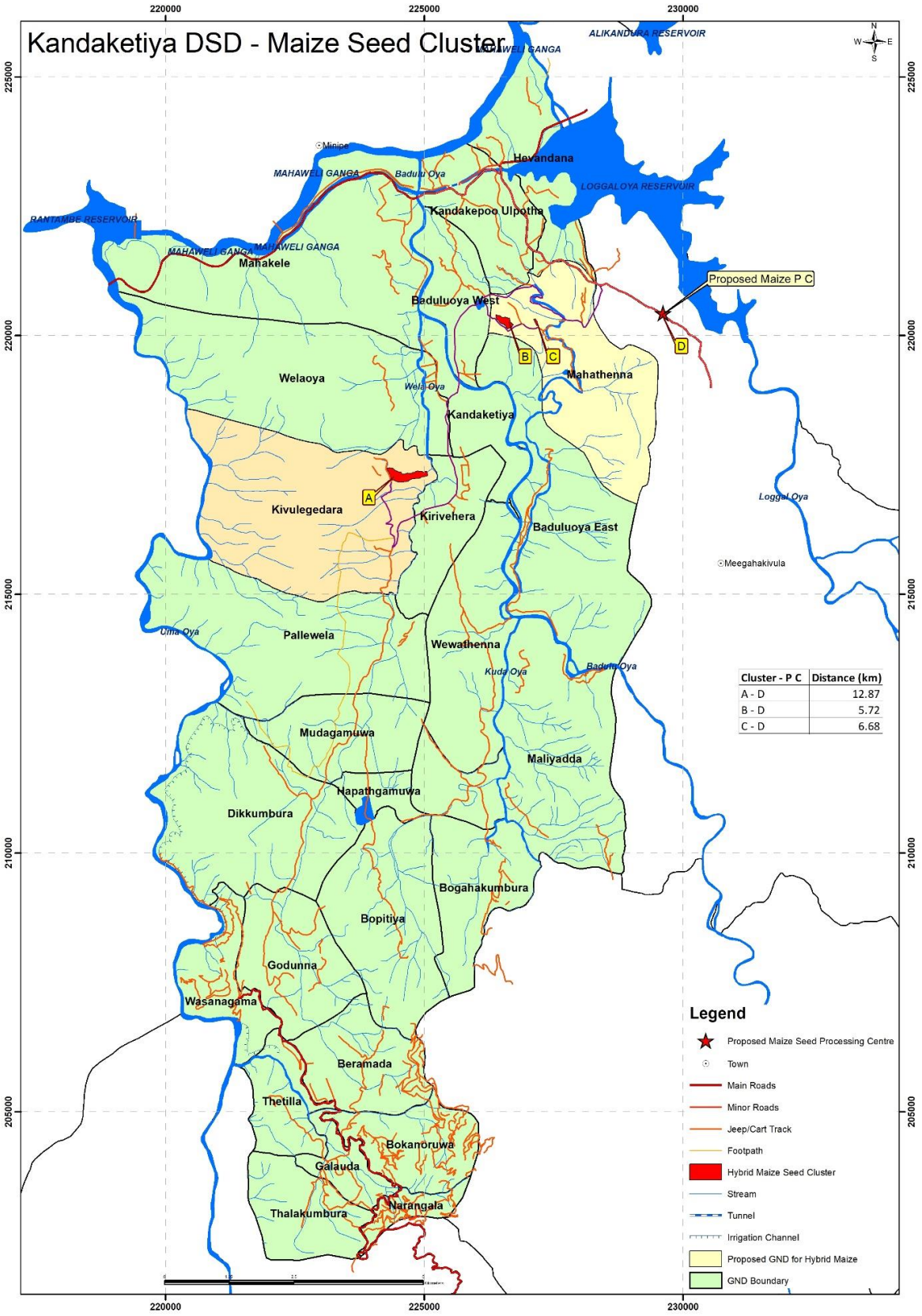
230000
235000
240000

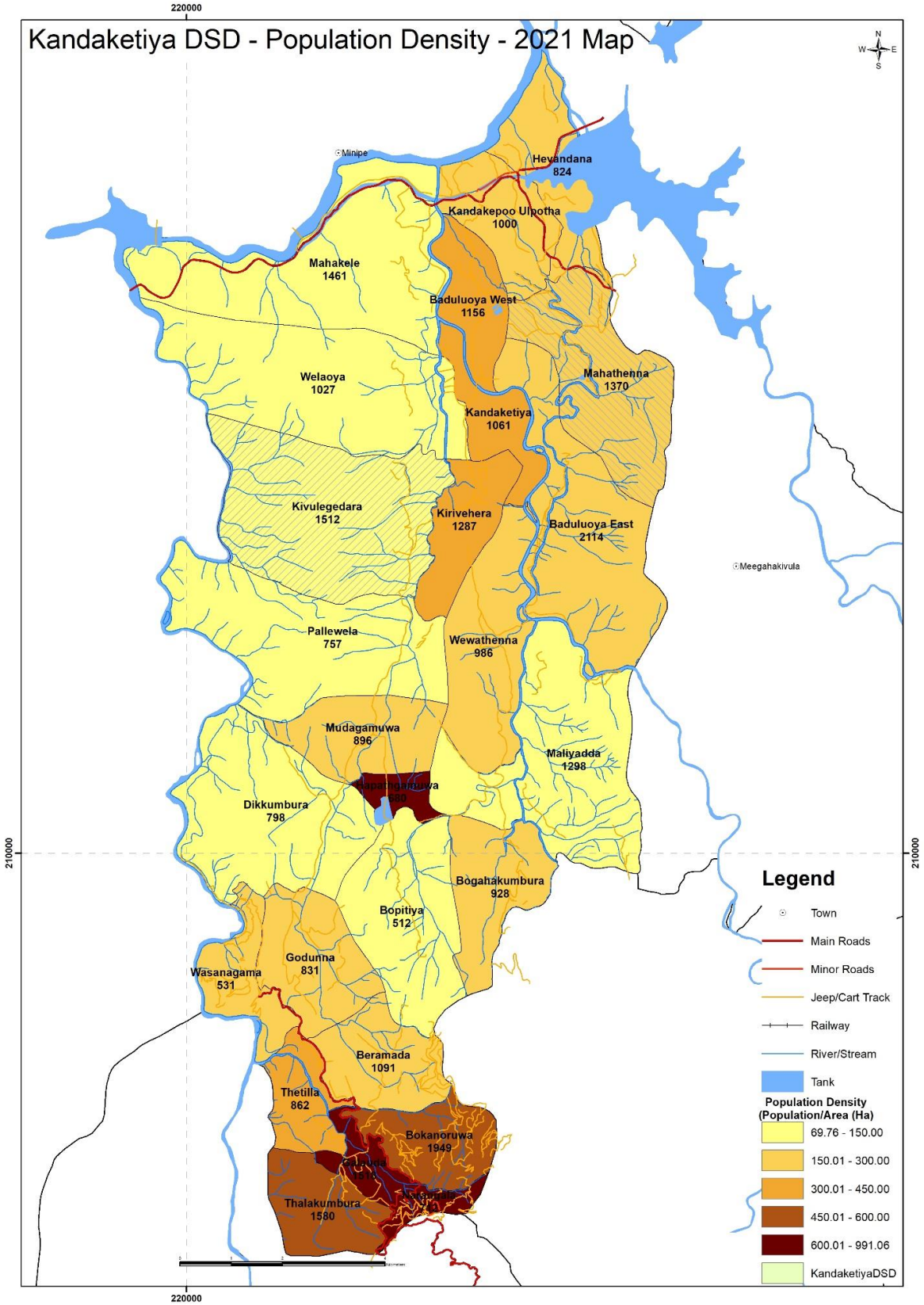

Kandaketiya & Meegahakiula DSD Area
Forest & Wildlife
MAHAWELI GANGA
Minipe
MAHAWELI GANGA
RANTAMBE RESERVOIR
LOGGAL OYA RESERVOIR
Proposed Maize P C
Wela Oya
Meegahakivula
KANDAKETIYA
MEEGAHAKIVULA
Kuda Oya
Badulu Oya
Loggal Oya
Legend
Proposed Maize Seed Processing Centre
Town
Main Roads
Minor Roads
Jeep/Cart Track
Stream
Tunnel
Irrigation Channel
Proposed GND for Hybrid Maize
DSD Boundary
Hybrid Maize Seed Cluster
Tank/Reservoir
Wildlife Area
Forest Type
Moist Monsoon Forests
Sub Montane Forests
Open & Sparse Forests
Shrubs
Montane Grasslands
Forest Plantations
Agriculture Modernization Project
N
W
E
S
225000
220000
215000
210000
205000
210000
215000
220000
225000
230000
235000
240000


