කෘෂිකර්ම අමාත්‍යාංශය
Ministry of Agriculture
கமத்தொழில் அமைச்சு

ENVIRONMENTAL SCREENING REPORT

Subproject title: Dried Chilli Production and Value addition under Lift Irrigation Schemes in Mullaitivu



Sri Lanka Agriculture Sector Modernisation Project (ASMP)

Prepared for Project Management Unit of the Agriculture Sector Modernization Project

Democratic Socialist Republic of Sri Lanka, Ministry of Agriculture (MOA)

Updated: Oct 2021

CONTENTS

FIGURES

TABLES

ABBREVIATIONS

ASMP	Agriculture Sector Modernization Project
DSD	Divisional Secretary Division
EMP	Environmental Management Plan
GND	Grama Niladari Division
LKR	Sri Lanka Rupees
MOA	Ministry of Agriculture
PMU	Project Management Unit
WQI	Water quality index
RDS	Rural Development Society
WRDS	Women Rural Development Society

Agriculture Sector Modernization Project

Environmental Screening Report

PROJECT IDENTIFICATION

Project title	Dried Chilli Production and Value addition under Lift Irrigation Schemes in Mullaitivu
Project Proponent	Agriculture Sector Modernization Project (ASMP)

PROJECT LOCATION

Location (*Relative to the nearest town, highway*)	Mullaitivu District was declared in 1979 and is located in the Northern Province of Sri Lanka. The District is bounded by Jaffna and Killinochchi District from the North, Sea from the East, Trincomalee and Vavuniya Districts from the South, Mannar District from the West, and a small part of the South. The absolute location of the District is longitude 090 14/ N & latitude 800 32/ E. The total land area of the District is approximately 2616.9 sq. km This District accounts for 3.87% of the country's total land area. The District has six Divisional Secretary Divisions namely Maritimepattu, Puthukkudiyiruppu, Oddusuddan, Thunukkai, Manthai East, Welioya. There are 127 Grama Niladari Divisions & 624 Villages. Administratively the District belongs to part of the Vanni electoral District and having five Pradeshiya Saba's sub-offices[1]. Altogether there are five selected project locations and 4 out of them belong to the Oddusudan DS division while one belongs to the Manthai East DS division. This environmental screening report is prepared only considering two selected locations namely Thaddayamalai (pump 4&5) & Thoddiyadi (Pump 6&7), which are belonging to the Oddusudan DS division. Oddusudan DS division represents around 24% of the total land area of the Mullaitivu district. Oddusudan DSD has 27 GND and these two selected project locations belong to the Thaddayamalai GN division. Selected farmland plots will be fed by the Pump house 4&5 and pump houses 6&7. Selected farmland's along with the pipe laying is attached in annexure 2. Location maps of these farmlands are shown in Annexure 3. 1) Random location of farmland under Pump 4&5- $9^0$11'28"N, $80^0$38'27"E 2) Selected location of farmland under Pump 6&7- $9^0$10'57"N, $80^0$38'23"E Muthiyankattu Major Irrigation scheme is one of the dedicated tanks for Food Crop Production in Sri Lanka. Of the 6,000 acres command area, 4,100 acres are fed by gravity irrigation system while the remaining 1,900 acres are fed by the lift irrigation system. Originally, the lift irrigation scheme was established in the late 1960s for dried chili and red onion production. However, farmers of

[1] https://luppd.gov.lk/images/content_image/downloads/pdf/llrc_mullaitivu.pdf

	the area have abandoned the cultivation due to conflict, displacement, and liberalization of food commodity imports in the past years. As a result, the lift irrigation systems were not in operation and were left in dilapidated conditions for a long period. Especially, the Right Bank (RB) canal of the tank has been designed for the lift irrigation for the command area.
Definition of Project Area *(The geographical extent of the project & areas affected during construction)*	Before establishing the dry chili project, ASMP is engaged in rehabilitating two dilapidated lift irrigation pump houses and water distribution infrastructure in the Thaddayamalai GN division. Under the project, 4 Nos lift irrigation pumps and pipe laying for irrigation water distribution to farmer fields will be rehabilitated. With the irrigation water available from this rehabilitation, the project will be able to cultivate about 500 acres of dried chili (8 months) and another 500 acres of groundnut (4 months) in a year as detailed below. All the selected farmlands will be fed by the rehabilitated pumps (pump 4&5, pump 6&7) and all the beneficiaries identified in Annexure 4. Pipe laying and increasing gravity flow using overhead tanks will enable easy access for the water with high pressure. Lands are generally flat terrain. Either side of the proposed area contains both cultivated and bare lands. Mullaitivu is an agricultural economy-based district and rice production is the main agricultural activity undertaken by farmers in lowlands. Almost all farmers have both lowlands and uplands for their livelihood activities. However, Thaddayamalai RB canal farmers don't have a well-established and managed irrigation system, farmers cultivate paddy on a lowland in one term (Maha Seasons) per year. During Yala season (May to August), cultivation activities are limited to paddy on lowlands with water scarcity. Farmers have cultivated perennial crops such as coconut and mango on upland for their household consumption. Since it is receiving high rainfall during the Maha season (September to March), some farmers are cultivating seasonal crops on their uplands. During the Yala season, seasonal crops such as groundnuts, Chili, and various vegetables are cultivating by using open well/tube well water. However, open well/tube well water is not sufficient to cultivate their entire land, and most of the time only around 1acer is cultivated. The existing pump house is not in operational condition and water extraction is limited during the dry season. Hence, proposed pump houses rehabilitation initiatives will benefit the farmers in Thaddayamalai by providing enough water to increase their acreage of chili and the yield. It will ensure sustainability in the agriculture sector. A total of 60 farmers in Thoddiyadi village (under pumps 6&7) will be benefitted from the project and it will cover 102 acres of uplands. A total of 60 farmers of 37 families in Thaddayamalai will be benefitted from the project and it will cover 80 acres of uplands. Altogether 120 farmers from 85 families in the Thaddayamalai GN division will be benefitted from the dry chili cluster project and it covers 182 acres of cultivable extent.

	Figure 1: Existing lands for Chili cultivation 
Adjacent land and features	Oddusuddan DS Division is one of the divisions among the six DS divisions in Mullaitivu District. There are 27 GN Divisions in the Oddusuddan DS Division. On the northern border of this DS division there are Puthukkudiyiruppu DS division of Mullaitivu district and Karaichchi DS division of Kilinochchi district, and on the eastern border is the Maritimepattu DS division. Similarly in the southern border Vavuniya North DS division of the Vavuniya district and in the western border is Thunukkai and Mathai east DS divisions. The total extent of the division is 618sq.km, and this DS division is the largest one consisting of 28% of the land area of the district. The Land Cover of the District mainly includes Agricultural Lands, Home Gardens, Forest Lands, and Water Bodies. The total land area of the District is 261,690ha. Approximately 13% of the total land area consists of agriculture; Forest Lands cover nearly 69%; Home Garden accounts for 6%. Both these selected farmlands are in the Thaddayamalai GN division which belongs to the Oddusudan DS division. RB canal of Muthiyankattu Tank is feeding water to paddy lands during the paddy season. Selected farmlands are scattered along with the area fed by the rehabilitated pump houses (pump 4&5, pump 6&7). All these selected farmlands belong to the farmers and selected farmlands are attached in Annexure 1. However, adjoining lands are owned by farmers, and most of the farmers are having 3-acre upland plots for crop cultivation. Most of these adjacent lands are used to cultivate groundnuts, chili, and vegetables. Perennial crops such as coconut and Mango are also found. Permits/deeds were available for all farmers and No main structures were found other than houses and Hindu temples near the project area.

PROJECT JUSTIFICATION

Need for the project (*What problem is the project going to solve*)	Chili production is very low in the drier months of May, June, July and again in the rainy days of November, December and January. During the dry period production is affected due to extreme heat causing stress to the plant which in turn reduces the fruit set. Further, the presence of a peak insect pest population during the months of May to July also makes the plants less productive. Flower drops are very high during the rainy season and the wet conditions are more favourable for many fungal diseases leading to loss of production. The technology package of the insect-proof net and poly mulching along with the drip irrigation technology system would overcome the losses caused by biotic and abiotic stresses, especially during drier months. The hybrid chili variety MICHHY1 introduced by the Department of Agriculture is fairly resistant to the leaf curl complex disease which is the major cause for production loss and also other technical constraints encountered in chili production. Further, it provides an enhanced yield of more than two to four times compared to other normal recommended chili varieties. Thus, the project will use this hybrid chili variety for dried chili production to enhance proactivity and reduce losses The new technology package for dried chili production is more remunerative than conventional dried chili production. This will pave way for a chili-based agribusiness to commercialize agriculture in the Mullaitivu district. However, this new technology package requires a high initial cost and also a farmer group with an entrepreneurship attitude. The project will assist to build up these physical and human capacities for the selected two farmer groups for intensive chili cultivation and marketing practices. Before starting the project at Thoddiyadi and Thaddayamalai, existing pump houses at Thoddiyadi (pump 6&7) and Thaddayamalai (pump 4&5) will be rehabilitated to ensure water availability and accessibility during the cultivation period. Currently, selected beneficiaries of these two villages cultivate two seasons per year using water from open wells and tube wells by confirming that they will go for three times cultivation per year if they are provided enough water from the proposed project. Further, almost all farmers are having 3 acres of land plots and most farmers cultivate only half of their total land area due to insufficient water. Rehabilitation of pump house with new motors and laying of PVC pipes to distribute water among the beneficiaries will provide sufficient water to cultivate entire land plots of selected farmers with high frequency and high yield. Overhead tanks are designed to develop the pressure required for the operation of a farm drip irrigation system in the scheme. Water will be pumped to the overhead tanks directly and gravitational force will create

	the required pressure required to the on-farm drip irrigation system. In addition, the below objectives are to be achieved to increase the economy of selected farmers. a. To rehabilitate lift irrigation system to expand dried chili production b. To introduce and demonstrate efficient and effective water management in dried chili production c. To organize farmers for group marketing and value addition
Purpose of the project (*What is going to be achieved by carrying out the project*)	Dried Chili production and value addition under the lift irrigation schemes project in Mullaitivu is driven to achieve the below objects. a. To expand dried chili production b. To introduce and demonstrate new technology for enhanced productivity and value addition in dried chili production c. To organize farmers for group marketing and value addition To achieve these objectives, the ASMP project is engaged in rehabilitating a set of dilapidated lift irrigation pumps and water distribution infrastructure in Muthiyankattu to improve water accessibility. Therefore, local farmers' difficulties in finding water will be reduced, cultivation frequency will be increased from twice a year to thrice a year, an increase of yield of their cultivations, encourage farmers to cultivate more lands, and farmers who have left cultivation will be encouraged to start farming activities again. At last, increase regional and national agriculture productivity. A total of 120 farmers of 85 families will be benefitted from the project and it will cover 182 acres of uplands. The main cultivation is December/January. However, in the first stage project will commence its cultivation in July 2021 in selected 50 farmers (25 acres) using a modern technology package of drip irrigation, insect-proof net, polythene mulch for half an acre unit under above lift irrigation systems. In the second stage in January 2022, another 70 farmers (37.5 acres) will do cultivation using the same technology package. The balance acreage of 39.5 acres will come under normal ridge and furrow system cultivation in January 2022 using the new hybrid chili MICHHY1. ASMP rehabilitated irrigation system will supply the lift irrigated water for the entire 182 ac cultivation.
Alternatives considered (*Different ways to meet the project need and achieve the project purpose*)	The “site alternative” would mean the feasibility of meeting the project needs at the selected cluster. Thaddayamalai GN division has well-established farmer organizations already and production of seasonal crops is available immediately. There are experienced ground nuts, chili, and vegetable farmers and all these upland cultivations rely on water abundance. Most of the farmers have large-scale, low flat farmer-based lands with a lack of water. These farmers are capable of cultivating their entire uplands 3 times per year if sufficient water is available. Further, an attitude and market-led vision of field staff are highly acceptable. Hence,

	the selected area is highly supportive to meet the project needs within a short period of time with the expected quality. The "technology alternative" would mean different technology applications to meet the project needs at the selected cluster. Rehabilitating existing pump houses will ensure the extraction of water. Overhead tanks and PVC laying will be taking place to distribute water among the selected farmers with the pressure required for the operation of an on-farm drip irrigation system in the scheme, and it will increase the accessibility of water. Further, 40KWh solar panels will be installed to generate renewable energy and it will be directly benefitted to reduce the electricity cost of motors. On-farm technological applications will be introduced by ASMP with the dry chili cluster development plan. Hence, these technological improvements will result in consistent dry chili production to meet the project objectives. The "no-action" alternative would mean that no Dry chili cluster project undertake by the ASMP and hence no irrigational support for the existing cultivators in the selected area. That will lead the same agricultural activities and economy of farmers won't increase. Therefore, conventional farm practices, low productivity, low quality, and low income will continue to dominate the economy of the farmers, and the agriculture sector will not develop in the Thaddayamalai GN division.

