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Ministry of Agriculture
கமத்தொழில் அமைச்சு

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விவசாய நவீனமயமாக்கல் திட்டம்
Agriculture Modernization Project

Social Screening Report

Strengthening Field Crops Research and Development Institute's (FCRDI) Activities- Improvement of Hybrid and Basic Seed Production in Mahailuppallama

Sri Lanka Agriculture Sector Modernization Project (ASMP)

Prepared for Project Management Unit of the Agriculture Sector Modernization Project

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

February 2022

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ABBREVIATIONS

AI	Agriculture Instructor
ASMP	Agriculture Sector Modernization Project
ASC	Agrarian Service Center
ATDP	Agricultural Technology Demonstration Park
CBO	Community-Based Organization
DSD	Divisional Secretary Division
EMF	Environmental Management Framework
EMP	Environmental Management Plan
ESR	Environmental Screening Report
ESS	Environmental and Social Standards
FCRDI	Field Crop Research and Development Institute
FO	Farmers Organization
FPO	Farmers' Production Organization
GAP	Good Agricultural Practices
GND	Grama Niladhari Division
GoSL	Government of Sri Lanka
IDA	International Development Association
IEE	Initial Environmental Examination
LGA	Local Government Authority
MOA	Ministry of Agriculture
MOPI	Ministry of Primary Industries
NIRP	National Involuntary Resettlement Policy
NGO	Non-Governmental Organization
OP	Operational Policy
PAP	Project Affected Persons
PCR	Physical Cultural Resources
PMP	Pest Management Plan
PMU	Project Management Unit
RARDC	Regional Agriculture Research and Development Centre
SCS	Seed Certification Service
SIA	Social Impact Assessment
SIMP	Social Impact Mitigation Plan
SLRs	Sri Lanka Rupees
SSR	Social Screening Report

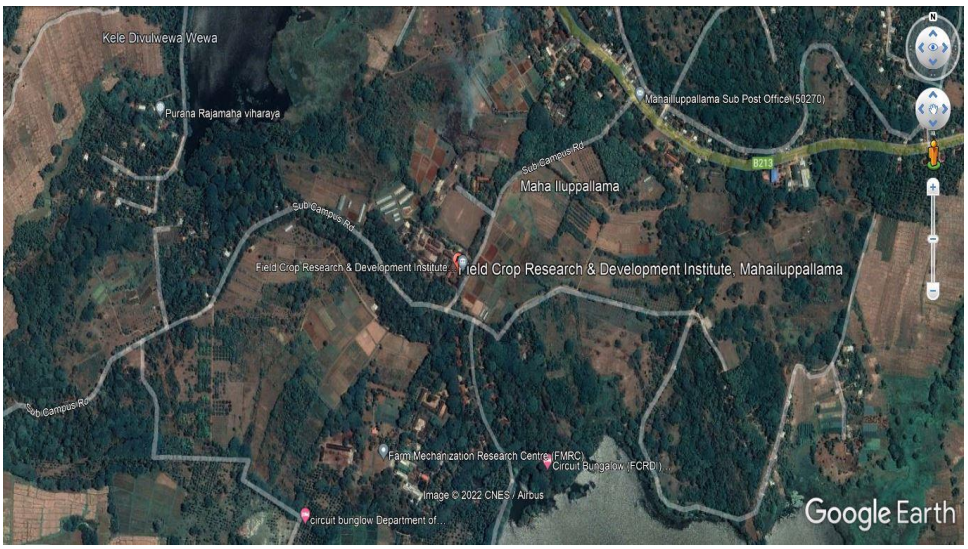
A. SUBPROJECT IDENTIFICATION

Subproject Title	Strengthening Field Crops Research and Development Institute's (FCRDI) Activities- Improvement of Hybrid and Basic Seed Production in Mahailuppallama
Parent Project Objectives (briefly)	The World Bank Funded **Agriculture Sector Modernization Project** is aligned with the Country Partnership Strategy (CPS) 2013-2016. The project seeks to contribute to two CPS focus areas, namely: "Supporting structural shifts in the economy" and "Improved living standards and social inclusion" through: (a) improving agricultural productivity and competitiveness to strengthen the links between rural and urban areas and facilitate Sri Lanka's structural transformation; (b) providing and strengthening rural livelihood sources, employment opportunities in agriculture and along agriculture value chains, as well as market access for the poor, bottom 40 percent, and vulnerable people, thereby improving income sources and livelihood security in lagging rural areas; and (c) contributing to improved flood and drought management, through project's linkages to the water and irrigation sectors and a climate-smart agriculture approach. The project is also to promote diversification, value addition and increased competitiveness in the agriculture sector. **The project has three components.** (01) Agriculture Value Chain Development (02) Productivity Enhancement and Diversification Demonstrations (03) Project Management, Monitoring and Evaluation The Ministry of Agriculture (MOA) is responsible for the implementation of Component 2: **Productivity Enhancement and Diversification Demonstrations**. The component aims at supporting smallholder farmers to produce competitive and marketable commodities, improve their ability to respond to market requirements, and move towards increased commercialization. Component 2 comprises the following sub-components: 2.1: Farmer Training and Capacity Building 2.2: Establishment of Modern Agriculture Technology Parks 2.3: Production and Market Infrastructure Supporting; (i) Rehabilitation of small-scale irrigation infrastructures (ii) Improvement of selected production and market access roads and construction of new field access tracks to improve transportation, access to markets and accessibility for agricultural machinery (iii) Village level storage and product handling facilities 2.4: Analytical and Policy Advisory Support- Activities to be supported under this sub-component would include technical assistance to: (i) Evaluate policies and regulations and recommend adjustments, reforms or new policies needed to make agriculture more competitive, responsive to market demand, gender sensitive, sustainable, and resilient; (ii) Undertake strategic market analysis for promoting new and high value exports, and analyze the changes needed in the policy, regulatory and institutional framework, or public investments needed to address the binding constraints to the evolution of high impact value chains;

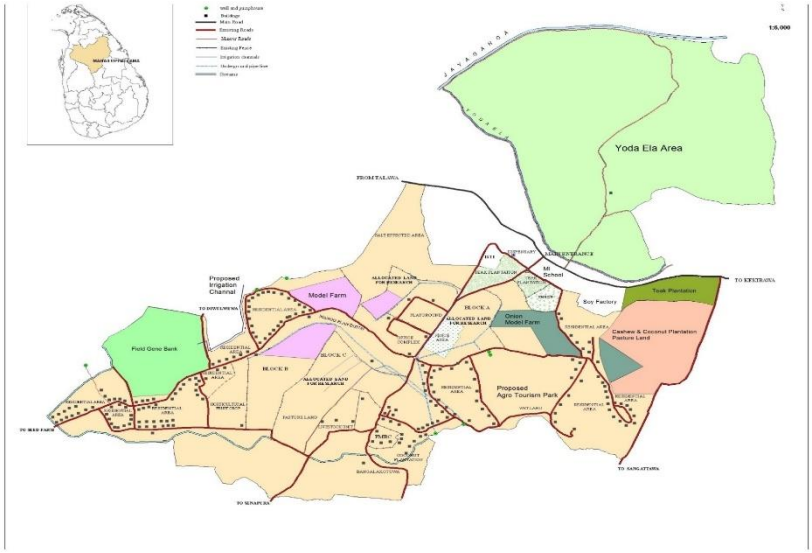
	(iii) Evaluate the social and economic impact of policies and public expenditures and make recommendations on course corrections to improve the efficiency and effectiveness of public expenditures. (iv) Undertake external and independent monitoring and evaluation functions, including formal impact evaluations of government programs and investments, to provide the critical learning and feedback loop into the ministries' decision-making processes. It would also support: (v) Annual conferences on Sri Lanka's agricultural policy; (vi) Equipment, office furniture, and communications technology for MOA's proposed Center of Excellence The development objectives of Agriculture Sector Modernization Project for Sri Lanka are to support increasing agriculture productivity, improving market access, and enhancing value addition of smallholder farmers and agribusinesses in the project areas. Up to now, ASMP has launched its activities in nine districts of seven provinces of the country. Project Management Unit (PMU) and Provincial Project Management (PPMUs) directly implement the two kinds of subproject activities that mainly consist of Productivity Enhancement and Diversification Demonstrations and the infrastructure development programs. The Department of Agriculture (DOA) acts as the main project partner agency of Productivity Enhancement and Diversification Demonstrations. DOA's activities consist of designing subprojects, training farmers, monitoring subprojects' activities, and involving the troubleshooting of the program. The agricultural research stations play a remarkable role in ASMP's activities by providing technical inputs and introducing new hybrid varieties to the farmers. Further, analyzing soil & crop samples of the farmers and giving recommendations for the fertilizer usage, investigating pest and disease attacks of the crops, and giving viable mitigation measures to overcome the issues timely are services provided by the agricultural research stations**.** Strengthening the capacities of Agricultural Research Stations, seed production farms, and seed certification service is identified as the subcomponent of ASMP. Inventing new crop varieties and expansion of hybrid seed production is one of the main sustainable factors of the ASMP's activities to achieve its development objectives. Meantime, it will facilitate supply the of high-quality hybrid seed requirements and finally contribute to enhancing the productivity of the field crops, vegetable, and fruit farming sector in Sri Lanka
Project proponent	Project Management unit, Agriculture Sector Modernization Project (ASMP), Ministry of Agriculture (MOA)
Implementing agency	Agriculture Sector Modernization Project (ASMP) implementing through Department of Agriculture
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/ **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, DOA officials and field visits to the project