Kandaketiya & Meegahakiula DSD Area
Landuse Map & Maize Cluster
MAHAWELI GANGA
Mupane
MAHAWELI GANGA
LOGGALOYA RESERVOIR
RANTAMBE RESERVOIR
Proposed Maize P C
Wela Oya
KANDAKETIYA
MEEGAHAKIVULA
Meegahakivula
Kuda Oya
Badulla Oya
Uma Oya
Loggal Oya
N
W
E
S
Landuse in 2000
Kandaketiya DSD
Meegahakiula DSD
Lu Type
Area (Ha)
Area (Ha)
Tea 368.75 635.11
Homesteads/Garden 2288.43 1029.43
Chena 5.08 485.18
Paddy 1887.56 631.80
Other cultivation 11.35
Rubber 19.56
Forest 665.50 521.16
Scrub land 9442.42 7166.66
Grassland 35.29
Rock 95.26 28.58
Stream/Tank/Reservoir 481.88 306.14
Water holes 0.86
Irrigation Channel 33.76
Total Area 15269.50 10870.26
Legend
Homesteads/Garden
Tea
Paddy
Other cultivation
Chena
Rubber
Forest
Scrub land
Grassland
Quarry
Rock
Irrigation Channel
River/Tank/Reservoir
Water holes
Proposed Maize Seed Processing Centre
Town
Main Roads
Minor Roads
Jeep/Cart Track
Stream
Tunnel
Irrigation Channel
Proposed GND for Hybrid Maize
Hybrid Maize Seed Cluster
Agriculture Modernization Project
210000
215000
220000
225000
230000
235000
240000
225000
220000
215000
210000
205000


Kandaketiya & Meegahakiula DSD Area
Soil Map & Maize Cluster
MAHAWELI GANGA
Minipe
MAHAWELI GANGA
LOGGAL OYA RESERVOIR
RANTAMBE RESERVOIR
Proposed Maize P C
Wela Oya
Meegahakivula
KANDAKETIYA
MEEGAHAKIVULA
Kuda Oya
Badulu Oya
Uma Oya
Loggal Oya
Legend
Proposed Maize Seed Processing Centre
Town
Main Roads
Minor Roads
Jeep/Cart Track
Stream
Tunnel
Irrigation Channel
Tank/Reservoir
Hybrid Maize Seed Cluster
DSD Boundary
Soil Type
Alluvial soils of variable drainage and texture
Erosional remnants
Red Yellow Podzolic soils
Red Yellow Podzolic soils & Mountain Regosols
Reddish Brown Earths & Immature Brown Loams
Rock knob plain
Steep rockland & lithosols
Agriculture Modernization Project
N
W
E
S
225000
220000
215000
210000
205000
210000
215000
220000
225000
230000
235000
240000


Kandaketiya & Meegahakiula DSD Area
Topography & Maize Cluster
MAHIYANGANAYA
MAHAWELI GANGA
MINIPE
UDADUMBARA
Minipe
MAHAWELI GANGA
LOGGAL OYA RESERVOIR
RANTAMBE RESERVOIR
Proposed Maize P C
RIDEEMALIYADDA
Wela Oya
BIBILA
Meegahakivula
KANDAKETIYA
MEEGAHAKIVULA
Badulu Oya
Kuda Oya
Uma Oya
Loggal Oya
LUNUGALA
SORANATHOTA
PASSARA
UVA PARANAGAMA
HALI ELA
Legend
Proposed Maize Seed Processing Centre
Town
Contour (m)
Stream
Tunnel
Irrigation Channel
DSD Boundary
Hybrid Maize Seed Cluster
Tank/Reservoir
Proposed GND for Hybrid Maize
Elevation (m)
Value
High : 2506
Low : -33
කෘෂි නවීකරණ ව්‍යාපෘතිය
விவசாய நவீனமயமாக்கல் திட்டம்
Agriculture Modernization Project
N
W
E
S
225000
220000
215000
210000
205000
210000
215000
220000
225000
230000
235000
240000