PROJECT DESCRIPTION

Proposed start date	October 2021
Proposed completion date	April 2022
Estimated total cost	LKR 35 million (Total cost of 1st Stage for July, 2021 cultivation, Muthiyankattu)
Present land ownership	Private Farmlands, Lands with deeds and permits

Planned interventions	Planned interventions of the project includes
	• Installation of drip irrigation systems in individual farmlands
	• Laying GI pipes as the distribution line from the pump house to individual lands
	• Introduction of quality and Productive enhancing technologies and provide to farmers
	  ✓ Insect proof net
	  ✓ Polymulch
	  ✓ Electric dryer
	• Conducting Farmer exposure visits to share the knowledge on Cluster post-harvest facilities, organic fertiliser facilities and others

	• Nursery management • Training, capacity building and extension
Description of the project (*With supporting material such as maps, drawings etc. attached as required*)	Agriculture Sector Modernization Project identified dried chili also one of the market's competitive and remunerative crops with potential for value addition. Chilli is one of the main spice ingredients in cooking. Thus it should be made available without shortage and price hikes. The country's annual dried chili requirement of 60,000 MT is largely imported and supplied. The cost of annual import amounts to about SLRs. 10 billion. Chili is one of the most important cash crops to farmers. However, farmers' chili cultivation is mainly meant for green chili production, and dried chili production is very much marginal. Thus self-reliance on dried chili production is important for the country. The immediate objectives of modernization are to increase productivity, decrease the cost of production, improve value addition and provide a steady market through buy-back agreement. The ultimate goal is increased income and employment opportunities in production and value addition. Chili production is very low in the drier months of May, June, July and again in the rainy days of November, December and January. During the dry period production is affected due to extreme heat causing stress to the plant which in turn reduces the fruit set. Further, the presence of a peak insect pest population during the months of May to July also makes the plants less productive. Flower drops are very high during the rainy season and the wet conditions are more favourable for many fungal diseases leading to loss of production. The technology package of the insect-proof net and poly mulching along with the drip irrigation technology system would overcome the losses caused by biotic and abiotic stresses, especially during drier months. The hybrid chili variety MICHHY1 introduced by the Department of Agriculture is fairly resistant to the leaf curl complex disease which is the major cause for production loss and also other technical constraints encountered in chili production. Further, it provides an enhanced yield of more than two to four times compared to other normal recommended chili varieties. Thus, the project will use this hybrid chili variety for dried chili production to enhance proactivity and reduce losses The new technology package for dried chili production is more remunerative than conventional dried chili production. This will pave way for a chili-based agribusiness to commercialize agriculture in the Mullaitivu district. However, this new technology package requires a high initial cost and also a farmer group with an entrepreneurship attitude. The project will assist to build up these physical and human capacities for the selected two farmer groups for intensive chili cultivation and marketing practices. Muthiyankattu Major irrigation scheme is the only dedicated tank for Other Food Crop Production in Sri Lanka. Of the 6,000 acres command area, 4100 acres are fed by gravity irrigation while the remaining 1,900 acres are fed by lift irrigation.

	Originally the said lift irrigation scheme was established in the late 1960s for dried chili and red onion production. However, farmers of the area have abandoned the cultivation due to conflict, displacement, and liberalization of food commodity imports in the past years. As a result, the lift irrigation systems were not in operation and were left in dilapidated conditions for a long period. Based on a need assessment conducted by ASMP, PDOA, and Dept. of Irrigation, identified about 85 farm families living in 255 acres of land are urgently requiring water for irrigation to cultivate dried chili and groundnut in Thaddayamalai and Thoddiyadi. They are willing to cultivate about 182 acres of chili (8months) and 182 acres of groundnut in the same plot after the chili crop is harvested leaving the balance extent for perennials and homestead. In the first stage, these pump houses will be rehabilitated to ensure that about 182 acres of land will get irrigation water supply throughout the year for one crop of dried chili and another crop of groundnut in a year. The cycle can be continued year after year. Then the first stage of the dry chili project will commence its cultivation in July 2021 in selected 50 farmers (25 acres) using a modern technology package of drip irrigation, insect-proof net, polythene mulch for half an acre unit under above lift irrigation systems. In the second stage in January 2022, another 70 farmers (37.5 acres) will do cultivation using the same technology package. The balance acreage of 39.5 acres will come under normal ridge and furrow system cultivation in January 2022 using the new hybrid chili MICHHY1. ASMP rehabilitated irrigation system will supply the lift irrigated water for the entire 182 ac cultivation. There are altogether about 120 leading farmers who will be selected with existing plantations in the most suitable locations with maximum exposure to a large number of farmers. The project is keenly looking to get on board at least 30`% of female representation for the project. The selection of such farmers will be carried out with the participation of farmer organizations of the area, agriculture instructors, agriculture research and production assistant, agriculture scientist of PPMU, etc.

Project Management Team	A PMU was established under the Ministry of Agriculture to implement proposed project activities. **Project Director** Agriculture Sector Modernization Project Ministry of Agriculture No. 123/2 Pannipitiya Road, Battaramulla Tel: +94 112 877 550 Fax: +94 112 877 546 Email: projectdirectorasmp2@hotmail.com Web: https://www.asmp.lk/ Deputy Project Director – Northern Province Agriculture Sector Modernization Project Ministry of Agriculture Tel:+94 773 876 364 **Environmental and Social Safeguards Specialist** Agriculture Sector Modernization Project Ministry of Agriculture No. 123/2 Pannipitiya Road, Battaramulla Tel: +94 112 877 550 Fax: +94 112 877 546 Email: sanjayadms@hotmail.com Web: https://www.asmp.lk/ **Nature of Consultations and Inputs Received** Consultations with Environmental and Social Safeguard Specialist/ PMU • Great potential to increase farmers' income with less labour and inputs. • Ability to save water in the reservoir for the next cultivation season and minimize water crisis during Yala season. • Effective mechanism to attract young farmers for commercial agriculture. • Almost all the farmers cannot cultivate their entire farmland (3 acres) due to lack of water • Farmers are waiting up to the completion of the project to extend the cultivation in their entire.

DESCRIPTION OF THE EXISTING ENVIRONMENT

PHYSICAL FEATURES – ECOSYSTEM COMPONENTS	
Topography and terrain	The Topography of Mullaitivu District is flat land, gently sloping to the East and North and in the Western part, the directed towards West and South. This District has 70km of coastal belt and four lagoons namely Kokkulai, Nayaru, Nanthikadal, and Mathalan with high potentials for prawn culture. The elevation varies from sea level to 36.5 meters. Geologically, the project area belongs to the Wanni Complex of Sri Lanka. Generally, the project site is undulating terrain with a gentle slope (slope <30%) and the relief is <20m. The elevation of the project site is around 36.5m AMSL. Agro ecologically the District is located in the low country dry zone. There are two agro-ecological regions namely DL1 and DL3. The DL 1 Region is subdivided into 4 sub-regions i.e. DL1b, DL1e, DL1f, and DL1d.
Soil (*type and quality*)	According to the agro-ecological map of Sri Lanka, the annual rainfall pattern in the Mullaitivu district is around 1,270mm. Reddish Brown Earths cover 44% of the land area in the Mullaitivu District. Other soil types namely Grumusols, Alluvial Soil, Regosols, and solodized solonetz and solonchaks are scattered in the District. Some of the surfaces are eroded and it accounts for about 12% of the total land area of the District. The Reddish Brown Earths (RBE) occupy the crest and the upper and mid-slopes of the landscape. The Low Humic Gley (LHG) soils occupy the lower parts of the slope and upper parts of the valley bottom. A narrow strip of alluvial soils occurs along the natural drainage stream. Reddish-brown earth soil is a well-drained soil found on the crest, upper slope, and mid-slope physiographic positions within undulating and rolling landforms. Depth of soil varies according to the physiographic position of the landform. On hilly terrain, surface soil is eroded and quarts rich subsurface soil is present as a surface layer. The size of the quartz fraction and the amount depends on the location. The texture and structure of the sub-surface soil are gravelly sandy loam. Available soil moisture content is very low and therefore very susceptible to drought conditions. The soil is susceptible to soil erosion and should not be exposed. It has low organic matter content but is fair in available nutrient[2]. Low Humic Gley soil is a deep and poorly drained soil found in flat terrain. The texture is sandy clay loam throughout the profile. CaCO3 depositions are present in the subsurface soil as concretions and it is a potential saline soil. Available soil moisture content is medium. It has low organic matter content and low available nutrient. Soil is used mainly for irrigated paddy. The dominant soil type of the Oddusudan DS division is Reddish Brown Earths & Low Humic Gley soils with undulating terrain. Further, eroded lands and Red Yellow Latosols with flat to slightly undulating terrain were

	found within the DS division. Reddish Brown Earths & Red Yellow Latosols which are suitable for cultivation
Surface water (*Sources, distance from the site, local uses and quality*)	Mullaitivu District is having 3 major tanks, 16 medium tanks, and 208 minor tanks with command areas of 5791ha, 2794ha, and 5098ha respectively. There are no major perennial rivers that could be tapped to provide irrigation for cultivation. Many annual streams enter into Mullaitivu District from their uppermost catchment areas occupied in the Vavuniya District. The stream network has created some opportunities to form small tank cascade systems. The streams running towards the East of the Mullaitivu District end up flowing into Nayaru and Nanthikdal lagoons. Some of the major and medium tanks found in the Mullaitivu District are Iranamadu, Vavunikulam, Akkarayan, Muthuaiyankaddu, Thannimurippu, and Udayankattu. The Irrigation schemes mainly depend on rainfall-runoff and river basins for capacity filling. As there are no perennial rivers, seasonal rivers drain the rainfall water into the tank. Nevertheless, surface runoff water is stored in the irrigation tanks. Most of the canals and the streams within a 1 Km radius from the selected locations are fed by Muthiyankattu Tank. Other than these canals and streams, no other surface water sources are found within the radius.
Ground water (*Sources, distance from the site, local uses and quality*)	In Mullaitivu district deep confined aquifers of more than 60m deep have a relatively high recharge rate. The sedimentary limestone is highly faulted and it separates the aquifer into a series of isolated blocks, thus forming a number of separate groundwater basins. Based on field investigations, it is not possible to exactly quantify the availability, yield, and capacity within the project area. The groundwater table could be observed at 5-6m depth from the ground surface. The water table goes deeper during the dry season, however, it rises up during the rainy season. Groundwater is used for drinking purposes through dug wells, however, “hard water” is found in the project area. Agricultural wells are a common sight in the area which is used to extract groundwater to irrigate small areas of high-value crops or to provide a supplementary and secure source of water for the paddy crop. Closer to lagoons and the shoreline there is a possibility of contaminating groundwater by salts.
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, https://www.breezometer.com/air-quality-map/air-quality/sri-lanka/kachchilamadu shows that the Air Quality Index (AQI US) of Thaddayamalai is 32/500 and $PM_{2.5}$ is the dominant pollutant.
ECOLOGICAL FEATURES – ECOSYSTEM COMPONENTS	
Vegetation	The land Cover of the Mullaitivu District mainly includes Agricultural Lands, Home Gardens, Forest Lands, and Water Bodies. The total land area