B. SUBPROJECT LOCATION

Location $8^0$06'42.21" N $80^0$28'01.26" E	The subproject's activities will be mainly implemented in the land belongs to Field Crops Research and Development Institute (FCRDI)-Mahailuppallama. The institute is located at Mahailuppallama 35 km away from Anuradhapura city in Ipalogama DS division of Anuradhapura district in the North Central Province Under this subproject, Development of Hybrid and Basic Seed Production will be implemented. The location maps are annexed as Annex 2.  **Figure 1: Location of the Field Crops Research & Development Institute- Mahailuppallama**
Definition of Project Area / Project Impact area	The research history of Mahailluppallama dates back to the year 1903 in which field experiments were initiated aiming to identify suitable economic crops for dry zone rainfed conditions. Cotton, Sisal, Tobacco, and Groundnut were given more emphasis, however, remoteness and other difficulties led to the close down of the research station in 1919. Research Programmes were then operated at Vavuniya and Anuradhapura (1926), Kurundakulama (1938), Relapanawa, Olukaranda and Makalanagama (1949). In 1950 a fully equipped research station was established at Mahailluppallama and many research findings have been reported since then. The station was renamed as Field Crops Research and Development Institute

	in 1994 and entrusted the responsibility of conducting research programs on field crops There are nine (9) main divisions and six (6) subdivisions come under FCRDI 1. Plant Breeding Divisions Chili Coarse grains Onion Soybean & Cowpea Mungbean & Blackgram Vegetables 2. Agronomy Division 3. Soil & Water Management Division 4. Soil Science Division 5. Biotechnology Division 6. Entomology Division 7. Plant Pathology Division 8. Weed Science Division 9. Horticulture Division.  **Figure 2: Field Crop Research and Development Institute- Mahailuppallama**
Adjacent land and features	The total land extent under FCRDI- Mahailuppalama is about 360ha (890 acres) and it includes research station buildings, staff quarters, and cultivation area. The area where FCRDI is located belongs to Ipologama DS division of the Anuradhapura district in North Central Province. The area belongs to the low country dry zone. This research station mainly aims at development of the field crops since the major portion of the field crop production is generated by the low country dry zone of Sri Lanka. The institute is aiming at developing new technology and facilitating the technology dissemination for enhancement of production and productivity in the field crop sector. Field crops include condiments (chili and onions), grain legumes (mungbean, cowpea, black gram, pigeon pea, and chickpea), oilseed crops (groundnut, soybean, sesame, and sunflower) and non-rice cereals (maize, sorghum, finger millet, and other millets). There are no privately owned lands adjacent to FCRDI but it is surrounded by many government institutions. They are; • Government Seed and Planting Material Production Farm- Mahailuppallama • Seed Certification Service- Regional Office

	• Seed Certification Laboratory • Plant Protection Service Office • Farm Mechanization Research Center- Mahailuppallama • In-Service Training Institute, Department of Agriculture, Mahailuppallama • Veterinary Office • Mahailuppallama Sub Campus (Dry Zone - Teaching, Research, and Outreach) • Mahaweli Block Manager's Office • Mahaweli Community Radio • A Primary Medical Care Unit  **Figure 3: Site map of the FCRDI-Mahailuppallama**

C. SUBPROJECT JUSTIFICATION

Need for the project (What problem is the project going to solve)	The Agriculture Sector Modernization Project (ASMP) seeks to contribute to two Country Partnership Strategy (CPS) focus areas, namely: "Supporting structural shifts in the economy" and "Improved living standards and social inclusion" through (a) improving agricultural productivity and competitiveness to strengthen the links between rural and urban areas and facilitate Sri Lanka's structural transformation; (b) providing and strengthening rural livelihood sources, employment opportunities in agriculture and along agriculture value chains, as well as market access for the poor, bottom 40 percent, and vulnerable people, thereby improving income sources and livelihood security in lagging rural areas; and (c) contributing to improved flood and drought management, through project's linkages to the water and irrigation sectors and a climate-smart agriculture approach. The project is also to promote diversification, value addition and increased competitiveness in the agriculture sector. The development objectives of Agriculture Sector Modernization Project for Sri Lanka are to support increasing agriculture productivity, improving market access, and enhancing the value addition of smallholder farmers and agribusinesses in the project areas. Up to now, ASMP has launched its activities in nine districts of seven provinces of the country. Project Management Unit (PMU) and Provincial

	Project Management (PPMUs) directly implement the two kinds of subproject activities that mainly consist with Productivity Enhancement and Diversification Demonstrations and the infrastructure development programs. The Department of Agriculture (DOA) acts as the main project partner agency of Productivity Enhancement and Diversification Demonstrations. DOA's activities consist with designing of subprojects, training farmers, monitoring subprojects' activities and involving the troubleshooting of the program. The agricultural research stations play remarkable role in ASMP's activities by providing technical inputs, and introducing new hybrid varieties to the farmers. Further, analyzing soil & crop samples of the farmers and giving recommendations for the fertilizer usage, and investigating pest and disease attacks of the crops and giving viable mitigation measures to overcome the issues timely are services provided by the agricultural research stations. The services of the research stations have extended to increase productivity and profitability of other field crops (OFC) farming, make available quality produces and resource conservation, and eco-friendly OFC farming. The main objective of the research and the development activities of these research station are; • To make available demanding OFC varieties for stakeholders • To make available associated technologies for high productivity, profitability, and sustainability with an emphasis on climate change mitigation/adaptation/escape • To minimize post-harvest losses and enhance value addition • To assure the availability of quality seeds for stakeholders The conventional farming techniques and the field crops varieties are not enough to produce the country food requirement. A Major portion of the field crops production except locally grown vegetables are imported to the country to cater the existing demand. Further, a considerable foreign exchange has to be paid by the country annually to import the high yielding hybrid vegetable seeds. This situation makes burdens to the country, one is it threats on the food security and importation of the field crops production requires high foreign exchange while it directly effects on the country's economy. Hence, producing of hybrid crop varieties that are giving high yielding and continues research activities pertaining to the field crop production is essential to ensure the production. The need of this subproject emphasizes that enhancement of hybrid seed production (Chili and Maize) that are implemented under ASMP. These two crops have potential benefits to the country economy. Chili is one of the most important cash crops grown in Sri Lanka and an essential condiment. In 2019, Sri Lanka produced 75,000 t of green chili, meeting about 95% of the national requirement. However, the total requirement for Dry Chili is imported approximately 50,000 t per annum. The national average yield of green chili was stagnated at 4.7 t/ha until the recent past, which could be boosted to 20 t/ha with the introduction of locally-developed Chili hybrids which are moderately resistant to LCC and with associated precision farming technologies. The chili hybrids, MICH HY 01 and MICH HY 02 have the yield potential of over 35 t/ha of green chili. But the limited production of hybrid Chili seeds, fulfilling less than 25% of the demand, is the major constraint to expanding its cultivation, which is about

	2,000 kg per annum at present. Hence, about 15,000 ha Chili cultivation is still under open-pollinated varieties (OPV). Current efforts by the DOA in collaboration with the farmer organizations, foreign-funded projects, and the private sector to produce Chili hybrid seeds need to be expanded to achieve self-sufficiency in both green and dry chili production. More than 10,000 ha of hybrid Chili cultivation and 8,000 ha of OPV as commercial cultivation as well as a home garden crop is required to meet the demand for green and dry Chili. Hence, the annual hybrid Chili seeds requirement is 6,500 kg. Hence, efforts to strengthen the capacity of seed production of locally developed Chili hybrids at a reasonable price are timely. Maize is the second-largest cereal extent in Sri Lanka, next to rice. Mainly used for animal feed (80% of the production) and the rest is used in the confectionery industry. A low percentage of maize is harvested at the green cob stage for direct consumption as boiled cobs, while the whole maize plants are harvested as fodder for the dairy industry. The demand for maize grains increased over the years and was about 500,000 t in 2019. However, the local production was 391,000 t in 2019 and the rest is imported. Farmers have gradually shifted to the cultivation of hybrid seeds during the last two decades, thus, increasing national productivity. More than 95% of farmers are growing hybrids at present, but about 95% of the total seed requirement is fulfilled by imported maize hybrids. The DOA recently released new maize hybrids i.e., MI Maize HY 3, MI Maize HY 4, and MI Maize HY 5, and these hybrids, are comparable in yields with most of the imported hybrids and moderately resistant to drought. These locally developed hybrids are well adapted to rainfed upland ecosystems in the Dry zone where major maize-growing areas are located. The total hybrid seed requirement is about 1,200– 1,500 tons per annum. The local maize hybrid seed production, a very limited quantity, is still confined to the government sector. With the inadequacy of local production, the price of imported hybrids is increasing annually making them unaffordable to most farmers. Therefore, interventions through public-private-producer partnership to enhance seed production of locally-developed hybrid maize varieties at least to meet at least 25% of the seed demand is essential and timely. The cultivation of locally-produced Chili and Maize hybrids among Sri Lankan farmers is low, which is mainly attributed to the non-availability of their required quantities in local markets. Thus, producing hybrid seeds suitable for local environments and making them available at a reasonable price is a prerequisite for the productivity enhancement of chili and maize crops in Sri Lanka. Private sector has not invested on large scale hybrid seed production but continue their operations in a limited scale. Under the proposed project, the technology for hybrid seed production will be refined with improvement of existing facilities with the DOA aiming at an up-scaling of the involvement of private sector partnerships as the next step. The facilities available for the production of high-quality Chili and Maize hybrid seeds is inadequate resulting in some drawbacks such as poor germination and shelf-life, thus failing to meet the demand (in addition to the limited quantities produced by the private sector through private-public partnership).