Kandaketiya DSD - Maize Seed Cluster
220000
225000
230000
225000
220000
215000
210000
205000
ALIKANDURA RESERVOIR
MAHAWELI GANGA
LOGGALOYA RESERVOIR
RANTAMBE RESERVOIR
Minipe
Badulu Oya
Hevandana
Kandakepoo Ulpotha
Mahakele
Baduluoya West
Proposed Maize P C
A
B
C
D
Welaoya
Wela Oya
Mahathenna
Kandaketiya
Kivulegedara
Kirivehera
Baduluoya East
Logga Oya
Meegahakivula
Uma Oya
Pallewela
Wewathenna
Kuda Oya
Badulu Oya
Mudagamuwa
Maliyadda
Hapathgamuwa
Dikkumbura
Bogahakumbura
Bopitiya
Godunna
Wasanagama
Beramada
Thetilla
Bokanoruwa
Galauda
Narangala
Thalakumbura
Cluster - P C
Distance (km)
A - D
12.87
B - D
5.72
C - D
6.68
Legend
Proposed Maize Seed Processing Centre
Town
Main Roads
Minor Roads
Jeep/Cart Track
Footpath
Hybrid Maize Seed Cluster
Stream
Tunnel
Irrigation Channel
Proposed GND for Hybrid Maize
GND Boundary


Kandaketiya DSD - Population Density - 2021 Map
220000
210000
Minipe
Hevandana 824
Kandakepoo Ulpotha 1000
Mahakele 1461
Baduluoya West 1156
Welaoya 1027
Mahathenna 1370
Kandaketiya 1061
Kivulegedara 1512
Kirivehera 1287
Baduluoya East 2114
Meegahakivula
Pallewela 757
Wewathenna 986
Mudagamuwa 896
Maliyadda 1298
Dikkumbura 798
Bogahakumbura 928
Bopitiya 512
Godunna 831
Wasanagama 531
Beramada 1091
Thetilla 862
Bokanoruwa 1949
Thalakumbura 1580
Legend
Town
Main Roads
Minor Roads
Jeep/Cart Track
Railway
River/Stream
Tank
Population Density (Population/Area (Ha)
69.76 - 150.00
150.01 - 300.00
300.01 - 450.00
450.01 - 600.00
600.01 - 991.06
KandaketiyaDSD