(*Trees, ground cover, aquatic vegetation*)	of the District is 261,690ha. Approximately, 13% of the total land area consists of agriculture; Forest Lands cover nearly 69%; Home Garden accounts for nearly 6% of the total land area of the Mullaitivu district. A Study conducted based on GIS and RS Technology on land Cover Change Detection in Oddusuddan DS Division in 2016 shows that vegetation occupied 447.14 km2, representing 61.45% of the DS divisional area. Similarly, agricultural activity covers a land area of 140.91km2 which is about 19.36% of the total area. The area of bare land constituted 106.42 km2, representing 14.62% of the total land area. Waterbody has an area of 33.21 km2 (representing 4.56%). Agricultural activities include paddy cultivation and high lands are used for seasonal crops such as groundnuts, chili, long bean, and several cereal crops. Further, perennial crops such as Palmyra, coconut, Cashew are found within the selected area. The habitat downstream of the tank is dominated by low grasses and common aquatic herbs and retains water most of the time. In addition, it was observed that many Adathoda and some native species such Kohomba, Murunga, etc.
Presence of wetlands	Mullaitivu district has water bodies covering around 8% of the total land area and it is around 13% of the total protective areas of the Mullaitivu district. Annexure 6 shows the distribution of water bodies of the Mullaitivu district. These water bodies include lagoons, major and minor tanks, natural ponds, and rivers and streams. There were no Wetlands observed within a 500m radius from the selected location.
Fish and fish habitats	The economy of the Mullaitivu district mainly depends on Agriculture and fishing. Livestock and Forestry play a supplementary role in the district's economic activities. Nearly 23,680 and 4,850 families are engaged in Agriculture and fishing sector respectively. This district has a coastal belt of 70 km and four lagoons namely Mathalan, Nanthikadal, Nayaru & Kokulai which are very suitable for fishing development. These lagoons are famous for crab and prawn cultivation. There are possibilities for inland fishing development in Major Tanks. The fishing sector takes an important place in generating employment opportunities and income facilities for a considerable number of families in this district. Muthiyankattu tank and associated waterways can be identified as fish habitats around the selected area. The reservoir provides important habitats for a wide range of species including migratory birds and waterfowl, amphibians, and fish.
Birds (*waterfowl, migratory birds, others*)	The Tank and associated vegetation, natural scrublands and abandoned paddy fields can be potential bird habitats including migratory birds. Many large birds such as owls, eagles and hawks hunt rodents. Also, aquatic bird species such as cranes, storks, and herons feed on insects and crabs that pose a threat to rice production.
Presence of special habitat	Mullaitivu district has protected areas such as forest reserves, historical reserves, archaeological reserves, and water bodies. More than 99% of the

areas (*special designations and identified sensitive zones*)	protected area includes forest reserves and water bodies. Refer to Annexure 7 which shows the reserve forest of Mullaitivu district. The selected project areas have not been identified as special habitat areas. However, the tank provides important habitats for a wide range of species including migratory birds and waterfowl, amphibians, and fish. Many of these species also comprise a large part of the daily nutritional intake. The tanks also benefit neighbouring farmers by providing a habitat for bio-control agents, which consume pests such as insects, crabs, and rodents. The surrounding canals also provide a habitat for a variety of flora.
5.3 OTHER FEATURES	
Residential/Sensitive Areas (*E.g., Hospitals, Schools*)	Commonly, there are few Hindu temples are found and 3 of them are within 1 Km distance from the randomly selected location of farmlands. The closest Hindu temple is around 150 m away from the randomly selected location of Thoddiyadi farmlands. The closest school is called Eeswaran Vidyalayam and it is around 1.2 Km away from the randomly selected location of Thoddiyadi farmlands. However, there are few public service offices such as the Police station, Post office, DS divisional office, and state timber corporation are within 4 Km distance from the randomly selected location of Thoddiyadi farmlands. Commonly, there are few Hindu temples found around Thaddayamamali selected farmlands and 1 of them are within 530 m distance from the randomly selected location of Thaddayamalai farmlands. The closest school is called Eeswaran Vidyalayam and it is around 2 Km away from the randomly selected location of Thaddayamalai farmlands. However, there are few public service offices such as the Police station, Post office, DS divisional office, and state timber corporation are within 5 Km distance from the selected pump house. Randomly selected locations of Thaddayamalai and Thoddiyadi are attached in Annexure 2.
Traditional, economic and cultural activities	Out of the 27, Grama Niladhari's (GN) Thaddayamalai is one GN division in the Oddusuddan DS division which has been selected for the implementation of the Agriculture Sector Modernization Project (ASMP). There are four villages namely Thaddaiyamalai, Periyasalampan, Poonthoddam, and Murukanoor. The land area of the GN division is nearly 471.0 HA. Thaddayamalai GN division has 267 families consisting of 799 members. The number of males is 385 and the females account for 414. The population density in the division is 1.69 per hectare which is very low. The entire population was displaced and resettled gradually after the cessation of the civil war in 2009. The ethnic composition of the GN division is Sri Lankan Tamils. All 267 families are Tamils. All the families in the GN division are Hindus.

Age structure and gender distribution of the GN division's population is given below in the following table.

Table 1: Demographic data of the project area

Age	Male	Female	Total	Age	Male	Female	Total
0-05	10	09	19	19-30	177	175	**352**
6-10	20	22	42	31-60	96	114	**210**
11-18	22	26	48	≥ 60	60	68	**128**
Total	**52**	**57**	**109**	**Total**	**333**	**357**	**690**

Source: Oddusuddan DS Divisional Statistical Handbook 2020

Only 79.3% of the population is economically active in the GN division. Nearly 16.0% of the population is above 60 years of age and 13.6% of the population is below 18 years of age. The average family size in the GN division is 3.0. As per the age structure, 86.3% of the population should have registered as voters eligible for voting in the public elections. However, only 52.0% of the population has registered themselves with the Department of Elections and has the right to vote. This is equivalent to 3.8% of the total registered voters in the DS division.

Major income sources of the majority of families is crop cultivation and sale of milk and cow dunk from their cattle herd. The paddy lands in the vicinity of major tanks are cultivable in the Yala and Maha seasons. There are two Agrarian Service Centres in the DS division servicing for the farmers by providing inputs such as chemical fertilizers at subsidized prices and paddy and other seeds. There are 10 small-scale enterprises such as mills, shops, and tailoring in the GN division.

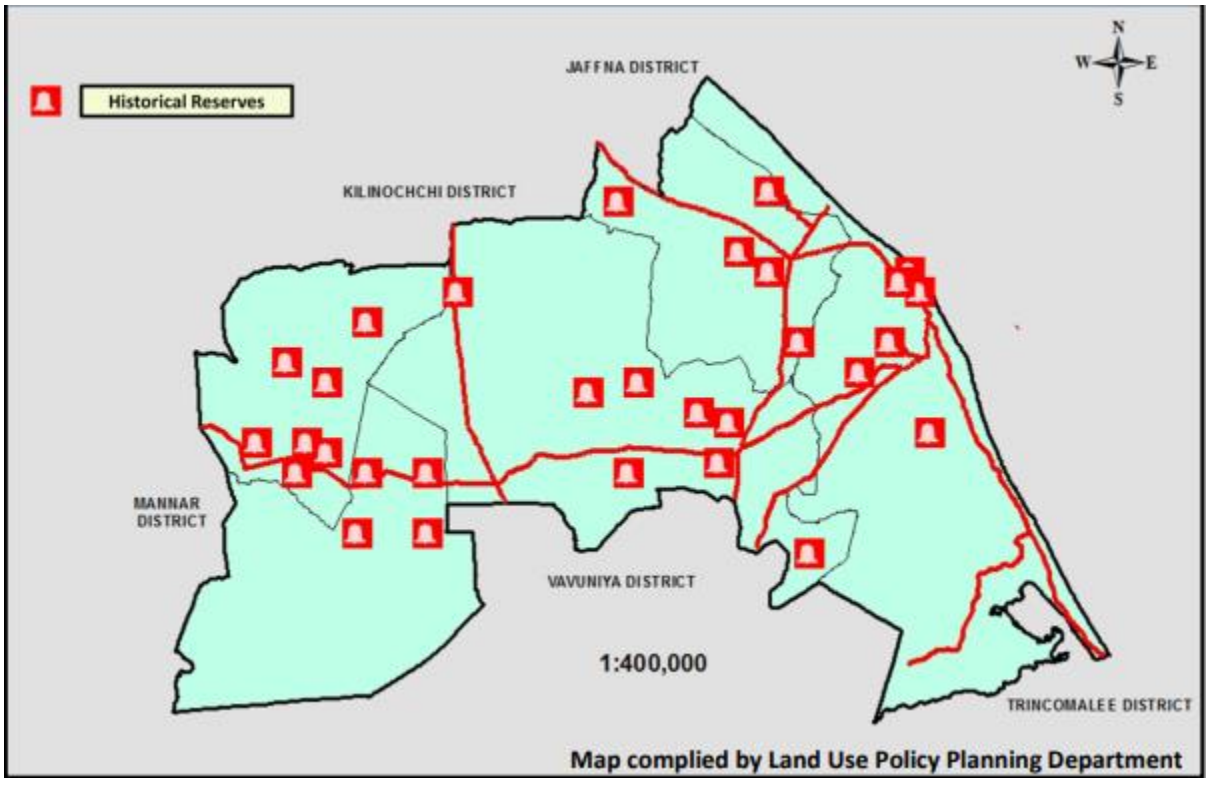
Accordingly, there are 122 families out of 267 are receiving Samurdhi in the GN division. Almost 44.0% of the families are living in poverty and receiving Samurdhi monthly cash grant. Twenty-five families or 9.0% of the families are receiving rupees 1,500 per month and 11.9 % of the families are getting rupees 2,500 per month and 23.1% of the families considered as most vulnerable are receiving rupees 3,500 per month (Divisional Statistical Handbook 2019). Further, there are 92 members in the division are receiving P.A.M.A grant provided by the Government for helpless people. Moreover, there are 39 widows, 22 orphans who lost their both parents, and 15 disabled people in the division.

There are two sports clubs in the GN division. They are Barathy and Kalaimagal sports clubs. The major commercial activities are conducted by the Muthiyankaddu MPCS located in Vithiyapuram having 16 branches in the DS division. One such branch located in the Muthaiyankaddukulam GN division is not functioning currently. Rural Development Society (RDS) and Women Rural Development Society (WRDS) are social-based organizations. 24 RDS and 25 WRDS are functioning in Oddusuddan D.S Division. In the Thaddayamalai GN division, both RDS and WRDS are functioning. Moreover, there is a youth club and a sports club in the GN division. There is three registered Hindu temple in the GN division.

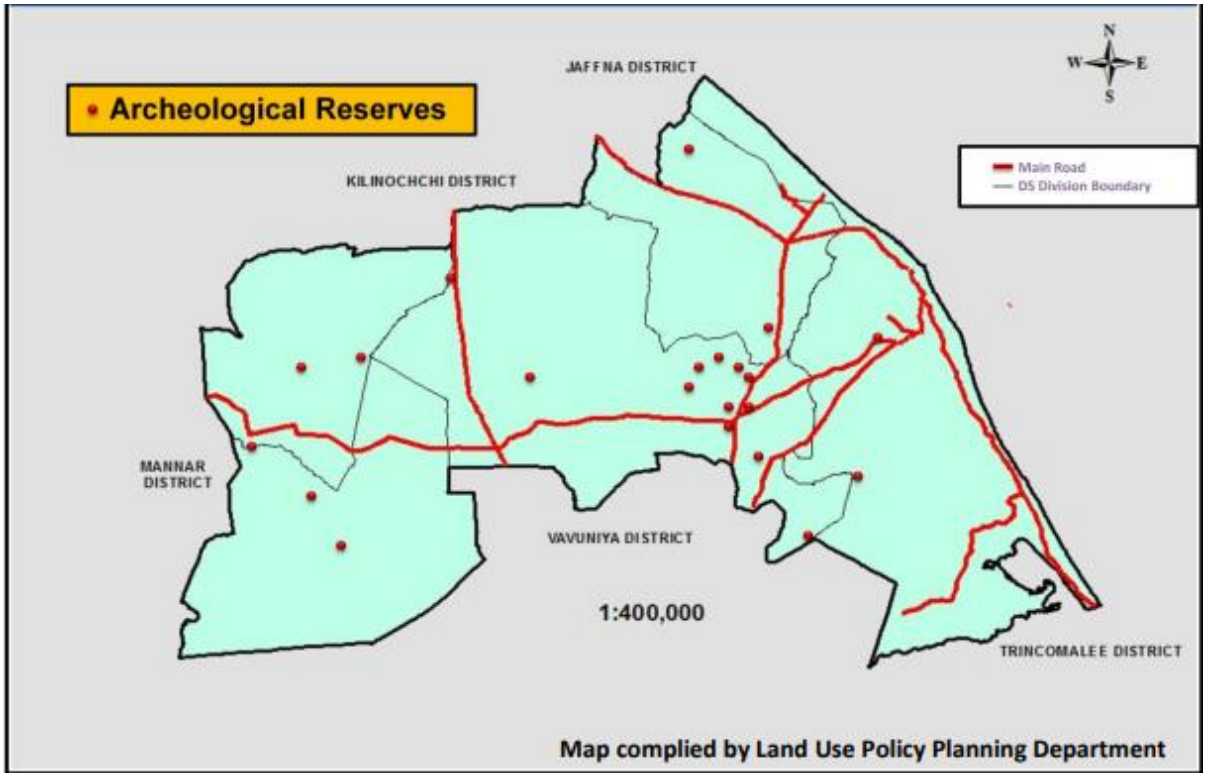
	Community participation in the above community organizations is satisfactory.
Archaeological resources (*Recorded or potential to exist)*	Figure 1 shows the archaeological resources of the Mullaitivu district. As per the map, there are 8 archaeological reserves found in the Oddusudan DS division, and most of them are located nearby DS divisional office. Further, the map of the historical reserve shows there are few historical reserves in the Oddusudan DS division Proposed locations are fed by the pump houses 4&5, and Pumphouse 6&7 which are attached to the RB canal of the Muthiyankattu tank, and no archaeological reserves were found. However, two religious places were found along the RB canal, but not affected by the rehabilitation activities.