	Therefore, strengthening of the facilities available at Mahailuppallama is considered an essential and timely need for Chili and Maize hybrid seed production, which can be utilized by other public and private sector agencies to enhance the hybrid seed production in Sri Lanka But existing seed production facilities of the stations are not enough to cater the farmers and the country requirements. Strengthening infrastructure and Technological/Technical capacities of the Department of Agriculture is an essential need to ensure provision services and follow-up support for the farmer production organization (FPOs) established under Component 2 of the ASMP. This is further to the basic field facilities established for basic seed production of chili and maize (FIELD CROPS CENTER), vegetables including potato vegetable CENTER), and the fruit crops (FRUIT Center), which the centers of excellence of the relevant crop categories established at Mahailuppallama (including Kilinochchi and Aralaganiwila), Gannoruwa/Kundasale/Dondagolla/Seetha Eliya Complex, and Horana, respectively. Therefore, strengthening of the facilities available at Mahailuppallama is considered an essential and timely need for Chili and Maize hybrid seed production, which can be utilized by other public and private sector agencies to enhance the hybrid seed production in Sri Lanka Development of hybrid seed production in FCRDI- Mahailuppallama, will be a sustainable solution for the continuing of modern technologies that are introduced to the farmers by ASMP. Therefore, launching of capacity building program to enhance the hybrid seed production of FCRDI is an essential and mandatory requirement of the agriculture sector modernization.
Purpose of the project (What is going to be achieved by carrying out the project)	The project will directly result the development of hybrid seed production at FCRDI- Mahailuppallama. Ultimately, it gives the benefits to the farmers who have engaged in field crop cultivation in the country. The following purposes will be achieved by implementing the subproject. • Improving the hybrid seed production capacity of the FCRDI of Excellence is imperative to achieve the objectives of the ASMP, especially in terms of sustainability through continuous interventions. • Providing basic hybrid seeds to selected farmers and private organizations to promote them for hybrid seeds production. • Providing technical support to the farmers/private organizations to improve crop productivity, especially in the established SL-GAP farms through the services provided by the Centers of Excellence and the Extension and Training arms of the DOA, Provincial Departments of Agriculture, and the Mahaweli Authority of Sri Lanka. • Field quality assurance by auditing and issuing of SL-GAP certificate to the GAP farms established through the involvement of the Centers of Excellence and with the assistance of the Seed Certification Service in the DOA, which regulates the auditing of SL-GAP farms. • Support the establishment of productive model farms, including GAP Model Farms, in the project sites through technological intervention from the Centers of Excellence, including the production of Onion, Chili, and Maize. • Continuous laboratory monitoring programs to be carried out island-wide on pesticide residues, contaminants, and pollutants in the

	agriculture environment comprise of food, soil, and water and monitoring programs for periodic assessment of toxicity of pesticides to pests, natural enemies, and beneficial organisms for maintaining the sustainability of model farms The expected outcomes through the implementation of the subproject are as follows; • Expanded the seed production capacity of available local Chili and Maize hybrids per annum • Chili (F1) Hybrid seeds: One poly tunnel with 400 m2 extent can produce 30- 35 kg of seeds. Therefore, five (5) tunnels will produce 150- 175kg hybrid seeds per annum • Chili parental lines: Parental lines produce 0.5kg of parental seeds from one (1) tunnel and expected parental seeds production is 1.0kg from two (2) tunnels • Conduct Chili Crosses: Number of crosses 150 • Maintain Maize parental lines and produce 2,000 kg of parental seeds • Production of Maize hybrid seeds: 18,000 kg • Conduct Maize Crosses: Number of Crosses 60 and produce 60 kg of seeds The ultimate effort of the ASMP is to establish good agriculture practices (GAP) in the farming activities by introducing new technologies.
Beneficiaries	Maize is primarily a rainfed crop cultivated in the maha season in both settled and shifting (chena) types of highland cultivation. The primary sources of demand for maize are the rural farming population, where maize is consumed both on the cob and as flour, and in the provender industry, where it is used in about 25% of the poultry feed manufactured. Maize is cultivated in all but six districts in Sri Lanka, but it is an important crop only in the districts of Anuradhapura, Ampara, Badulla, Monaragala, Matale, and Batticaloa, where the area is over 2000 ha. These districts, popularly called "the maize belt", account for over 80% of the land planted to maize in the country. Now, Maize is cultivated in Hambantota, Badulla, Kurunegala, Ampara, and Northern Province districts also. The national extent of maize is 57,380ha and the Maize production quantity in 2020, was 313,000 Mt. Maize production of Sri Lanka increased from 26,000 Mt in 2001 to 313,000 Mt in 2020 growing at an average annual rate of 16.30%. Maize is one of the subsidiary food crops cultivated in the highlands, and it, therefore, competes with other crops such as cowpea, green gram, groundnut, chili,and finger millet for space and inputs. It is often cultivated mixed with these crops. Research on maize in Sri Lanka was initiated in the early 1950s at the Field Crops Research and Development Institute (FCRDI)-Mahailluppallama, with research on breeding, agronomy, pests, and disease control. Early research was on the improvement of varieties, which resulted in the release of the first open-pollinated variety, T-48. Later research was conducted on hybrids, but without a continuous source of hybrid seeds, emphasis was redirected towardsthe development of open-pollinated varieties. To cater to the present Maize requirement, research and development on hybrid maize varieties is an essential component to produce high yielding, pest, disease, and drought-resistant varieties with decreasing the cost of production.

	Presently, all the Maize seed requirement is fulfilled by the imported seeds and local seed production is very low. Sri Lanka has invested about 4.6 million USD to import 1,075 metric tons of Maize seed in 2019. Further, the government has taken a decision to import 50,000 metric tons of Maize for poultry feed production in 2022 due to insufficient local production. Chili is one of the most important cash crops grown in Sri Lanka. It has become an essential ingredient in Sri Lankan meals. Per capita consumption of Chili in the form of dry Chili is estimated 2.84 kg per annum and the national annual requirement of dry Chili is around 57,400 mt. The annual production of dry Chili is about 7,500 Mt. Therefore, an amount of 49,928 Mt is imported (Year 2015 figures). Chili contributes on an average SLRs. 5,000 million to GDP and creates employment of 5.3 million work days annually. Chili is extensively grown for dry Chili production, but part of the crop is harvested as green pods. The average extent under Chili at present is around 13,000 ha, of which 2/3 is cultivated in maha season. Department of Agriculture has recommended 10 Open Pollinated Varieties (OPV) up to now namely MI-1, MI-2, KA-2, Arunalu, MI- Hot, MI Green, Galkiriyagama Selection, MI waraniya 1, MICH 3, MIPC 1. The potential yield of these varieties is 10-15 t/ha as green Chili, but the national average yields is around 5.13 t/ha. Such low yields are mainly due to high incidences of pest and diseases, moisture stress, use of inferior quality seeds, poor crop management and high input costs. First local Chili hybrid, MICH HY 1 developed by the Department of Agriculture released in year 2015 with the yield potential of 32t/ha as green Chili. Chili is cultivated in large scale in the dry zone especially in north central province and the intermediate zone. At present, major Chili growing districts are Anuradhapura, Moneragala, Ampara, Putthalama, Vavuniya, Kurunegala, Hambantota and Mahaweli System H. Seed and planting material Development Centre of DOA produces 7,000 - 9,000 Kg of local Chili seeds annually. These seed are produced by farmers selected from seed and planting material Development Centre. Those have been established as Chili seed villages. Field Crop Development Institute Maha Illuppallama, has introduced a high yielding Chili variety MICH3 recently apart from Open Pollinate Varieties (OPV) Chili varieties such as MI 1, MI 2, KA 2 and Galkiriyagama introduced by the Department of Agriculture. Furthermore, the Institute has introduced a high yielding Chili verity MICH 1 first time. Research has been proved that approximately 30 mt/ ha of chili yield can be obtained from this local hybrid Chili variety. This Chili variety itself has recorded a Chili production of 60 mt/ ha from the Northern Region. This is favorable prospect to the country and will enable to anticipate increase in the Chili production of the country. Seed requirement of Chili per hectare of land is 1 kg for OPV and 500g for hybrids. Strengthening the capacity of FCRDI- Mahailluppallama and two affiliated substations will give direct benefits to farmers, and other stakeholders who are engaging in the production, processing, and marketing of both Chili and Maize. Since FCRDI introduces new hybrid varieties and other crop management technology through their continued research and development activities, it benefits customers and the national economy by enhancing the country production while deducing of importation cost of seed and crop production.