ANNEX 3: BENEFICIARY LIST FOR HYBRID MAIZE SEED PRODUCTION CLUSTER, BADULLA

CLUSTER FARMER LIST - KANDAKETIYA										
CLUSTER NO – CDP NO				CLUSTER NAME: MAIZE						
Index No.	**Cluster No.**	**Name of the Farmer**	**Gender (M/F)**	**NIC**	**Ds Division**	**ADC**	**AI Range**	**GN Division**	**GN No.**	**Residential Address**
1		H.M. Lalitha Airangani	F	775365219V	Kandaketiya		Kandaketiya	Kiulegedara	31G	T1/39 Ulpatha, Kandeketiya
2		R.M. Saenavirathna	M	196003201013	Kandaketiya		Kandaketiya	Kiulegedara	31G	Kiriwehera, Kandeketiya
3		R.M. Karunawathi	F	627634404V	Kandaketiya		Kandaketiya	Kiulegedara	31G	No.07, Ulpatha, Kandeketiya
4		R.M. Shanika Amali	F	865543395V	Kandaketiya		Kandaketiya	Kiulegedara	31G	T1/42 Ulpatha, Kandeketiya
5		R.M. Nandawathi	F	818151012V	Kandaketiya		Kandaketiya	Kiulegedara	31G	T1/67 Ulpatha, Kandeketiya
6		Ruwani Kanthi Nissanka	F	196574400809	Kandaketiya		Kandaketiya	Kiulegedara	31G	Mahagalayaya, Ulpatha, Kandekatiya
7		J.S.M. Lal Ranasingha	M	870951086V	Kandaketiya		Kandaketiya	Kiulegedara	31G	Nugagolla, Wewathenna, Maliyadda
8		D.M. Amaradasa	M	730684684V	Kandaketiya		Kandaketiya	Kiulegedara	31G	T1/49 Ulpatha, Kandeketiya
9		R.M. Sirimawathi	F	825632840V	Kandaketiya		Kandaketiya	Kiulegedara	31G	Mahagalayaya, Ulpatha, Kandeketiya
10		R.M. Nishanthi Priyadarshani	F	877924106V	Kandaketiya		Kandaketiya	Kiulegedara	31G	T1/44 Ulpatha, Kandeketiya
11		D.M. Kamalawathi	F	685755211V	Kandaketiya		Kandaketiya	Kiulegedara	31G	T1/38 Ulpatha, Kandeketiya
12		E.G. Nilanka Shamali	F		Kandaketiya		Kandaketiya	Kiulegedara	31G	T1/90 Ulpatha, Kandeketiya
13		D.M. Gamini Dissanayaka	M	781210366V	Kandaketiya		Kandaketiya	Kiulegedara	31G	T1/67 Ulpatha, Kandeketiya
14		A.R. Gunasekara	M	523064231V	Kandaketiya		Kandaketiya	Kiulegedara	31G	T1/43 Ulpatha, Kandeketiya
15		D.M. Amarathunaga	M	197530204620	Kandaketiya		Kandaketiya	Kiulegedara	31G	T1/41 Ulpatha, Kandeketiya
16		W.M. Somathilaka Bandara	M	750834612V	Kandaketiya		Kandaketiya	Kiulegedara	31G	T1/41 Ulpatha, Kandeketiya
17		R.M. Sarath Senevirathna	M	831394706V	Kandaketiya		Kandaketiya	Kiulegedara	31G	T1/38 Ulpatha, Kandeketiya
18		R.M. Premalatha	F	722103580V	Kandaketiya		Kandaketiya	Kiulegedara	31G	T1/41 Ulpatha, Kandeketiya
19		D.M. Thilakarathna Banda	M	590434558V	Kandaketiya		Kandaketiya	Kiulegedara	31G	T1/39 Ulpatha, Kandeketiya
20		R.M.M. Rathnayaka	M	199802504834	Kandaketiya		Kandaketiya	Kiulegedara	31G	T1/24 Ulpatha, Kandeketiya
21		P.M. Yasawathi	F	1957564100039	Kandaketiya		Kandaketiya	Kiulegedara	31G	T1/7 Ulpatha, Kandeketiya
22		M.M. Gamini Sarath Kumara	M	852804199V	Kandaketiya		Kandaketiya	Kiulegedara	31G	T1/7 Ulpatha, Kandeketiya
23		D. Gamini Dissanayaka	M	19680551030	Kandaketiya		Kandaketiya	Kiulegedara	31G	T1/14 Ulpatha, Kandeketiya
24		R.M. Somawathi	F		Kandaketiya		Kandaketiya	Kiulegedara	31G	T1/11 Ulpatha Para, Kandeketiya
25		R.M.P.S. Kumari	F	995110237V	Kandaketiya		Kandaketiya	Baduluoya	30C	No.46, Higureyaya, 22 Post, Baduluoya
26		K.D. Sumanawathi	F	197858903310	Kandaketiya		Kandaketiya	Baduluoya	30C	T4/14 Godigamuwa, Baduluoya