Figure 2: Historical and Archaeological reserves – Mullaitivu district

Historical reserves



Archaeological reserves



DESCRIPTION OF PROPOSED AGRICULTURAL ACTIVITIES

6.1 Cultivation	
Existing Condition of the Crop	The subproject concerns the introduction of new technology for the farmers who are practicing the traditional irrigation system for Chilli cultivation. The screening revealed that the existing watering system is a high-cost method and it increases water losses and wastes more time. The selected farmers will be encouraged to obtain high yield with more quality from their cultivations with improved irrigation system and it will be indirectly benefitted for customers too since they have the opportunity to buy high-quality fruit products at the local market. Presently, there are some farmers cultivating chili, and used land slots are low compared to the other crops. This is mainly due to the lack of water availability. Farmers were further discouraged due to low yield due to pests and diseases, moisture stress, shortage of availability of quality seeds, high inputs costs, the unstable market situation with the Government import policy. As a result, farmers withdrew themselves from the chili cultivation. Only uplands are used for Chilli cultivation and they will be provided the required water with the rehabilitation of lift irrigation system. The land area that is being used for chili cultivation in this area is an average of 1/2 acres. Marketing and all other activities related to Chili cultivation are at present attended by farmers individually with no collective bargaining for sales. The closest market for these selected

	farmers is Oddusudan and the Price fluctuation is the major issue faced by Farmers. At the present market price of 1 kg of dried chili is about 550 LKR. Furthermore, a short supply is direct to the retail market, mainly to the local boutiques. Chili cultivation has always been associated with inappropriate and indiscriminate use of pesticides and high labour input for weed control, both of which have significantly contributed to increasing the cost of cultivation. The continuous and indiscriminate use of pesticides has major drawbacks such as adverse effects on human beings and other non-target organisms, development of pest resistance, the outbreak of secondary pests, and environmental pollution. However, agrochemicals have not shown successful results for controlling the leaf curl complex. At present farmers prefer to produce green chili than dry red chili due to high price, ready market, high return, lack of availability of drying facilities, high labour input for drying, etc. For dry chili, production harvesting should be done at the proper stage more than 80% red coloured pods, and the use of tarpaulins when dryers are not available. This sub-project encourages Chilli crop production in the dry zone of Sri Lanka. The introduction of a drip irrigation system will save water and it will be beneficial to conserve the groundwater table of the area. Further, the current watering system (Irrigation) encourages spreading diseases since the irrigated water flows over the total cultivation land.
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	In general, farmers prepare nursery beds width of almost 0.9m (3ft) in well-drained virgin soil. Farmers sterilized soils before sowing by burning the nursery bed with rice husk and rice straw. At present some farmers use seed treatment with fungicides recommended by the DOA or chemical companies. Usually, nursery beds are prepared few days before seeding. Application of compost or any other organic manure is a common practice. In addition, the application of recommended fungicide for control of damping-off and anthracnose is also practice. After seeding seeds are covered with a layer of soil and straw. Thereafter, remove the mulch 7-10 days after sowing before the seedlings overgrow through the mulch. To avoid hot sunlight and heavy rain cover the bed with Cajon leaves or transparent polythene. Then almost one week before transplanting control water application. When the seedlings are ready for transplanting planting will be done with the onset of rain. Land preparation is done by using agricultural machineries such as ploughing or disking for the cultivation of OFCs and vegetables. In general, raised beds are prepared width of 0.9 m (3ft) to facilitate proper drainage due to high clay in paddy soils. Some farmers make farrows without making beds. The majority of farmers make planting holes approximately

	with the spacing of 50x50cm or 60cm x50cm. In general, compost and chili chemical fertilizer mixture are applied in the hole.
Water requirement[3]	Water is applied immediately after transplanting. After planting, they apply different chemical fertilizers every 3-4 weeks. Though flood irrigation is popular among farmers it has created many problems due to poor drainage of soils found in the area. Excess water use due to flood irrigation could be considered as the main reason for the increase of diseases and subsequent low yield. New low-pressure drip and mini-sprinkler irrigation systems that conserve water and prevent laminar erosion; precise application of fertilizers using the low-pressure irrigation systems and based on soil and foliar analyses.
Use of fertilizer and pesticides and weedicides	Farmers use chemical fertilizer for Chilli cultivation. Urea is used as the nitrogen source, Rock Phosphate and Triple Super Phosphate are used as the phosphate source and Mutreate of Potash is the Potassium source. Leaf Curl Complex (LCC) was identified in the 1980s is considered a major threat for chilli cultivation particularly in the dry zone of Sri Lanka. Chilli leaf curl complex is prominent especially in Yala season than in Maha season. Therefore, the objective of the chilli hybridization and selection programme of the DOA targeted to develop new chilli varieties with tolerance/resistance to leaf curl complex (LCC), Choanephora blight (Choanephora spp.), Anthracnose (Colletotrichum capsica), Leaf spot (Cercospora capsica) etc. In addition, insect pests are also major constraints to the production of chilli in Sri Lanka. It reduces not only the production but also the quality of pods. Important pests reported in chilli are Trips (Scirtothrips dorsalis), Mites (Hemitarsonemous latus), Aphids (Aphis gossypii, Myzus persicae), White fly (Bemisia tabaci), and Pod borer (Spodopetera litura / Helicoverpa armigera) etc. Chilli leaf curl complex identified as due to damage by thrips (Scirtothrips dorsalis), mites (Hemitarsonemous latus) and aphids (Aphis gossypii, Myzus persicae) and viruses transmitted by white fly (Bemisia tabaci). Therefore, farmers apply various agrochemicals available in the market. Chilli cultivation has always been associated with inappropriate and indiscriminate use of pesticides and high labour input for weed control, both of which have significantly contributed to increasing the cost of cultivation. The continuous and indiscriminate use of pesticides has major drawbacks such as adverse effects on human beings and other non-target organisms, development of pest resistance, the outbreak of secondary pests and environmental pollution. The project proposed by the DOA is a selection of quality seeds, use appropriate nursery management techniques, early planting, use of barrier crops, use of recommended fertilizer, use of sticky traps, use of

[3] https://doa.gov.lk/FCRDI/index.php/en/crop/42-green chili-e

	mulches, spraying of water, control weeds, adequate irrigation and use of insect-proof net.
Harvesting	At present farmers prefer to produce green chilli than dry red chilli due to high price, ready market, high return, lack of availability of drying facilities, high labour input for drying etc. For dry chilli, production harvesting should be done at the proper stage of more than 80% red coloured pods and the use of tarpaulins when dryers are not available.
Post-harvest storage and transportation	This Chili is mainly used as dry chili and a quality drying process is important. Therefore, the harvest should be transported to the processing centre after harvesting. Grading, drying, and packing of the dried chili is an essential part during the post-harvest period as it helps to cut down the losses and increase the high quality and value. Therefore grading, drying, packing, and transporting should be undertaken with improved technology. These technology facilities will be available for farmers.
Other factors	
Solid waste	The solid organic waste is generated as crop residuals and at the post-harvest period. All the crop residuals and post-harvest waste should be burnt or buried under the soil to keep the hygienic condition of the farmlands.
Wastewater	Due to the application of an integrated pest management mechanism, soil and ground/surface water pollution will be minimalized. ASMP will conduct awareness creation and training programs for both farmers as well as the officers regarding integrated pest management as per the Pest Management Plan (PMP).

APPLICATION OF AN INTEGRATED PEST MANAGEMENT PRACTICES FOR DRY CHILLI CLUSTER

SN	Crop stages	IPM Practice/ practices	Impacts of IPM Practices	Benefits
1	Pre-Land preparation stage	• Proper removal of debris, residues, and host plants (Buring, dumping, compost making) - Keep land clean. • Deep ploughing during dry seasons • Field disinfection by burning straw or paddy husk or spreading transparent polythene cover	• Fewer incidents of pests, diseases, and weeds • Improvements in aeration in the soils	Farmers maintain pests and disease-free fields
2	Land preparation stage	• Deep ploughing and making soils into fine tilth using a rotavator. • Removal of weeds and their residual parts (tubers and rhizomes etc.) • Sun drying, adding cow dung and compost	• Destructions of pests (eggs and cocoon and adult) • Controlling weeds growth • Improve the drainage	• A low incident of pest attack • Improved drainage leads the healthy plants and minimizes the virus wilt diseases
3	Planting stage	• Growing resistance variety, using disease-free seeds, seed treatments and carrying out good nursery management (Sanitation of nursery by burning of paddy husk and straw). • Removal of unhealthy plants	Healthy planting materials	Low incidents of pest and disease attack
4	Seedling stage/ Planting stage	• Using appropriate spacing and timely planting (Collective planting by all farmers at a particular time frame in early in the season) • Border planting (selecting insect-repelling plants)	Pest and disease-free fields	Low incidents of pest and disease attack

SN	Crop stages	IPM Practice/ practices	Impacts of IPM Practices	Benefits
5	Juvenile stage	• Identifying pests, diseases, and proper removal of infected plants. • Controlled watering by using a sprinkler system • Using insect protective nets or clothes • Proper manual weeding	• Pests and disease-free fields • Weeds free fields	Low incidents of pest and disease attack
6	Flowering stage	• Identifying pests, diseases, and proper removal of infected plants. • Removal of the larva of pests (Manual collection) • Controlled watering by using a sprinkler system	• Pests and disease-free fields • Weeds free fields	Low incidents of pest and disease attack
7	Maturity stage	• Identifying pests, diseases, and proper removal of infected plants. • Controlled watering by using a sprinkler system	• Pests and disease-free fields • Weeds free fields	Low incidents of pest and disease attack
9	Harvesting stage	• Identifying pests, diseases, and proper removal of infected plants. • Controlled watering by using a sprinkler system	• Pest and disease-free fields • No pest and diseases spreading	Low incidents of pest and disease attack
10	Post Harvesting stage	No post-harvest	----------	----------
11	Storage stage	No storage	----------	----------
12	Transport stage	Proper packing in hygienic gunny bags and transport	No pest and diseases spreading	Low incidents of pest and disease attack

SN	Crop stages	IPM Practice/ practices	Impacts of IPM Practices	Benefits
13	Marketing stage	No	No	No
14	Any others	Inorganic fertilizer and chemicals are used when there is a necessity only	Pest and disease-free fields	Low incidents of pest and disease attack

PUBLIC CONSULTATION

The consultation was held with the support of the project director, project engineer, and agricultural scientist of the Northern Province and the project coordinator of the selected DS division. Overall project implementation and future plan were discussed with them and deep level information was collected. They were trying hard to rehabilitate and distribute water as soon as possible to the beneficiaries.

Farmer gatherings were not conducted due to the pandemic situation. However, on-field discussions were conducted with benefitted farmers while ensuring COVID 19 safety precautions. The conclusion of the consultation was clear, and it was to rehabilitate the pump house and provide water immediately starting from next season onwards. Further, the following comments were taken during the discussions held with farmers in the selected area.

- **Water availability and accessibility**

All above-selected farmlands are uplands and the RB canal of the Muthiyankaddu tank is the main water source for the water. These lands will be fed by lift irrigation and required pump houses will be rehabilitated before commencing the dry chili project. Further, overhead tanks will be introduced to afford the required pressure for drip irrigation.

- **Other ASMP projects**

Beneficiaries are well aware that the old pump houses of Thoddiyadi and Thaddayamalai to be rehabilitated before commencing the dry chili project. Further, the Dry chili processing centre is one of their keen hope to produce high-quality dried chili. Some beneficiaries already cultivating Chili up to 0.25-0.5 acres along with the other crops. They are very keen to expand the chili cultivation once water accessibility is confirmed and willing to take technical support towards the high yield. Market accessibility was highlighted during the discussion and it was mentioned that the closest market is Oddusudan. Oddusudan market price per 1Kg of dry chili is around 550 LKR and farmers looking to have a higher and stable prices in the future.