Alternatives considered (Different ways to meet the project need and achieve the project purpose)	Some farmers use the locally produced seeds for chili and maize cultivation but it is useless effort since the cost of production increases by the low yielding, high pest and diseases attacks. Therefore, enhancement of hybrid seed production is the one and only alternative to cater the national requirements of the both crops. But DOA's research stations have no capacity to produce the whole hybrid seed requirement of the country. Through these initiatives, FCRDI hopes to promote the farmers and private organizations in hybrid seed production industry of the country. To achieve this objective, FCRDI will supply the basic seeds for the hybrid seed producers, transfer technology through the training and demonstration programs, conduct continues auditing, and intervenes to solve the issues arisen timely.

D. SUBPROJECT DESCRIPTION

Proposed start date (duration)	March 2022 (03 Months)
Proposed completion date	May 2022
Estimated total cost	SLRs 100.0 Mn
Land ownership	FCRDI-Mahailuppallama is located on the state land that is under the purview of the DOA. The total land extent belongs to FCRDI is 360ha (890 acres).
Planned interventions	This subproject is mainly focusing to develop the hybrid seed production. The following activities will be implemented as the scope of the subproject. 1. Development of 10 ha (25 Acres) Cultivation land bounded to *Yoda Ela* (Irrigation Canal) to enhance the seeds production (Location map is annexed as Annex 3) - Land development (Cleaning, levelling, terracing, drainage improvements) - Establishing sprinkler irrigation system for 10ha (25 acres) 2. Purchase of farm implements: - Four-wheel tractors (2 units) (1 FCRDI, 1 University) - Four-wheel tractor above 55 hp (1 unit) - (With Front loader and Backhoe) - Two- wheel tractors (3 units) - Disc ploughs (2 Furrow) (2 units) - Disc ploughs (3 Furrow) (1 unit) - Harrowers (3 units) - Tine tillers (2 units) - Rotavator (1 unit) - Ridger (1 unit) 3. Strengthening irrigation facilities: Construction of Agro-wells (3 units) 4. Renovation of existing water source (Agro-wells) (1 unit) 5. Construction of Controlled Environment Research Facility – locally assembled (4 units)

	6. Construction of insect-proof environment-controlled poly tunnels (400 m^2 each) with micro irrigation facilities for chili parent/hybrid seed production (5 units) at FCRDI, MI 7. Construction of insect-proof environment-controlled poly tunnels (400 m^2 each) with micro irrigation facilities for chili parent/hybrid seed production (1 unit) at RARDC, Kilinochchi 8. Construction of insect-proof environment-controlled poly tunnels (400 m^2 each) with micro irrigation facilities for chili parent/hybrid seed production (2 units) for Seed Farm and University unit @ MI The sub-activities with the cost allocation under the subproject is presented in Annex 4. The design drawings of the Agro-wells, insect-proof environment-controlled poly tunnel (400 m^2 each) is presented in Annex 5.
Beneficiary selection criteria and process	The whole capacity building program pertaining to the department of agriculture was collectively negotiated by MOA, DOA and ASMP. Then, DOA has prepared the capacity building needs with participation of the relevant research institutions, planting material production center and the seed certification service. Accordingly, the subproject activities were identified by the sector experts in the DOA.
Vulnerable groups and Gender	Generally, agriculture sector development directly gives benefits to vulnerable groups and women since the majority (80%) of the farmers and agriculture sector laborers belong to the low-income category. The project helps to enhance the farmers' livelihood and the food security for low-income community.

E. DESCRIPTION OF THE SOCIOECONOMIC CONDITIONS

Institute Profile	There are nine (9) main divisions and six (6) subdivisions that come under FCRDI- Mahailuppallama. Each division has laboratory facilities within the premises and research activities have been undertaken by the well-experienced & qualified research staff that consists of Director, Additional Director (Research), Deputy Director (Research), Assistant Directors Agriculture (Research), Research Assistants, and Technical Assistants. As the main research divisions, there are 1. Plant Breeding Division that consists of the subdivisions categorized as (i) Chili, (ii) Coarse Grains, (iii) Onion, (iv) Soybean & Cowpea, (v) Mungbean & Blackgram and (vi) Vegetables, (2) Agronomy Division, (3) Soil & Water Management Division, (4) Soil Science Division, (5) Biotechnology Division, (6) Entomology Division, (7) Plant Pathology Division, (8) Weed Science Division and (9) Horticulture Division. Apart from these research divisions, FCRDI- Mahailuppallama has six (6) laboratory facilities that have been established to conduct research and experiments. Bio-Technology, Entomology & Plant Pathology, Soil Science, Breeding, Agronomy and Soil & Water Management are the main laboratories that help to FCRDI activities. There are seven (6) research units that come under the heading of RARDC-Kilinochchi. They are; 1. Plant Breeding: Developing new plant varieties suitable for dry and intermediate zones of Sri Lanka. Changing the traits of plants to produce desired characteristics.

2. Plant Pathology: Evaluation of disease samples collected from research and farmers' fields. Detect the causal organism and suggest the possible solution to control the disease. Evaluation and efficacy of bio-control agents for pathogens.
3. Plant Entomology: Management of insect pests of field, fruit, and OFCs. Deliver effective solutions using integrated pest management strategies.
4. Breeder Seed Production
5. Soil and Agronomy
6. Organic Agriculture

Major research related activities of RARDC- Kilinochchi are as follows,

- Development and release of new plant varieties which suitable for dry and intermediate zones.
- Development of High yielding locally preferred and field tolerant crops to major fungal diseases.
- Collect and analyze soil and water samples and generating reports with recommendations.
- Organic control methods for pest and other insects

DOA annually allocates funds for the recurrent expenditures of the laboratories. But existing equipment and the facilities are not enough to expand the labs' services. These labs should be equipped to expand their service to produce hybrid varieties of the crops and other crops related research stations and developments.

The FCRDI has established the facilities required for the existing research works, seed production activities and the lab testing program at the request of farmers and the private sector.

Figure 4: A degraded polytunnel

Figure 5: FCRDI's open cultivation land-fallow

Figure 6: A poly tunnel under preparation for cultivation

Figure 7: A newly constructed poly tunnel

	  **Figure 8: An ongoing cultivation trial** **Figure 9: Cultivation trial**
Project Benefits	The project will directly result the Strengthening Field Crops Research and Development Institute's (FCRDI) Activities- Improvement of Hybrid and Basic Seed Production in Mahailuppallama. Ultimately, it gives the benefits to the farmers, entrepreneurs and labors who have engaged in cultivation, processing and marketing in the country and the consumers as well who can reach healthy foods. The following benefits will be achieved by implementing the subproject. • Maize and Chili cultivation farmers will access to the high-quality hybrid Chili seeds at an affordable price in the local area • To ensure high average production with less cost of production and limited resources (Land, Water) • Decrease the cost for hybrid seed importations • Decrease the cost for Maize and Chili production importation by enhancing the local production with improved crop varieties • To promote high quality certified seed production of local hybrid varieties • Make available opportunities for seed production sector for the local farmers and entrepreneurs The ultimate effort of the ASMP is to establish good agriculture practices (GAP) in the farming activities by introducing new technologies.
Social Impact	The proposed subproject will be implemented within the government premisses which are earmarked for the field crop research and development activities. Hence there is no direct contact of subproject activities with the community. As the subproject activities, development of 10 ha (25 Acres) cultivation land, establishing sprinkler irrigation system for 10ha (25 acres), supplying of farm implements, construction of 3 agro- wells, renovation of existing agro- well, construction of Controlled Environment Research Facilities (polytunnels), construction of insect-proof environment-controlled poly tunnels (400 m^2 each) with micro irrigation facilities for FCRDI- Mahailuppallama are included. All the activities will be implemented within the land under purview of FCRDI. Hence, there is no social impact emerging by the subproject activities. There are no assets or activities that will be disturbed or affected by the subproject activities. The magnitude of the proposed project interventions is very low. accordingly, the anticipated negative social impacts of the proposed project will be minor or insignificant. Only possible impacts regarding the health & safety of the FCRDI staff and the contractor staff during the subproject implementation are anticipated. Summarised social impacts and mitigation measures are shown in

	table 2. However, the following impacts are listed to get emphasis in the project selection and implementation. 01. Construction impacts such as dust, noise, and vibrations 02. Labour influx for establishment of polytunnels 03. Occupational health and safety hazards, and on impacts on the environment during the construction period All environmental related issues and mitigation measure are in the EMP under ESR.
Mitigation Measures	Proposed migratory measures for the negative social impacts listed above. **01. Construction impacts such as dust, noise, and vibrations** Anticipated impacts due to the construction will be generic and most of the impacts will be mitigated by following good construction practices. Noise and vibration will be reduced by maintaining the construction machinery and limiting the construction activities in the daytime only. Since the proposed site to construct agro- well, polytunnels, sprinkler irrigation systems are free from other activities as well as located separate from human settlement, public accesses, office buildings, staff quarters, or any community gathering centres, there are no impacts for the outsiders. But contractor staff and supervision staff may face inconveniences due to construction-related impacts such as dust, noise, and vibration. Hence, the construction contractor will be responsible to implement the minimizing, preventing, and mitigation measures proposed in the SIMP and EMP. **02. Labour influx for construction activities** There is no high labour demand in civil works envisage with this subproject. If labour will be hired where possible from the local community and the contractor will give priority to women when hiring. Worker Code of Conduct will be included as part of the employment contract - that establishes the workers' commitment in attitudes and behaviour preventing, combating, and responding Gender-Based Violence (GBV). During implementation, robust measures will be implemented to prevent sexual harassment/GBV including training of workforce and sanctions for non-compliance (e.g., termination). **05. Public/ occupational health and safety Hazards, and on impacts on the environment** All measures in the Environment Management Plan (EMP) will be implemented in regard to management. Necessary COVID19 safety measures and protocols will be implemented as per the government, WHO, and World Bank interim guidelines on COVID-19 by all construction workers. Training and awareness will reduce the direct exposure to minimize the risk.