27		R.M. Jayasundara	M	720254263V	Kandaketiya		Kandaketiya	Baduluoya	30C	T3/A23, 22 Post, Baduluoya
28		R.M. Gunasiril	M	721761622V	Kandaketiya		Kandaketiya	Baduluoya	30C	T3/36A Kandapothtawa, Baduluoya
29		H.P.D. Chandrapala	M	630214475V	Kandaketiya		Kandaketiya	Baduluoya	30C	Manuranga home, Baduluoya, Baduluoya
30		R.M. Rupasingha	M	702000866V	Kandaketiya		Kandaketiya	Baduluoya	30C	T3/D41, 22 Post, Baduluoya
31		S.M. Gunasekara	M	451190938V	Kandaketiya		Kandaketiya	Baduluoya	30C	T4/D14, Godigamuwa, Baduluoya
32		D.M. Wijesingha	M	672052637V	Kandaketiya		Kandaketiya	Baduluoya	30C	No.150, Mahathenna, Baduluoya
33		A.M. Jayathilaka	M	602503658V	Kandaketiya		Kandaketiya	Baduluoya	30C	No. 31 Cannel, Higureyaya, Baduluoya
34		R.M.T.M. Rajarathna	M	922011974V	Kandaketiya		Kandaketiya	Baduluoya	30C	T3/B12 Kadapothtawa, Baduluoya
35		D.M. Somathilaka	M	731853347V	Kandaketiya		Kandaketiya	Baduluoya	30C	T4/A4, Godigamuwa, Baduluoya
36		H.P.D. Rathnasiri	M	681733434V	Kandaketiya		Kandaketiya	Baduluoya	30C	No. 95, Baduluoya, Baduluoya
37		W.M.R.A. Kulaweera Weerasingha	M	731074275V	Kandaketiya		Kandaketiya	Baduluoya	30C	30 Cannel, Higureyaya, Baduluoya
38		R.M. Rathnayaka	M	58036553V	Kandaketiya		Kandaketiya	Mahakale		T3/14 Mahakale, Kandekatiya
39		R.M. Kumarihami	F	537895373V	Kandaketiya		Kandaketiya	Mahakale		T3/14/1 Mahakale, Kandekatiya
40		T.M. Thilakasiri	M		Kandaketiya		Kandaketiya	Mahakale		T3/12 Mahakale, Kandekatiya
41		N.M. Gunasekara	M	551680509V	Kandaketiya		Kandaketiya	Mahakale		T3/11 Mahakale, Kandekatiya
42		D.M. Sunil Premachandra	M	682793511V	Kandaketiya		Kandaketiya	Mahakale		T4/12 Mahakale, Kandekatiya
43		H.M. Karunawathi	F		Kandaketiya		Kandaketiya	Mahakale		Welaoya, Kandekatiya
44		B.G. Ganga Hemamali	F	828271822V	Kandaketiya		Kandaketiya	Mahakale		T3/12 Mahakale, Kandekatiya
45		K.M. Aberathna	M	195616702636	Kandaketiya		Kandaketiya	Mahakale		T3/9 Mahakale, Kandekatiya
46		W. Weerasekara	M	632222599V	Kandaketiya		Kandaketiya	Mahakale		Mahagalayaya, Ulpatha, Kandeketiya
47		T.M.I.M. Gunasekara	M	817502997V	Kandaketiya		Kandaketiya	Mahakale		T1/47 Ulpatha, Kandeketiya
48		D.M.Amarathunga	M	197762501305	Kandaketiya		Kandaketiya	Mahakale		T1/47 Ulpatha, Kandeketiya
49		R.M.Weerasingha	M	68262494V	Kandaketiya		Kandaketiya	Mahakale		T1/44 Ulpatha, Kandeketiya
50		D.M. Senadira	M	682884088V	Kandaketiya		Kandaketiya	Mahakale		T1/49 Ulpatha, Kandeketiya

ANNEX 4: INSTITUTIONAL ROLES

Agency/ committee	Officers responsible	Official functions assigned	Expected role in cluster development programme
Department of Agriculture (Inter Provincial)	• Assistant Director (Ext), Badulla	• Provide extension support through Field Staff and maintain data system	• Coordinate all the extension activities on new technology and crop management
	• Agriculture Instructor, (Badulu Oya and Bathmedilla)	• Carry out extension field programmes with technical assistance and Agriculture Research and Production Assistant (ARPA)	• Implement extension activities on new Ag, technology and crop management
	• Technical Assistants (Badulu Oya and Bathmedilla)	• Carry out extension field programmes ARPA under the guidance of Agricultural Development Officer (ADO) and Agriculture Instructor (AI)	• Implement extension activities on new Ag, technology and crop management and organise farmer meetings
Irrigation Management Division of Ministry of Irrigation	• Resident Project Manager Bathmedilla and Badulu Major Irrigation Scheme	• Coordinate and facilitate to make decisions as the Chairman of Project Management Committee (PMC) which DIE, ADA, ADO and all DCO Chairmen are participating. irrigation management functions and issues are discussed at this monthly meeting	• Develop relationship with Banana Farmers with PMC and extend fullest cooperation to Banana farmers and FPO in the process of decision making on water issues and issues related to lands under Banana
	• Development Officer attached to Residential Project Manager's (RPM) Office	• Involvement in coordinating of field Programmes with DCO in the Maize Seed Production Cluster area	• Develop data base on Maize Seed Production (extent and farmers) and strengthen links with DCO and Maize Farmers
Agrarian Development Department	• Agrarian Development Officer Kandaketiya	• Administering of ARPA attached to Agrarian Service centre. Agric. Input supplies, manage Paddy land Act and FPO registration under 56A and 56B	• Coordinate activities related to input supplies and make relevant ARPA involvement more active in the Programme. Extend cooperation to convert paddy lands into Maize lands as Maize is a short-term crop
	• ARPA	• Assist ADO and AI to implement field programmes. Maintain data and information on Agriculture and communicate with DCO and farmers on issues	• Communicate with DCO members including Banana farmers and keep records of updates on each Maize farmer. Organise farmer meetings when requested by AI, ADO or Senior Officer
Divisional Secretariat. Kandaketiya and Meegahakiwula	• Divisional Secretary/Asst. DS Kandaketiya and Meegahakiwula	• Administrative head of the Secretariat area and Chairman of the Divisional Agriculture Committee holding monthly which all the	• Extend cooperation to get the involvement of GNs, Development Officers and Samurdhi Niladari in the Cluster area. Assist to settle land