- **Current water usage**

All most all beneficiaries have their own open wells/agro wells or tube wells for the cultivation and maximum utilization ensure 1-1.5 acres of different crops. They cultivate two seasons per year using these resources and maximum land usage is limited to 1-1.5 acres. The water level is 6-7 m below the ground level and it goes deeper with the dry season. There were few farmers who take pump water from the RB canal using their own pumps. It was clearly communicated that all beneficiaries will get water from the rehabilitated pump houses and will be distributed through the PVC pipelines.

Figure 3: Open wells

- **Issues bound with flood irrigation system**

Excessive flood irrigation creates many problems such as waterlogged conditions, poor crop performances, high disease incidence and waste of water, high soil erosion due to prolonged flood irrigation were identified in underwater conservation and management discussions. Bringing water to inaccessible lands was a prioritized question raised by farmers and the introduction of water-conserving and low-pressure drip and the mini sprinkler systems was highlighted during the discussion. However, technical knowledge on implementation and continuity of mini sprinkler systems needed to be given.

- **Failure on export market**

One of the main objectives of the project is to full fill the local market-based production and doubt were highlighted that what will happen if local market demand is lower than the supply. Consequently, it should be searched that are there any options available in the local market for excessive production?

- **Infrastructure development**

Some farmers looking to bring water to lands that are not flooded by the existing irrigation systems. Hence water and drainage work is required to bring water to farms and to avoid flooding and waterlogging. Further construction of post-harvesting processing centre and solar-powered energy project was highlighted during the discussions.

Further, there were points highlighted during the discussions such as the use of weedicide, poor and inefficient land utilization pattern, attention for micronutrient fertilizers, and knowledge of farmers for pest management mechanisms for better crop production. There is a high tendency of using organic fertilizers and most of them are producing compost on their own. Further, livestock farming is found at each beneficiary.

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

Figure 4: Onsite discussions with farmers


- **Existing environmental issues**

Some farmers have raised their existing issues related to the agricultural activities during the public consultation such as water scarcity and accessibility difficulties. Unavailability of enough water is a major issue and they are extracting groundwater using agro wells and tube wells. Further, it is 6-7 m deeper from the ground level.

Pump house and the farmlands are accessible through gravel roads and most of these are eroded during rainy seasons. All these roads are to be developed to ensure the smooth transportation of goods. Further, it was highlighted that elephants are damaging the crops 3, 4 times per year. In addition, crop damages from monkeys were highlighted by few farmers.

Table 2: Community Consultations' outputs

Name	Details	Matter Discussed/Suggestions
R. Ananatharupan (Farmer)	He is the secretary of the Ganesapuram groundnut producer farmer society. He has four children and has 3 acres own farmland and 6 acres extent rented land.	Only a part of the land is cultivated twice a year using open well water and the water from pump 4. Currently, pump 4 is maintained by 4 farmers and they use the pump for their cultivation activities for around 12 acres. The current water level of the open well is around 20 feet below the ground level. However, he is getting piped water for drinking and eagerly looking to have the pump house in place to expand the cultivation. Groundnuts, Green peace, and green chili are the main crops he is entitled to, and the closest market is Oddusudan. Livestock farming is also continuing with the cultivation activities.
K. Karunananthan (Farmer)	He has 4 family members including himself and he is having 6 acres of farmland including 3-acre paddy land.	Only a part of the highland is used to cultivate per season. He is also getting water from the No. 4-pump and his open well. Only two seasons are cultivated. Chili, Kurakkan, Long bean, and green pea are his main crops and waiting to cultivate whole land (3 acres) under improved irrigation supply.

Name	Details	Matter Discussed/Suggestions
S.Nickelace (Farmer)	He has 3 family members and 3 acres of cultivable land available.	Similarly, only a part of the land is used to cultivate due to the un availability of water. Currently, he uses water from an open well and suggests completing the project asap.
Pubalasingam (Farmer)	He does not have relatives with him and he lives alone	He is also cultivation a part of his upland and he uses water from the existing pump 4. He has contributed up to some extent with other shareholders to maintain this pump and use water for their individual cultivation activities.
M. Suthagar (Farmer)	He is a divorced farmer who has one son and one daughter. He is having 3 acres of farmland	Only a part of the land is cultivated twice a year using open well water. The current water level of the open well is around 20 feet below the ground level. However, he is getting piped water for drinking and eagerly looking to have the pump house in place to expand the cultivation. Groundnuts, Green pea, and green chili are the main crops he is entitled to, and the closest market is Oddusudan. Livestock farming is also continuing with the cultivation activities.
S. Vishwanathan (40 Years old Farmer)	He has six family members including himself and he is the chairman of the Thaddayamalai farmer organization. He is also having 3-acre farmland and only 0.5 acres of the land slot is used to cultivate per season.	Only two seasons are cultivated, and he is pumping water from the RB canal using his own pump. Chili, Kurakkan, Long bean, and green pea are his main crops and waiting to extend the cultivation up full land (3 acres) per season. This farmer can expand his cultivation lands up to 3 acres. Further cultivation frequency will be thrice per year if the project is on board sooner.
S. Kopalasingham (54 Years old Farmer)	He is having 6 family members including himself. He is the one who donated a land plot to build the overhead tank of pump 6	He is willing to donate 10*10 m2 of land to construct the overhead tank of pump 6. He is donating this slot from his 3-acre deed land.

ENVIRONMENTAL EFFECTS AND MITIGATION MEASURES

SCREENING FOR POTENTIAL ENVIRONMENTAL IMPACTS

	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?)	√		1) Low-moderate	The existing land preparation and flood irrigation system will be changed. Land preparation techniques will focus on reducing the effects of flood irrigation. No significant disturbances for any existing land use or waterbodies and no negative impact causes are anticipated.
2	Will the Project involve use, storage, transport, handling or production of substances or materials which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health?	√		Moderate	Pesticides, weedicides, fertilizers, and some additional chemicals will be used and there is a possibility to have chronic impacts due to the long-term usage. However, proposed techniques will reduce the number of chemicals and fertilizers use and modern techniques/methods will be introduced to increase productivity by other means.
3	Will the Project produce solid wastes during construction or operation?	√		Low	Lands clearing and preparation stage there can be an insignificant solid waste generation. During the operation, solid organic waste will be produced as crop residuals.

	Screening question	Yes	No	Significance of the effect (Low, moderate, high)	Remarks
4	Will the Project release pollutants or any hazardous, toxic or noxious substances to air?		√	Moderate - high	Pesticides, weedicides will be used and released into the air. Possibility to have significant impacts on other flora & fauna.
5	Will the Project cause noise and vibration or release of light, heat energy or electromagnetic radiation?	√		Low	There will be an insignificant noise generation from machinery during land preparation and crops transportation.
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, including pesticides and weedicides during cultivation, may contaminate land or water. It will have an impact on the surface and groundwater in surrounding areas if not properly managed.
7	Will the project cause localized flooding and poor drainage during construction Is the project area located in a flooding location?		√		The project will not cause localized flooding
8	Will there be any risks and vulnerabilities to public safety due to physical hazards during construction or operation of the Project?		√		No severe health and safety hazard was identified. Better hazard identification and prevention and corrective measures during operation will eliminate the risk associate.

	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	Chilli transportation from cultivated lands to post-harvesting storages and transportation from post-harvesting storages to shipments/or any other location will be taken place. No creation of significant environmental problems.
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?		√	**N/A**	
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?		√		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?	√		**Low**	No important or sensitive areas on the project location are affected by the project. Wash offs from material stockpiles, sedimentation of surface waterways especially RB of Muthiyankattu.

	Screening question	Yes	No	Significance of the effect (Low, moderate, high)	Remarks
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**	Muthiyankattu tank and surrounding vegetation are an ideal habitat for aquatic birds.
14	Is the project located in a previously undeveloped area where there will be loss of green field land		√		No such green fields are encountered.
15	Will the project cause the removal of trees in the locality?		√		No removal of trees is required during PVC laying as the existing width of the road and canal will not be changed.
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 historical importance identified
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?		√	**N/A**	

	Screening question	Yes	No	Significance of the effect (Low, moderate, high)	Remarks
18	Are there any areas on or around the location which are densely populated or built-up, which could be affected by the project?		√		No densely populated or built-up areas are affected by the project.
19	Are there any areas on or around the location which are occupied by sensitive land uses e.g. hospitals, schools, places of worship, community facilities, which could be affected by the project		√		No sensitive land-uses in the vicinity are 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?	√		**Low**	RB of Muthiyankattu Tank may have a low impact only during the ongoing period.
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?		√		No location where any environmental standards exceeded or have environmentally polluted.

ENVIRONMENTAL MANAGEMENT PLAN

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	• 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 on the project, purpose and design, and outcomes with a comprehensive discussion • Communication and training activities focusing on women, youth, and farmers who are poor in communication • The contractor should take note of all impacts, especially temporary issues and safety hazards that will be of concern to the cropping pattern of the farmers. All possible impacts will be mitigated as stipulated in the EMP to mitigate them • The contractor will maintain a log of any grievances/complaints and actions taken to resolve them • A copy of the EMP should be available at all times at the project supervision office on site
2	Spreading COVID 19 virus	• All activities	• The contractor must ensure that all workers, including managers, are well trained on COVID 19 safety precautions published by the health ministry.
3	Lack of knowledge on basic harvest and post-harvest practices lead to low quality	• Mechanical scarring and bruising quality defects • Cleaning the selected product	• Maintain good hygiene and good housekeeping • Practical training for the selected farmers on basic harvest and post-harvest practices to protect the quality of the Maintain good hygiene and good housekeeping

№	**Potential Environmental Impacts and Risk Level**	**Key project activities causing the impact**	**Mitigation Measures proposed and action to be implemented by the Contractor**
	of product and high amount of waste	• Storing the harvested product before delivery to the drying facility • Discarding poor quality Chili and other waste organic materials in the field	• Practical training for the selected farmers on basic harvest and post-harvest practices to protect the quality of the product and to assure the packing facility receives only clean and viable product • Avoiding mechanical scarring and bruising quality defects • Provide packaging materials and storage facilities
4	Activities related to installation of drip irrigation systems	• Installation of drip irrigation systems • Fixing water pumps and electricity supply • Plumbing works	• Carry out installation works during off cultivation seasons • Solid waste generation during installation should be minimized and disposed generated waste with care • Potential damages to pipe system should be minimized by burying or covering the pipe distribution
5	Spreading of Invasive Alien Species	• Vegetation clearing • Cultivation of Chili	• Provide DOA certified Chilli variety only to farmers • Good housekeeping • Manual and integrated weed control • Prevent weed spreading via organic manure (Compost) by periodic inspection and manual removal after application
6	Noise Pollution & Vibration that can affect nearby structures	• Use of tractors and agricultural equipment/ machineries • Transportation of products from farmlands to post harvesting storages	• Working time for noise/vibration generation activities should be restricted and carried out only from 6 am to 6 pm. • Noise related to all agricultural improvement activities should not exceed 55 dB (daytime) and 45dB (night time) as practicable as possible. • Equipment and machinery should be maintained in good condition. • It is highly recommended to do transportation during daytime only

№	**Potential Environmental Impacts and Risk Level**	**Key project activities causing the impact**	**Mitigation Measures proposed and action to be implemented by the Contractor**
7	Contamination of water, land and air during usage of chemicals (pesticides, weedicides.)	• Land preparation • Vegetation clearing • Use of fertilisers • Use of chemicals for specific requirements	• Introduce technological methods to reduce dosage amounts • Awareness of usage time, handling, and storage • Guidance on a suitable time for the usage of chemicals • Promote organic fertilizers • Formulation of fertilizer regimes based on complete soil tests and foliar analysis
8	Water Quality	• Cultivation of Chilli	• Excess water extraction is to be cut down to preserve the ground water table • Proper introduction of drip irrigation practices instead of flood irrigation to preserve water and use of modern techniques to reduce water consumption • Proper irrigation practice to avoid excess water drain back to the RB canal
9	Solid Waste Disposal	• Organic materials in the field • Waste from weed control activities	• Burnt to maintain the farmlands' hygienic condition • Use post-harvest waste for compost production
10	Spread of crop related diseases among other flora species	• Throughout the cultivation period	• Provide technical guidance on the application of chemicals including dosage, suitable time, and frequency • Pest population and pest damage surveys to assess pest threshold status for application of pesticides
11	Health hazard	• Use of agrochemicals (fertilizers, pesticides, weedicides etc.)	• Carry out proper hazardous identification and risk assessment of all proposed activities • Training and awareness on safe chemical handling • Implement proper health and safety protocols by elimination, substitution, engineering controls, administrative control, and provide personal protection equipment (PPEs). Provided