F. STAKEHOLDERS ENGAGEMENT AND PUBLIC CONSULTATION

1. Stakeholders and Public consultation

Stakeholders' engagements

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

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

Table 1: Responsible Officers in ASM Project Activities

SN	Name	Designation	Contacts
Mahailuppallama Research Center			
1	Mrs. K.N.C.Gunawardhana	Director	nishanthigun@yahoo.com
2	Dr. R.L.Senanayake	Coordinator	ravisena@gmail.com
3	Dr. K.N. Kannangara	Principal Agriculture Scientist (Breeding)/ Chili Breeder	kannangara65@gmail.com
4	Dr. M.A.P.W.K. Malaviarachchi	Principal Agriculture Scientist (Agronomy)	wmalavi@yahoo.com
5	Dr. M.S. Nijamudeen-	Principal Agriculture Scientist (Soil Fertility)	msnija66@yahoo.com
6	Mr. D.C.M.S.I. Wijewardhana-	Maize Breeder	susantha.indi@gmail.com
7	Mr. R.A.C.J.Perera-	Soil and Water Management	chamilapere@yahoo.com
8	Ms. W.M.K. Fernanado	Pathologist	menukrisha@yahoo.com
9	Mrs. M.A.R.A. Mandanayake-	Entomologist	ra.mandanayake@gmail.com
10	Mrs. W.A.R. Dhammika	Biotechnology	ra.mandanayake@gmail.com

Stakeholders' consultation

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

Table 2: Consultation outputs

Locations / Sub Units / Fields Visited	Participants with Designations	Matters Discussed
FCRDI-Mahailuppallama on 05.01.2022		
• Director's Office • Pathology Laboratory • Entomology Laboratory	• Mrs. K.N.C. Gunawardhana- Director (Research)	• Overall capacity building plan on strengthening laboratory facilities and infrastructure

	• Agronomy Laboratory • Biotechnology Laboratory • Soil Water Management Division • Environment Control Research Unit • Common Stores	• Dr.R.L. Senarathna- Agronomist/ Coordinator-ASMP Activities • Ms. W.M.K. Fernanado – Pathologist • Mr. R.A.C.J. Perera- Assistant Director of Agriculture (Research) • Ms.P.I.K. Peris- Store man	development for hybrid seed production • Routine functions of the labs • Services provided to farmers and other outsiders • Safety precautions that are implemented • Waste disposal • Irrigation, water supply and drainage	

G. GRIEVANCE READDRESSED MECHANISM (GRM)

A GRM will be in place to promptly address any grievances including any unforeseen impacts that may arise during the implementation phase of the project, at no cost to the people. Field level grievances will record by FCRDI- Director by keeping the registry on their premises. The ASMP, and DOA official will facilitate resolving the grievances. The middle level grievances committee will operate at the DOA office to address the issues which are unsolved or when the affected person is not satisfied with the decision at the field level. The third tier of GRM will operate at PMU headed by the Project Director of ASMP with technical support from the Social Development Specialist to address the issues which are not solved at the initial stages.

H. IMPLEMENTATION AND MONITORING

1. MONITORING

Considering the magnitude of the proposed project interventions, the anticipated social impacts of the proposed activities will be none. There won't be any significant negative social impacts envisaged from the proposed project during implementation. Therefore, it is not necessary to have a complex monitoring system. However, it is necessary to ensure there are no violations of the regulations and conformity to the national and World Bank standards and guidelines pertaining to environmental and social safeguards.

Therefore, the contractor should be aware of the project management to ensure social management compliance during the implementation of the project. The Director -FCRDI will undertake the internal monitoring activities with close coordination of ASMP-PMU. Implementation of social and environmental safeguards compliance will be monitored by the social and environmental safeguard specialist at ASMP-PMU.

I. SCREENING OF POTENTIAL SOCIAL IMPACTS

Probable Involuntary Resettlement Impacts	Yes	No	Not known	Details
Will the intervention include new physical construction work?	√			Construction of agro- wells, polytunnels, establishment of polytunnels are included as new construction
Does the intervention include upgrading or rehabilitation of existing physical facilities?	√			Renovation of existing agro well is included as the subproject activities
Is the intervention likely to cause any permanent damage to or loss of housing, other assets, resource use?		√		No such impacts are anticipated
Are the sites chosen for this work free from encumbrances and is in possession of the government/community land?	√			Selected land belongs to DOA and vested to FCRDI-Mahailuppallama
Is this subproject intervention requiring private land acquisitions?		√		No land acquisition taken place
If the site is privately owned, can this land be purchased through negotiated settlement?		√		N/A
If the land parcel has to be acquired, is the present plot size and ownership status known?		√		N/A
Are these land owners willing to voluntarily donate the required land for this sub-project?		√		N/A
Whether the affected land owners likely to lose more than 10% of their land/structure area because of donation?		√		N/A
Is land for material mobilisation or transport for the civil work available within the existing plot/ Right of Way?		√		N/A
Are there any non-titled people who are living/doing business on the proposed site/project locations that use for civil work?		√		N/A
Is any temporary impact likely?		√		N/A
Is there any possibility to move out, close of business/ commercial/ livelihood activities of persons during constructions?		√		No such impacts are anticipated
Is there any physical is placement of persons due to constructions?		√		No such impacts are anticipated
Does this project involve resettlement		√		No such impacts are anticipated

Probable Involuntary Resettlement Impacts	Yes	No	Not known	Details
of any persons? If yes, give details.				
Will there be loss of /damage to agricultural lands, standing crops, trees?		√		No such impacts are anticipated
Will there be loss of incomes and livelihoods?		√		No such impacts are anticipated
Will people permanently or temporarily lose access to facilities, services or natural resources?		√		No such impacts are anticipated
Are there any previous land acquisitions happened and the identified land has been already acquired?		√		No such impacts are anticipated
Are any indigenous people living in proposed locations or affected/benefited by the project intervention?		√		No such impacts are anticipated

Assuming that all mitigation measures are implemented as proposed, the following effects can be predicted during the infrastructure development activities.

Key project activities	Potential Social Effects	Significance of Social effect with mitigation in place[1]
Land development (Cleaning, levelling, terracing, drainage improvements	Emission of dust, generation of noise, and vibration	NS
Establishing sprinkler irrigation system for 10ha (25 acres)	Emission of dust, generation of noise, and vibration	NS
Supplying of Purchase of farm implements	NA	
Strengthening irrigation facilities: Construction of Agro-wells (3 units)	Emission of dust, generation of noise, and vibration	NS
Renovation of existing water source (Agro-wells) (1 unit)	Emission of dust, generation of noise, and vibration	NS
Construction of Controlled Environment Research Facility – locally assembled (4 units	Emission of dust, generation of noise, and vibration	NS
Construction of insect-proof environment-controlled poly tunnels (400 m^2 each) with micro irrigation facilities	Emission of dust, generation of noise, and vibration	NS

[1] 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

SOCIAL RISKS & IMPACTS

Activities	Land requirements	Risk of exclusion of vulnerable groups	Construction impacts	Risks due to labour influx	Risk of livelihood impacts	Public/ occupational health and safety	COVID19 risks
Land development (Cleaning, levelling, terracing, drainage improvements	Land owned by DOA		Yes	Yes		Yes	Yes
Establishing sprinkler irrigation system for 10ha (25 acres)	Land owned by DOA		Yes	Yes		Yes	Yes
Strengthening irrigation facilities: Construction of Agro-wells (3 units)	Land owned by DOA		Yes	Yes		Yes	Yes
Renovation of existing water source (Agro-wells) (1 unit)	Land owned by DOA		Yes	Yes		Yes	Yes
Construction of Controlled Environment Research Facility – locally assembled (4 units	Land owned by DOA		Yes	Yes		Yes	Yes
Construction of insect-proof environment-controlled poly tunnels (400 m^2 each) with micro irrigation facilities	Land owned by DOA		Yes	Yes		Yes	Yes

INFORMATION ON AFFECTED PERSONS

Any estimate of the likely number of households that will be affected by the sub project? • [√] No. [ ] Yes. If yes, approximately how many? ……. • No. of HHs losing <10% of their productive assets **- N/A** • (land/cowshed/shops) …… **N/A** • No. of HHs losing 10% or more of their productive assets?..... **N/A**
Are any vulnerable households affected? [√] No. [ ] Yes. If yes, please briefly describe their situation with estimated numbers of HHs? N/A
What are the needs and priorities for social and economic betterment of vulnerable people who are affected by this project? N/A