Agency/ committee	Officers responsible	Official functions assigned	Expected role in cluster development programme
		Divisional Heads, FPO leaders are participating	ownership issues and disputes of Maize farmers
	• GN (Village administrator)	• Deal with key functions such as poverty alleviation, conflict resolution at village level and maintain population data of people in his area	• Extend village level cooperation to mobilise Maize Farmers and assist farmers to select their Representatives with good personnel qualities
	• Land officer	• Land management under Land Development Ordinance in Bathmedilla and Badulu Oya Schemes	• Assistance to settle land tenure issues and encroachments. Proper information on legal land ownership and nominated successors
Irrigation Department, Kandaketiya and Meegahakiwula	• Divisional Irrigation Engineer Kandaketiya and Meegahakiwula	• All the technical and management functions related to Irrigation under Bathmedilla and Badulu Oya systems	• Make an opportunity to provide year-round irrigation water to Maize fields on rotational basis and guide to carry out effective O&M of canal system for Maize through PMC
	• Engineering Assistant	• Monitor water issues, carry out O&M programme of canal system in the area, Settlement of irrigation disputes assuring availability of water availability for the crop	• Provide guidance to FPO and Farmers for water management and O&M of the canal system. Assist farmers to overcome the situations of water shortages
	• Work Supervisor	• Closely work with water users in water allocation and management. Also assist to maintain the irrigation canal system	• Provide guidance to Farmers' Organisations and farmers operating the gate system as per the rotational issue and O&M of the canal system. Assist farmers to overcome irrigation difficulties

ANNEX 5: ESTABLISHMENT OF COMPOST PRODUCTION UNIT

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.

The objective of this modernization project is to establish a commercially viable compost soil application as well as the folio application. Soil application of compost fertilizer significantly improve the soil structure, chemical properties (Cation Exchange Capacity (CEC), Water Holding Capacity (WHC) etc.) and biological properties. That will help to optimum usage of chemical fertilizer and water. Small quantities of growth promoting substances also include to the soil. Compost has ability to reduce the incidence of plant diseases.

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.

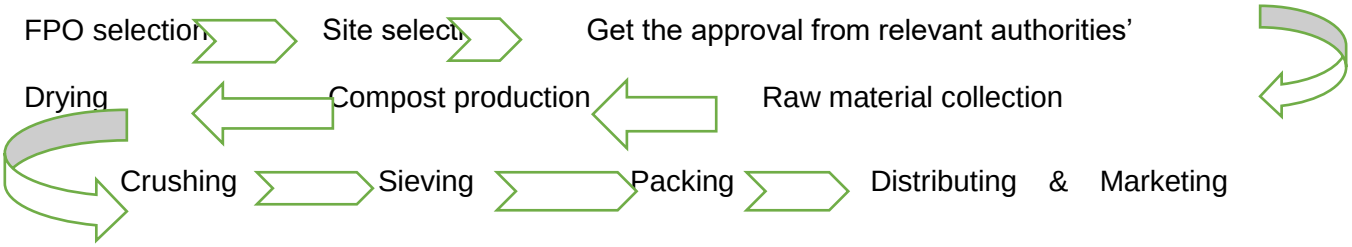
DoA has given different raw material combination for compost preparation in 2021.

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.

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.