№	**Potential Environmental Impacts and Risk Level**	**Key project activities causing the impact**	**Mitigation Measures proposed and action to be implemented by the Contractor**
			necessary PPEs (basic should include gloves, goggles, masks, and protective clothing) • A safety inspection checklist should be prepared to take into consideration what the workers are supposed to be wearing and monitored • Pest and disease control according to the international standard and pest management action plan prepared by ASMP • Formulation of fertilizer regimes based on complete soil tests and foliar analysis • Pest population and pest damage surveys to assess pest threshold status for application of pesticides
12	Temporary loss of livelihood due to inability to grow crops during Installation works	• Installation of dripirrigation systems	• Implement project activities during the off-season of upland cultivation. • Carry out sub-project activities to a strict timetable to prevent excessive losses to the farmers

COST OF MITIGATION

№	**Environmental mitigation measure**	**Cost (LKR)**	**Remarks**
1	Information Boards, leaflets	60,000	Awareness leaflets for organic cultivation practices and pest management
5	Waste removal from site	40,000	Waste from vegetation clearing, site preparation, labour camps
6	Training of Farmers and Village level stakeholders on new technological applications	200,000	Should be scheduled to a few sessions

CONCLUSION AND SCREENING DECISION

Summary of environmental effects:

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

Key project activities	Potential Environmental Effects	Significance of environmental effect with mitigation in place4
DURING AGRICULTURAL ACTIVITIES		
➢ Land preparation • Fencing (if applicable) • Land preparation • Micro levelling • Drainage Labour • Raised Beds • Preparation of pits & planting • Planting materials • Fertiliser in the planting pit • Planting Tools	Solid waste generation	NS
➢ Introduction of basic flood prevention and drainage field techniques • Quick water evacuation ditches • Surface drainage techniques (removal of wet spots)	Less water consumption, less soil erosion	SP
➢ Use of fertilisers and chemicals • Application of fertilizers • Application of weedicides • Application of pesticides	Land, water an air contamination	NS

[4] 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

Key project activities	**Potential Environmental Effects**	**Significance of environmental effect with mitigation in place4**
• Other Spray		
➢ Manual weed control	Solid waste generation	NS
➢ New and improved quality enhancing technologies • Introduction of water conserving and drip irrigation systems • Insect proof net • Polythene mulch	• No such harm, less use of water and Less contamination of agro-chemicals on Land, air and water • Less insect impact	SP

EMP IMPLEMENTATION RESPONSIBILITIES AND COSTS

The overall responsibility of ensuring compliance with safeguard requirements rests with the PMU while the contractor will be responsible for implementing the provisions of the EMP. In addition, the PMU will be directly responsible for reviewing the proposed design to ensure that all design-related mitigation measures mentioned herein are implemented. The overall supervision will be carried out by the in-house staff of the PMU supported by the Provincial Project Agro Specialist, who is responsible for the overall design and supervision of the proposed project. Any consequent design modification will be reflected in the project cost.
Environmental & Social monitoring will be carried out largely through visual observations and compliance monitoring using the checklist provided in the EMF & RPF by the Provincial Project Agriculture Specialist of the PMU and the contractor jointly. The Environmental and Social Safeguards Specialist will need to visit the site quarterly and report on issues and performance on ESMP implementation to the PMU.

SCREENING DECISION RECOMMENDATION

This project does not require environmental clearance under national environmental regulations. No other approval is required due to the spread and magnitude of the project. The project will have negligible environmental impacts, mostly limited to the cultivation period. The impacts on the physical and biological environment are virtually none. The majority of the potential adverse effects can be classified as general agricultural-related impacts and can be mitigated on-site with Good Agricultural Practices. These potential impacts are temporary in nature. It is recommended to start the project work in the off-season for paddy cultivation and avoid night-time work. Implementation of the Environmental Management Plan is sufficient to mitigate the identified impacts.

DETAILS OF PERSONS RESPONSIBLE FOR THE ENVIRONMENTAL SCREENING

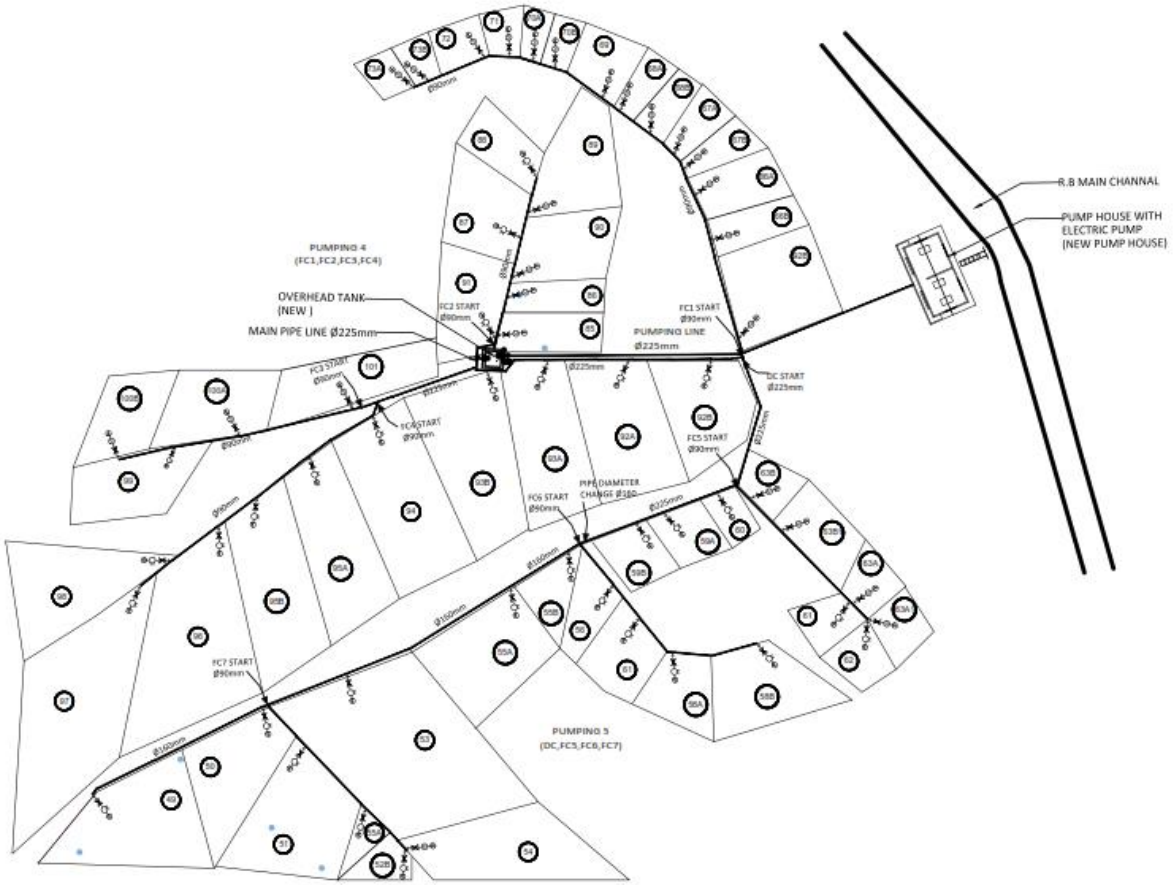
Screening conducted and reviewed by **D.M. Sanjaya Bandara** **Environment and Social Safeguard Specialist** **Agriculture Sector Modernization Project** **Name/Designation/Contact information**	**Date** **October 2021**  **Signature**
Screening report recommended by **Dr. Rohan Wijekoon** **Project Director** **Agriculture Sector Modernization Project** **Name/Designation/Contact information**	**Date** **October 2021**  **Signature**

Annexure 1: List of References

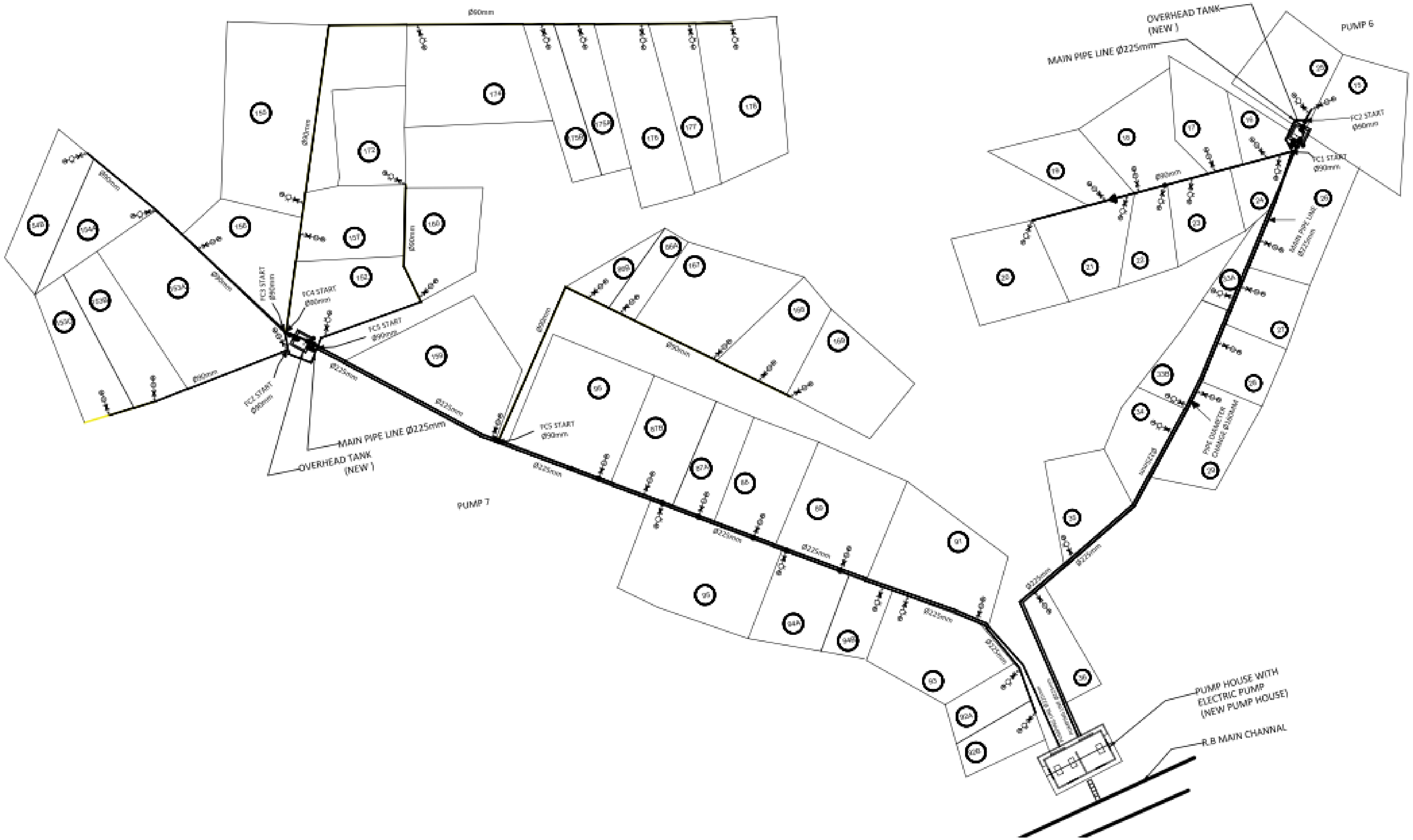
1) https://luppd.gov.lk/images/content_image/downloads/pdf/llrc_mullaitivu.pdf
2) Natural Resources Management Centre, Department of Agriculture, Peradeniya