J. SCREENING DECISION and recommendations

After reviewing the answers above, it is determined that the subproject is:

[ ] Categorised as a ‘B’ project, an Abbreviated Resettlement Action Plan is required

[√] Categorised as a ’C’ project, only the Social Screening/ Due Diligence Report is required

K. SOCIAL MANAGEMENT PLAN (SMP)

SN	Issues/ Impacts and risks	Mitigation measures	Institutional responsibility		Mitigation cost
			Implementation	Supervision/ monitoring	
1	Public complaints and lack of community awareness and support for the project implementation	• The staff of FCRDI will be briefed of the project, its purpose, design and outcomes with comprehensive discussion. Consultations will be repeated once the contractor is mobilised. • The GRM will be established to receive and resolve complaints/ grievances related to disturbances caused by construction including GBV related issues. • Awareness will be created of the GRM among staff and contact details will be publicly displayed to report grievances	Director (Field Crop Research and Development Institute)	PMU	Included in EMP
2	Construction related disturbances from dust, noise, and Vibration	• All measures in the EMP will be implemented in regard to management of construction related impacts including impacts to the environment including pollution, deforestation, soil erosion and management of solid waste • A copy of the SMP and EMP should be available at all times at the project supervision office on site • An Officer will be nominated to implement & monitor social/environment safeguards mitigations measures during construction	Contractor	Social/Environment safeguard specialist	Included in construction cost.
3	Labour Influx related issues (e.g. GBV)	• Local labour will be hired where possible and contract will give priority to women when hiring • Worker Code of Conduct will be included as part of the employment contract - that defines workers' commitment in attitudes and behaviour preventing, combating and responding GBV • Contractor will implement robust measures to prevent sexual harassment/GBV including training of workforce and	Contractor	Social/Environment safeguard specialist	Included in construction cost.

SN	Issues/ Impacts and risks	Mitigation measures	Institutional responsibility		Mitigation cost
			Implementation	Supervision/ monitoring	
		sanctions for non-compliance (e.g., termination)			
4	Public/ occupational health and safety Hazards, and on impacts on environment	• All measures in the EMP will be implemented in regard to management. • Provide training and awareness on safety for contractor staff • Necessary COVID19 safety measures and protocols will be implemented as per Government, WHO and WB guidelines by all construction workers • All construction activities should follow the '**INTERIM GUIDANCE ON COVID-19 (VERSION 1: APRIL 7, 2020)'** recommended by World Bank's Operations Environmental and Social Review Committee	Contractor	Social/Environment safeguard specialist	Included in construction cost.

L. CONCLUSION

The proposed Improvement of Hybrid and Basic Seed Production in Mahailuppallama well augers with enhancing the DOA's capacities. It aligns with the sustainability of the agriculture sector modernization under ASMP. The proposed activities will not have impacts in relation to land acquisition or involuntary resettlement. The impacts that can arise can be considered modest and can be reversed with mitigation action.

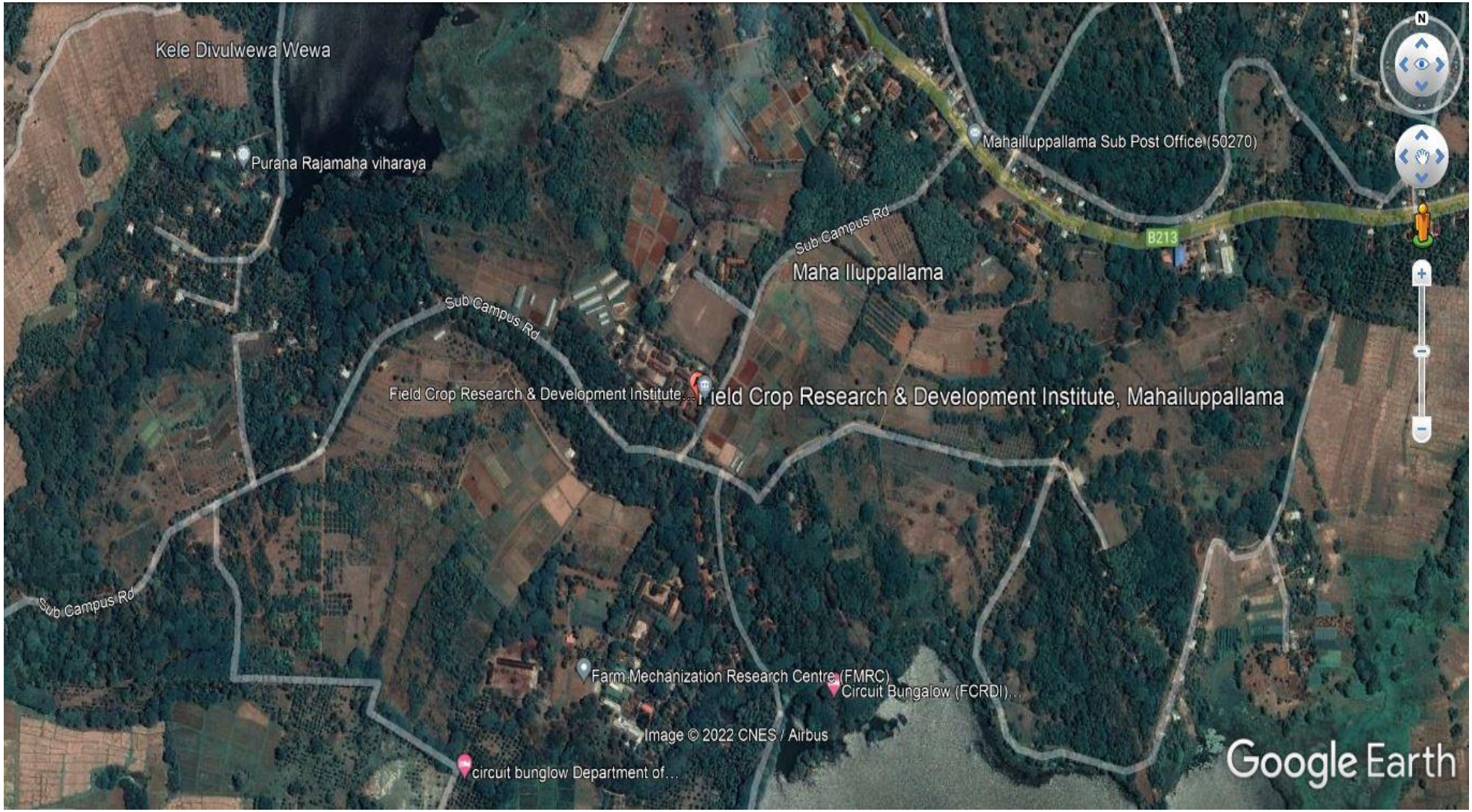
M. DETAILS OF PERSON RESPONSIBLE FOR THE SOCIAL SCREENING

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

ANNEX 1: LIST OF REFERENCES

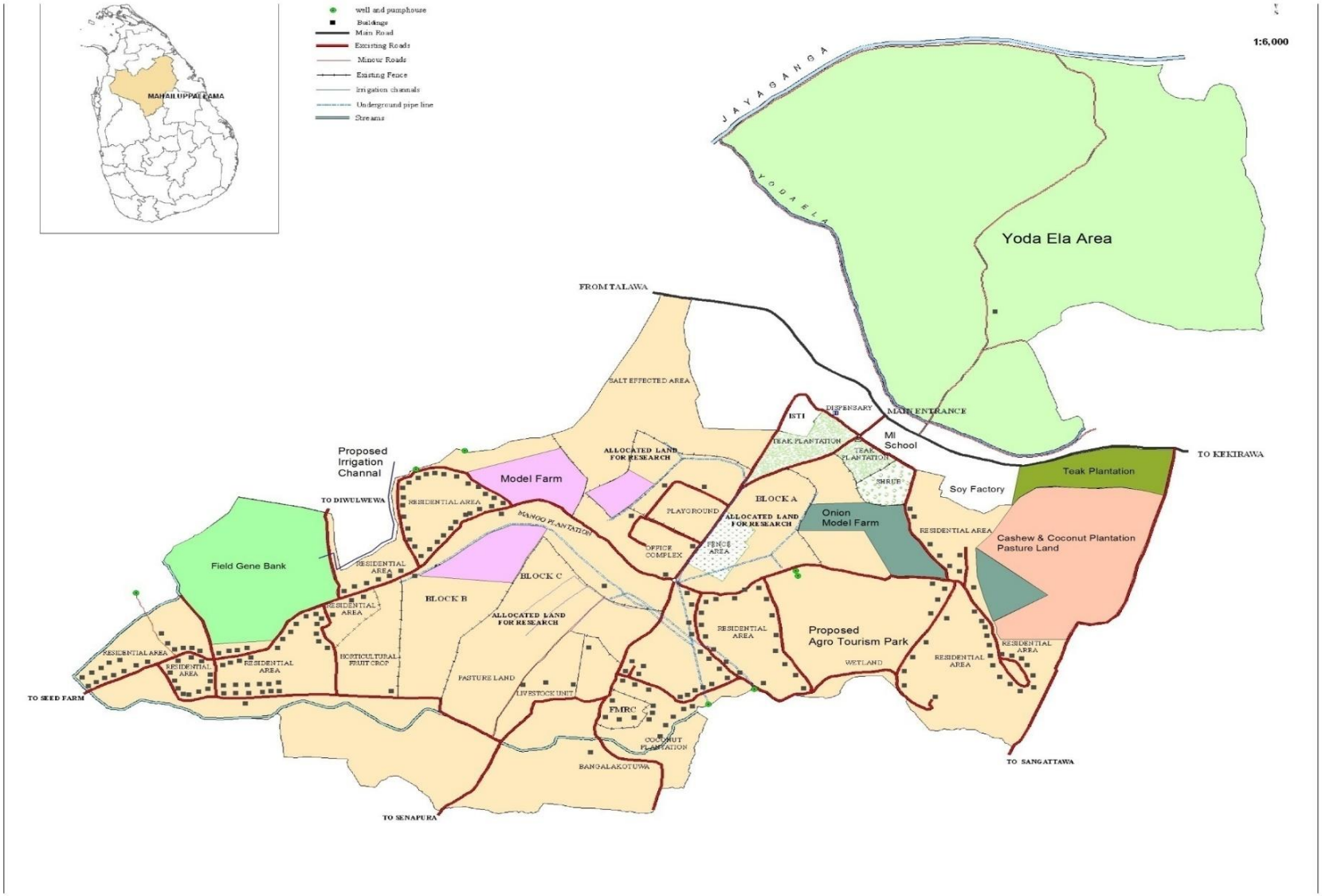
1) https://asmp.lk/the-project/
2) https://doa.gov.lk/home-page/
3) http://scsdoa.lk/index.php
4) https://doa.gov.lk/fcrdi-home/
5) https://wits.worldbank.org/trade/comtrade/en/country/LKA/year/2019/tradeflow/Imports/partner/ALL/product/100510
6) http://www.colombopage.com/archive_21B/Dec30_1640886310CH.php