Annexure 2: Project location maps

4&5 Area

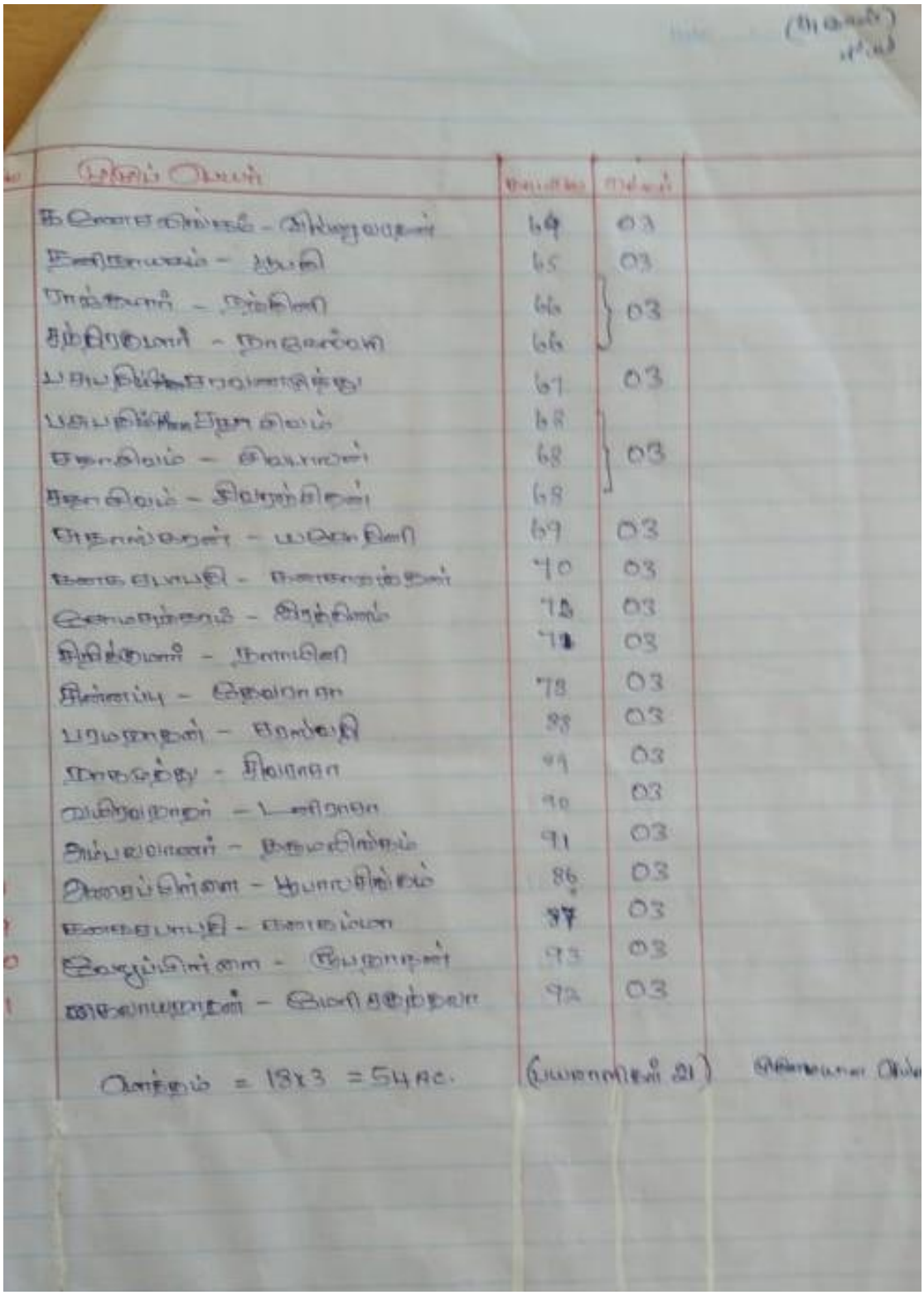


6&7 Area

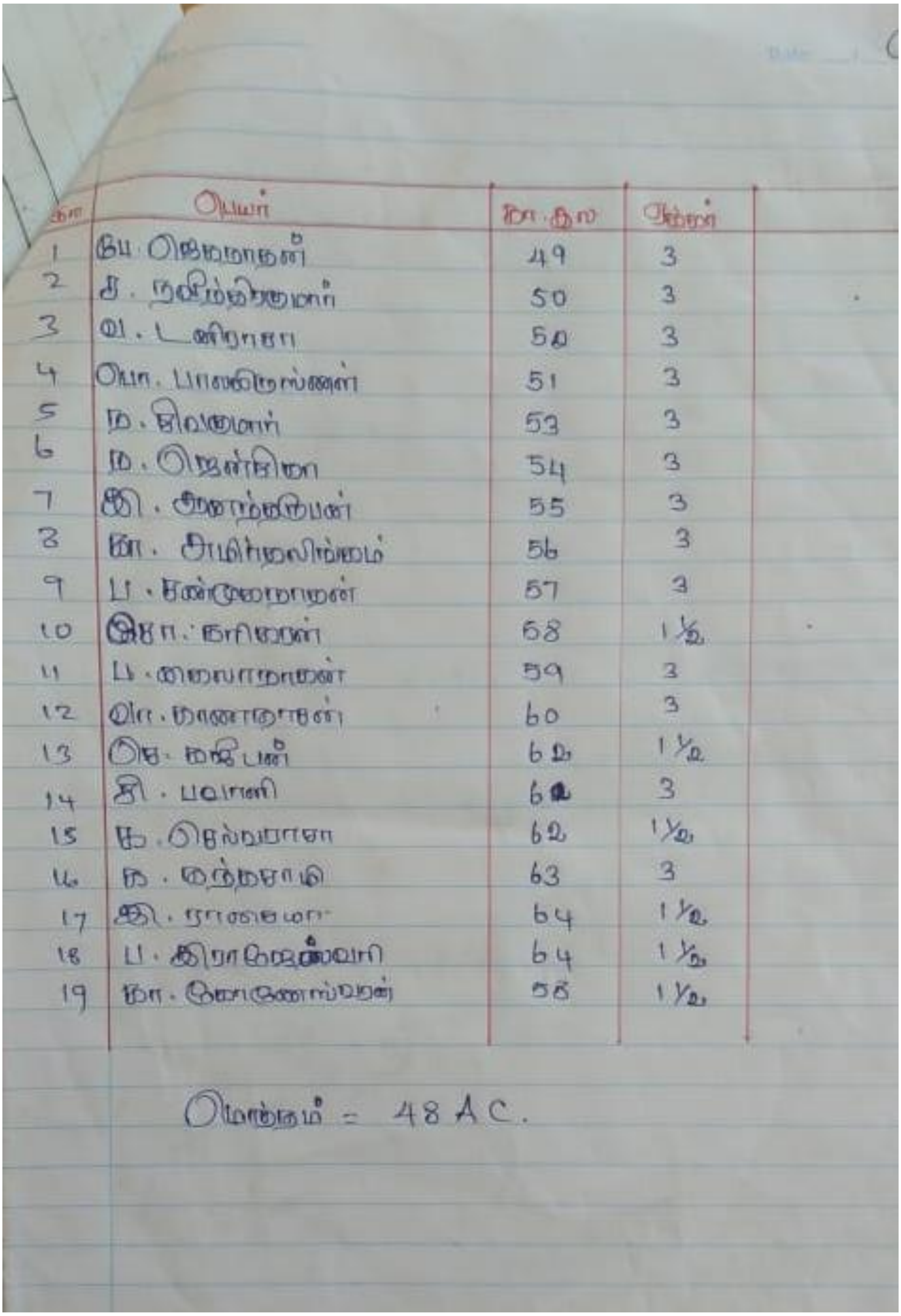

OVERHEAD TANK (NEW)
MAIN PIPE LINE Ø225mm
PUMP 6
PUMP 7
PUMP HOUSE WITH ELECTRIC PUMP (NEW PUMP HOUSE)
R.B MAIN CHANNAL
MAIN PIPE LINE Ø225mm
OVERHEAD TANK (NEW)

Annexure 3: Beneficiaries list

Beneficiaries of Pump 4



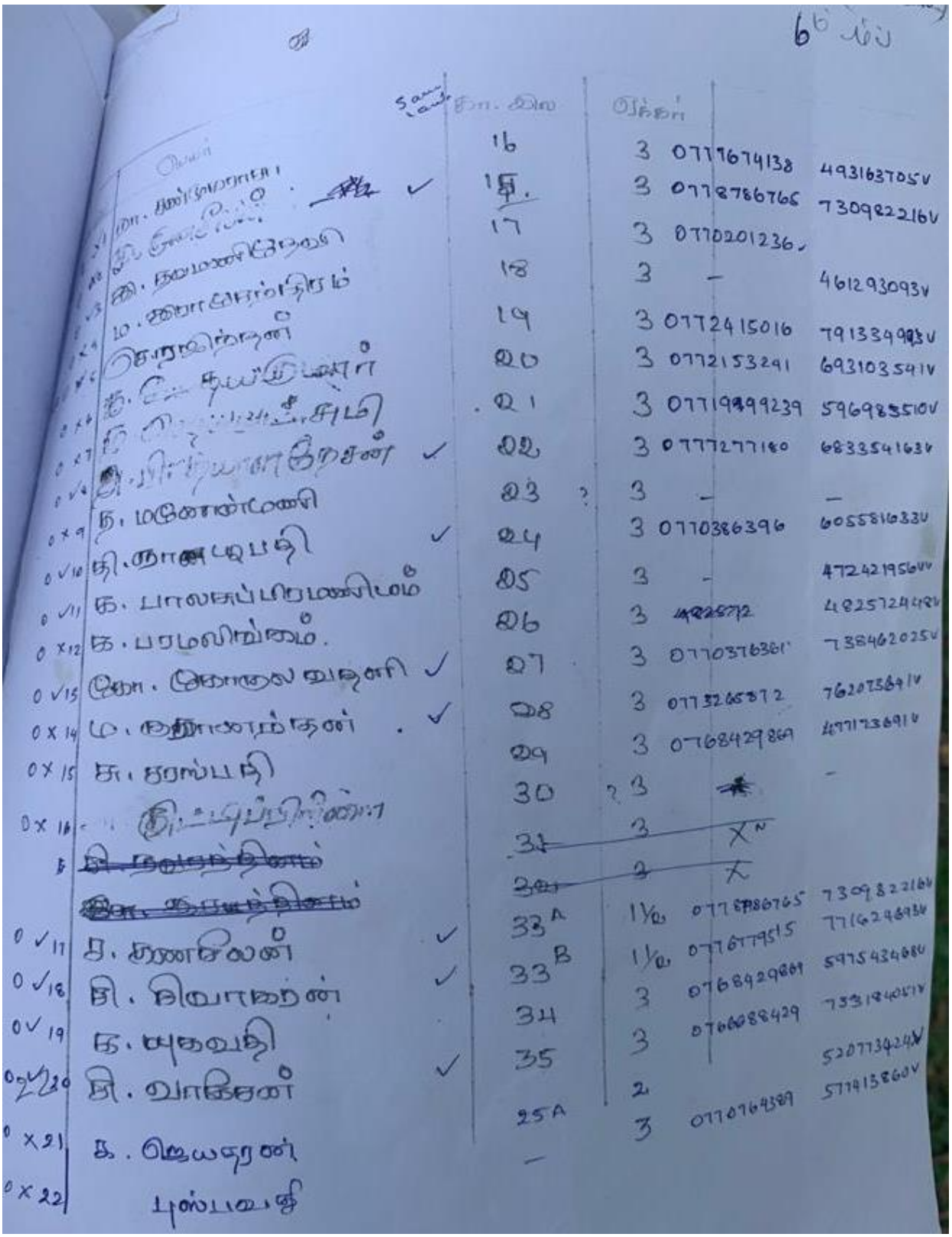
Beneficiaries of pump 5



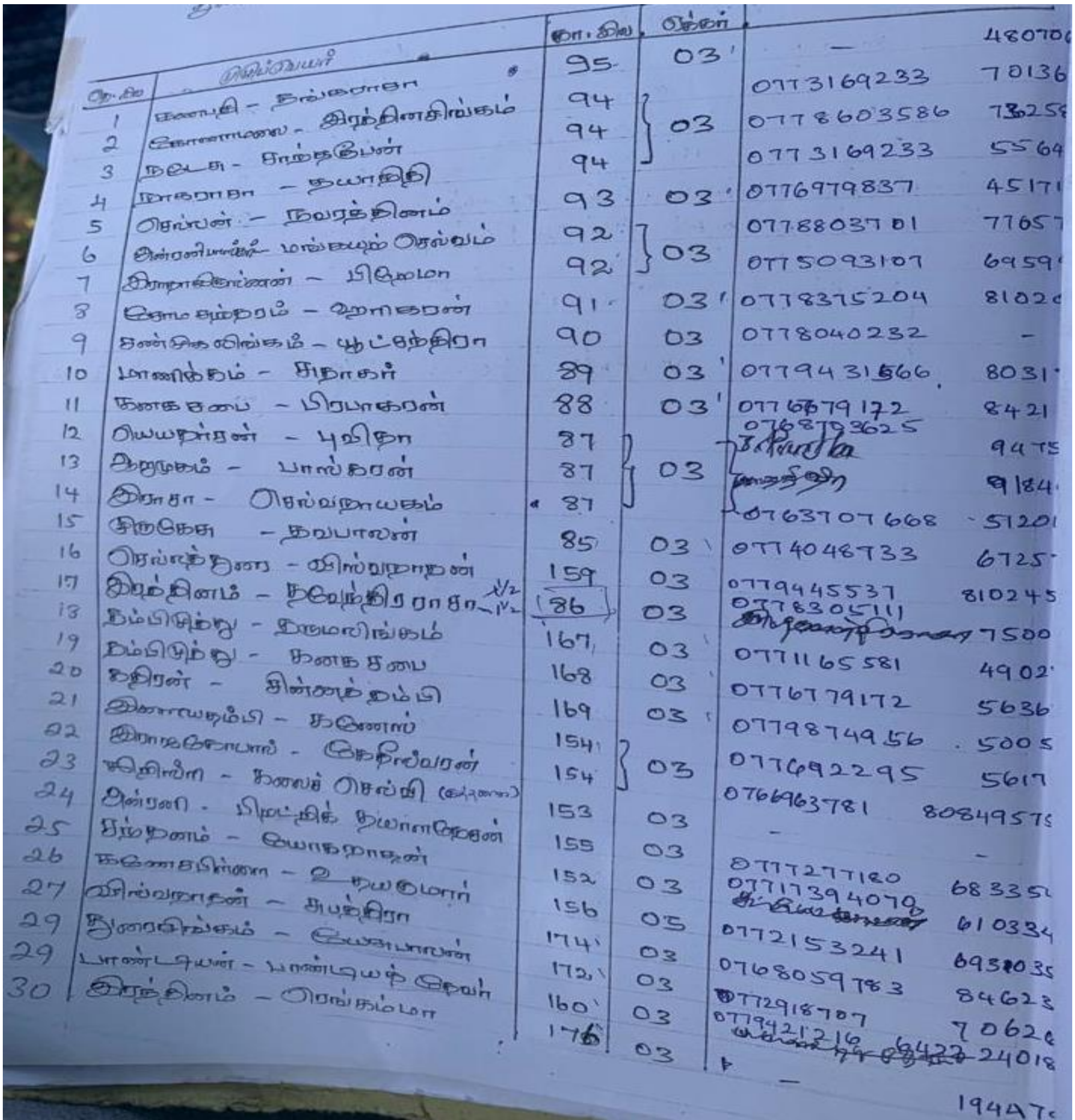
[illegible]	[illegible]	[illegible]	[illegible]
1	[illegible]	49	3
2	[illegible]	50	3
3	[illegible]	50	3
4	[illegible]	51	3
5	[illegible]	53	3
6	[illegible]	54	3
7	[illegible]	55	3
8	[illegible]	56	3
9	[illegible]	57	3
10	[illegible]	58	1½
11	[illegible]	59	3
12	[illegible]	60	3
13	[illegible]	62	1½
14	[illegible]	62	3
15	[illegible]	62	1½
16	[illegible]	63	3
17	[illegible]	64	1½
18	[illegible]	64	1½
19	[illegible]	58	1½

[illegible] = 48 AC.

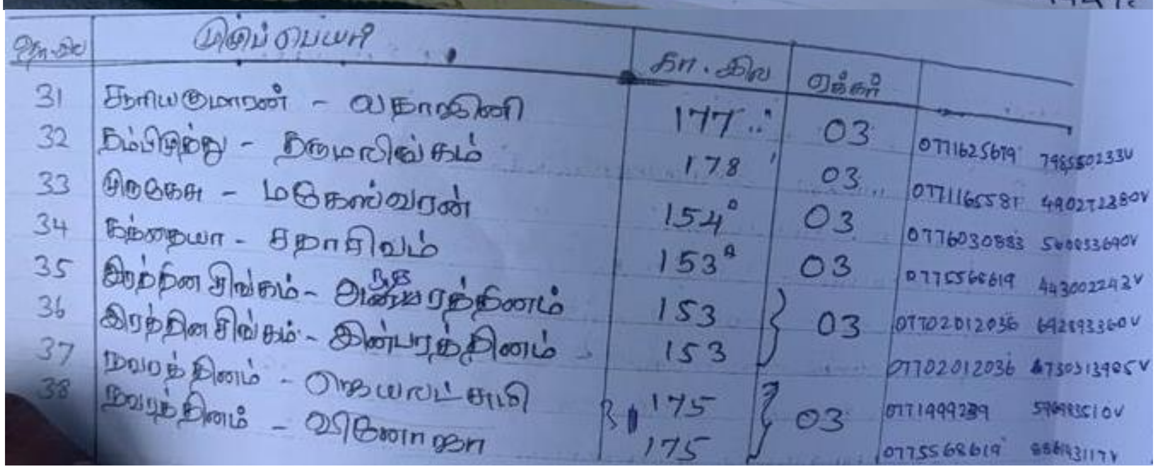
Beneficiaries of Pump 6



Beneficiaries of pump 7

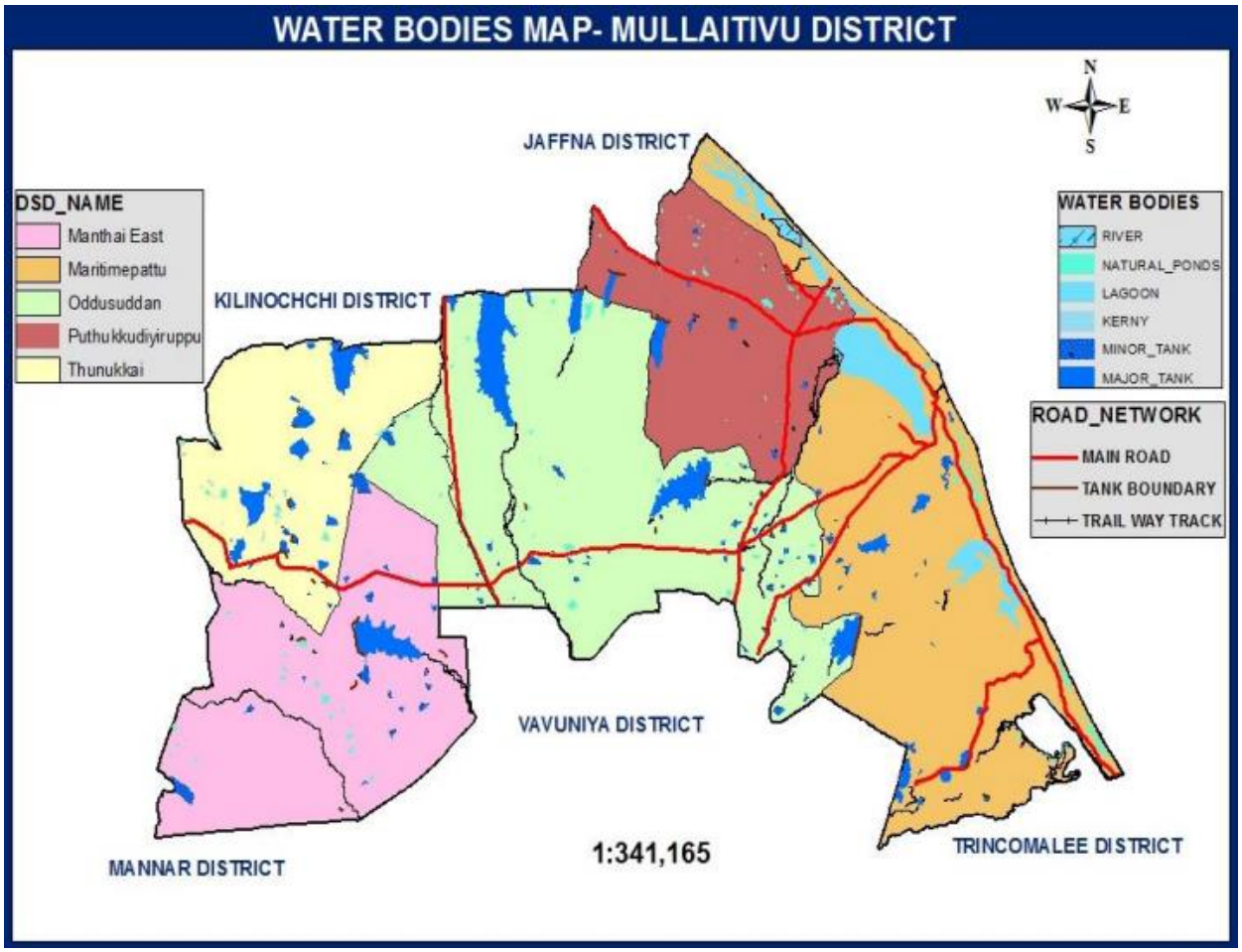


தொ.இல	பெயர்	கா.இல	ஏக்கர்		
		95	03	—	48070
1	கணபதி - தங்கராசா	94		0773169233	70136
2	கோணாமலை - இரத்தினசிங்கம்	94	03	0778603586	736258
3	நடேசு - சந்திரகுமார்	94		0773169233	5564
4	நாகராசா - தயாநிதி	93	03	0776979837	45171
5	செல்வன் - நவரத்தினம்	92		0778803701	77657
6	அன்ரனிப்பிள்ளை மங்கையும் செல்வம்	92	03	0775093107	69591
7	இராமலிங்கம் - பிரேமா	91	03	0778375204	81020
8	சோமசுந்தரம் - குமாரசேன்	90	03	0778040232	–
9	சண்முகலிங்கம் - புட்பகுமாரி	89	03	0779431566	8031
10	மாணிக்கம் - சிறிகரன்	88	03	0776679172	8421
11	கனகசபை - பிரபாகரன்	87		0768793625	9475
12	மெய்யநாதன் - புவிதா	87	03		9184
13	அருளம்பலம் - பாலகரன்	87		0763707668	51201
14	இராசா - செல்வநாயகம்	85	03	0774048733	6725
15	சிவநேசு - தவபாலன்	159	03	0779445537	810245
16	செல்லத்துரை - விஜயநாதன்	186	03	0778305111	7500
17	இரத்தினம் - நவரத்தினராசா ½	167	03	0771165581	4902
18	தம்பிமுத்து - இராமலிங்கம்	168	03	0776779172	5636
19	தம்பிமுத்து - கனகசபை	169	03	0779874956	5005
20	சுதிரன் - சின்னத்தம்பி	154	03	0776922295	5617
21	[illegible] - கணேசன்	154		0766963781	80849575
22	இராசகோபால் - சேகரீஸ்வரன்	153	03	—	
23	சதீஸ்கா - கலைச் செல்வி	155	03	0777277180	–
24	அன்ரனி - பிரட்றிக் நெல்சன்	152	03	0771739407	683351
25	சிற்றம்பலம் - யோகநாதன்	156	05		610334
26	[illegible] - உதயகுமார்	174	03	0772153241	6930035
27	வில்வநாதன் - சுபந்திரா	172	03	0768059783	84623
29	[illegible] - யோகேஸ்வரன்	160	03	0772918707	70626
29	பாண்டியன் - பாண்டியன் தேவி	176	03	0779421216	24018
30	இரத்தினம் - செங்கம்மா			—	19447



தொ.இல	பெயர்	கா.இல	ஏக்கர்		
31	சூரியகுமாரன் - வசந்தினி	177	03		
32	தம்பிமுத்து - இராமலிங்கம்	178	03	0771625619	796550233V
33	சிவநேசு - மகேஸ்வரன்	154	03	0771165581	490272380V
34	சின்னையா - சதாசிவம்	153	03	0776030883	560533690V
35	இரத்தினசிங்கம் - அன்பரத்தினம்	153	03	0775566619	443002243V
36	இரத்தினசிங்கம் - இன்பரத்தினம்	153	03	0770201203	642893360V
37	நவரத்தினம் - ஜெயலட்சுமி			0770201 2036	473031340SV
38	நவரத்தினம் - விஜேந்திரா	175	03	0771999289	576993510V
		175		0775568619	656931174

Annexure 4: Distribution of water bodies in Mullaitivu district



Annexure 5: Reserve forest of Mullaitivu district