ANNEX 2: GOOGLE MAP/ LOCATION MAP



Source: Google Map

ANNEX 3: SITE MAP OF FCRDI-MAHAILUPPALLAMA



Source: FCRDI- Mahailuppallama

ANNEX 4: DESCRIPTION OF THE SUBPROJECT ACTIVITIES DEVELOPED BY THE FCRDI-MI

(1) Field Crops Center at Mahailuppallama – Strengthening Capacity for Development of Chili and Maize Hybrid and Production of Planting Materials

1.1. Introduction

- The Government of Sri Lanka (GOSL) has launched a national policy framework "Vistas of Prosperity and Splendour", to enhance the living standard of the farming community.
- Recently, a policy decision has been taken by the Cabinet of Ministers to restrict imports of maize and chili, from among many others, which can be produced locally including the required quantities of high-quality planting materials. The GOSAL has also imposed taxes on the maize and dry chili products to create attractive farm gate prices.
- Therefore, increasing the availability of hybrid seeds of chili and maize will be an energizer to boost the production and to reach the anticipated self-sufficiency, while benefitting livelihood of farmers and overall national economy.
- The Agriculture Sector Modernization Project (ASMP) also focuses its activities on enhancing livelihood of farmers and the national economy. The proposed activities have a strong link with the expected outcome of the ASPM. Establishment of Center of Excellence at Mahailuppallama will be an important institutional set up helping further strengthening of cultivation and production of the locally-developed Chili and Maize hybrids, and for the overall sustenance of the ASMP activities, with the participation of the private sector and the practitioners.

1.1.1. *Chili*

- One of the most important cash crops grown in Sri Lanka and an essential condiment
- In 2019, Sri Lanka produced 75,000 t of green chili, meeting about 95% of the national requirement. However, the total requirements Dry Chili is imported approximately 50,000 t per annum.
- The national average yield of green chili was stagnated at 4.7 t/ha until recent past, which could be boosted to 20 t/ha with the introduction of locally-developed Chili hybrids which is moderately resistant to LCC and with associated precision farming technologies. The chili hybrids, MICH HY 01 and MICH HY 02 have the yield potential of over 35 t/ha of green chili.
- But the limited production of hybrid Chili seeds, fulfilling less than 25% of the demand, is the major constraint to expand its cultivation, which is about 2,000 kg per annum as at present. Hence, about 15,000 ha Chili cultivation is still under open-pollinated varieties (OPV).
- Current efforts by the DOA in collaboration with the farmer organizations, foreign-funded projects and private sector to produce Chili hybrid seeds need to be expanded to achieve self-sufficiency in both green and dry chili production

- More than 10,000 ha of hybrid Chili cultivation and 8,000 ha of OPV as commercial cultivation as well as a home garden crop is required to meeting demand green and dry Chili. Hence, the annual hybrid Chili seeds requirement is 6,500 kg.
- Hence, efforts to strengthen the capacity of seed production of locally developed Chili hybrids at a reasonable price are timely.

1.1.2. *Maize*

- The second largest cereal extent in Sri Lanka, next to rice.
- Mainly used for animal feed (80% of the production) and rest is used in confectionary industry. A low percentage of maize is harvested at green cob stage for direct consumption as boiled cobs, while the whole maize plants are harvested as fodder for dairy industry.
- The demand for maize grains increased over the years and was about 500,000 t in 2019. However, the local production was 391,000 t in 2019 and the rest is imported.
- Farmers have gradually shifted to cultivation of hybrid seeds during last two decades, and thus, increasing the national productivity.
- More than 95% of farmers are growing hybrids as at present, but about 95% of total seed requirement is fulfilled by imported maize hybrids.
- The DOA recently released new maize hybrids i.e. MI Maize HY 3, MI Maize HY 4 and MI Maize HY 5 and these hybrids, which are comparable in yields with most of imported hybrids and moderately resistant for drought. These locally developed hybrids are well adapted to rainfed upland ecosystems in the Dry zone where major maize-growing areas are located.
- The total hybrid seed requirement is about 1200 - 1500 t per annum. The local maize hybrid seed production, a very limited quantity, is still confined to government sector. With the inadequacy of the locally production the price of imported hybrids is increasing annually making them unaffordable to most of the farmers.
- Therefore, interventions through public-private-producer partnership to enhance seed production of locally-developed hybrid maize varieties at least to meet at least 25% of the seed demand is essential and timely.

1.2. Rationale

- The cultivation of locally-produced Chili and Maize hybrids among Sri Lankan farmers is low, which is mainly attributed to the non-availability of their required quantities in local markets.
- Thus, producing hybrid seeds suitable for local environments and making them available at a reasonable price is a prerequisite for the productivity enhancement of chili and maize crops in Sri Lanka.
- Private sector has not invested on large scale hybrid seed production but continue their operations in a limited scale.

- Under the proposed project, the technology for hybrid seed production will be refined with improvement of existing facilities with the DOA aiming at an up-scaling of the involvement of private sector partnerships as the next step.
- The facilities available for the production of high-quality Chili and Maize hybrid seeds is inadequate resulting in some drawbacks such as poor germination and shelf-life, thus failing to meet the demand (in addition to the limited quantities produced by the private sector through private-public partnership).
- Therefore, strengthening of the facilities available at Mahailuppallama is considered an essential and timely need for Chili and Maize hybrid seed production, which can be utilized by other public and private sector agencies to enhance the hybrid seed production in Sri Lanka.

1.3. Description of the activity

Activities	Estimated Cost (Rs Mn)	Expected Outcome (KPIs)	Beneficiaries
		• Expanded the seed production capacity of available local Chili and Maize hybrids per annum **Chili (F1) Hybrid seeds**: 400 m2 tunnel can produce 30 – 35 kg. Therefore @ 5 tunnels 150 to 175 kg hybrid seeds per annum **Chili parental lines**: parental lines produced @ 1 tunnel. 5 kg of parental seeds **Chili Crosses:** Number of crosses 150 and seeds 1 kg @ 2 tunnels **Maize parental lines 2000 kg** **Maize hybrid seeds**: 18,000 kg **Maize Crosses:** Number of Crosses 60 – 60 kg of seeds	• Chili growers: Direct Beneficiary • Maize Growers: Direct Beneficiary • Department of Agriculture: Indirect Beneficiary • Universities: Indirect beneficiary • Private sector: Indirect Beneficiary • General Public: Indirect Beneficiary
Yoda Ela area at Mahailuppallama (25 acres)			
• Land development (Cleaning, levelling, terracing, drainage improvements)	10.0		
• Purchase of farm implements: - Four-wheel tractors (2 units) (1 FCRDI, 1 University) - Four-wheel tractor above 55 hp (1 unit) - (With Front loader and Backhoe) - Two- wheel tractors (3 units) - Disc ploughs (2 Furrow) (2 units) - Disc ploughs (3 Furrow) (1 unit) - Harrowers (3 units) - Tine tillers (2 units) - Rotavator (1 unit) - Ridger (1 unit)	22.0		
• Strengthening irrigation facilities: - Construction of Agro-wells (3 units) - Renovation of existing water source (Agro-well) (1 unit) - Purchasing of items for sprinkler irrigation system for 25 acres at Yoda Ela area	10.0 3.0 10.0		
• Construction of Controlled Environment Research Facility – locally assembled (4 units)	16.76		
Research premises			

Activities	Estimated Cost (Rs Mn)	Expected Outcome (KPIs)	Beneficiaries
• Construction of insect-proof environment-controlled poly tunnels (400 m^2 each) with micro irrigation facilities for chili parent/hybrid seed production (5 units) at FCRDI, MI	17.65		
• Construction of insect-proof environment-controlled poly tunnels (400 m^2 each) with micro irrigation facilities for chili parent/hybrid seed production (1 unit) at RARDC, Kilinochchi	3.53		
Seed farm and University unit Mahailluppallama			
• Construction of insect-proof environment-controlled poly tunnels (400 m^2 each) with micro irrigation facilities for chili parent/hybrid seed production (2 units)	7.06	• Developed cost effective technology packages for hybrid seed production • IOT-based infrastructure facilities for future research & development activities • Novel land preparation and development technologies • Plant protection diagnostics - Effective diagnosis of diseases and thereby managing diseases- • Quick identification of samples • Microbial arrays – Number of samples	

1.4. Implementation arrangements:

- Implementation arrangements will be done by Field Crops Research and Development Institute (FCRDI), Mahailluppallama in collaboration with Seeds and Planting Material Development Center (SPMDC).
- Technical specifications for procurement items will be prepared by the ASMP and FCRDI. Procurement will be done by the Ministry of Agriculture.

1.5. Operations

- The activities will be operationalized by the research and technical staff of respective institutes under the Ministry of Agriculture.
- Field activities will be conducted under the supervision of technical staff. Additional labor will be hired to complete project activities on timely manner.

1.6. **Expected Contribution from each party**:

1.6.1. ASMP: Financial support for the capital expenditure

1.6.2. DOA: Man power, existing infrastructure facilities, land, water and other resources

1.6.3. ISP: designing and implementation planning

1.6.4. Other (e.g., University) Operational support

1.7. Financial Analysis (Overall):

1.7.1. Total Project Cost: Rs. 250 Mn

1.7.2. Cost borne by the ASMP: Rs. 200 Mn

1.7.3. Cost borne by the DOA per year: 50 Mn

1.7.4. Financial Analysis: Cost benefits

- Discount rate is 7.5% for 5-year time period.
- Net present value is Rs. 5,142,386 and benefit cost ratio is 1.02
- Unit price for all the inputs and outputs are used based on present market values.
- Infrastructure facilities will be used for other research purposes. Above values were calculated excluding other benefits.
- The project is economically viable considering the positive net present value and benefit cost ratio

1.8. Risk and mitigation

Risk anticipated	Proposed mitigation measures
High pest and diseases incidences for Chili and Maize crops due to adverse weather conditions	Integrated pest management approaches coupled with fixing date of planting according to the weather forecasts of the DOA

1.9. Environment safeguard & social safeguard concerns: (including gender)

- Representation of both genders in each and every activity of the project will be ensured. Some activities preferred by female field workers such as hand pollination in Chili hybrid seed production, etc. will be entrusted specifically to them, as more efficient outputs can be expected.
- Standard cultivation practices including recommended agro-chemicals for pest (insect pests and weeds) and disease control, and recommended fertilizer application will be practiced while minimizing the negative impacts on environment, including soil and water pollution.

1.10. Sustainability

- After completion of the project implementation in the first year, the recurrent cost and maintenance costs for the facilities will be borne by the DOA through the annual budget allocations.

ANNEX 5: DESIGN DRAWINGS OF THE SUBPROJECT ACTIVITIES

1. Specification and the estimation of the agro-wells construction

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[illegible]
Divisional Engineer's Office - Mahailluppallama.

[illegible]	[illegible]	[illegible]	NCP/MI/DE/02/02/03/05(2021)
[illegible]	[illegible]	[illegible]	2021.12.01

22 DEC 2021

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Provincial Engineering Department - NCP

BOQ FOR

Estimate for the Construction of 3 nos of Agriculture well (dia. 20', depth 30') at Yoda Ela Feild Area of FCRDI - Maha Illuppallama

Divisional Engineer's Office
Provincial Engineering Department-NCP
Mahailluppallama.

Estimate for the Construction of 3 nos of Agriculture well (dia. 20', depth 30') at Yoda Ela Feild Area of FCRDI - Maha Illuppallama

Description	No	Item	Amount
This estimate provide for all the cost of labour, materials,tools, transport and overhead etc. All as per detail in the body of the estimate and attached B.O.Q	1.0	Estimate cost	8,463,779.40
	2.0	Physical contigencies 10%	846,377.94
	3.0	Financial Contingencies 0.02%	169,275.59
	4.0	Engineering Consultancy fee 5%	423,188.97
		VAT - 8%	677,102.35
		Total Cost	10,579,724.25

Prepared By:

Signature

Name : E.N.S. EDIRISINGHE

Designation : Sri Lanka Technological Service
Class II 'B' Technical Officer
Divisional Engineer's Office
Maholluppallama

Checked & Recommended By :

(D.A.) Signature

Name : U.L.R.G. WERAGODA

Designation : DIVISIONAL ASSISTANT
Divisional Engineer's Office
Maholluppallama

Approved By:

(D.E.) Signature

Name : H.M.R.M. ABERATHNA

Designation : Eng.H.M.R.M. ABERATHNE
DIVISIONAL ENGINEER
Divisional Engineer's Office
Maholluppallama

Estimate for the Construction of 3 nos of Agriculture well (dia. 20', depth 30') at Yoda Ela Feild Area of FCRDI - Maha Iluppallama

ITEM NO	DESCRIPTION	AMOUNT
1	PREUMINARY	205,000.00
2	EXCAVATION & EARTHWORK	544,014.10
3	MASON	1,546,004.00
4	CONCRETOR	92,466.70
5	BRICK LAYER	78,420.00
6	PLASTERER	89,355.00
7	MISCELLANEOUS	270,000.00
	TOTAL CIVIL COST	2,821,259.80

ITEM NO	DESCRIPTION	AMOUNT
1	For One Well	2,821,259.80
2	For 3 Nos Well	8,463,779.40

Estimate for the Construction of Agriculture well (dia. 20', depth 30') at Yoda Ela Feild Area of FCRDI - Maha Illuppallama

1 PRELIMINARY

Instructions

(a) As per the instruction given by the Engineer following works should be complete.

Item No	Description	Unit	Quantity	Rate	Amount
1.1	Construct & maintain temporary building for consultancy site office (size not less than 10'X10') with cement paving & required facilities(Minimum facilities are Table, Chair, 4'x3' notice board, drinking water) as per the instruction given by Engineer.	Item Allow			30,000.00
1.2	Allow for Environmental Mitigation Measures	Provisional Sum			40,000.00
1.3	Allow for Supplying and erecting Project Sign Board - 01Nos (1800mm X 1200mm) as per plan and directed by Engineer / TO	Provisional Sum			30,000.00
1.4	Conducting Hydro Geological investigation to find suitable locations and submittion of report per each well including; a. Results of Geophysical investigation (Number of tested locations and most promising locations) b. Obtaining Water resource Board approval	Provisional Sum			30,000.00
1.5	Allow for Bank charges for Providing Security Bonds.	Provisional Sum			25,000.00
1.6	Allow for Premium of insurance for property materials at site, injures cause to workmen etc.	Provisional Sum			30,000.00
	Sub Total				205,000.00

2 EXCAVATION & EARTHWORK

Rates for Excavation and Earthwork shall include for:

(a) Trimming sides, keeping clean, leveling, grading and consolidating bottom of bases and trenches etc.

(b) Leveling and consolidating where required under slabs or sub-floor layers.

(c) Back filling and well ramming around foundation.

(d) Keeping all excavations free from storm or percolating water to keep excavation dry at all stages of construction.

(e) Any necessary additional excavation for working spaces, planking and strutting etc.

(f) Providing shoring work where necessary.

(g) Approval for constituent materials and test reports for properties of soil should be taken from Quality Control Engineer, Quality Control lab - Kelaniawa with contractor's expense as request by the Engineer.

(h) Minimum one compaction test should be done for each and every 50 m3 or request by the Engineer, from Quality Control Engineer, Quality Control lab - Kelaniawa

Item No	Description	Unit	Quantity	Rate	Amount
2.1	Earth Excavation in Sinking well from ground to 3m deep in any materials except rock requiring part return filling rammed and surplus disposed of with in site as directed	cum	158.1	986.00	155,886.60
2.2	Excavation in well in soft disintegrated rock (Not requiring Blasting) up to depth of 3.00m - 9.00m & depositing excavated materials to not Exceeding 3.00m	cum	244.3	1,425.00	348,127.50

2.3	Allow for Additional works of site clearing, Back filling For Consolidated As directed, Leveling Site Area & make clear for unloading construction materials arround the working area of well and make necessary drains & tyding up site as instruction given by engineer	Item allow	1	40,000.00	40,000.00
	Sub Total				**544,014.10**

3 MASON

Rates for Masonry work shall include for:

(a) All joggles, clamps, dowels, ties, and templates.
(b) Rough and fair cutting forming splays.
(c) Angles, reveals and returns.

Instructions :

(a) Cement used should be relevent SLS Certified Products for Masonry work or Engineer's instruction.
(b) Average crushing strength of 10 blocks shall be not less than 2.8 N/mm2 .
(c) One compressive strength, physical properties and water absorbtion test should be done for each and every 1000 units of blocks.

Item No	Description	Unit	Quantity	Rate	Amount
3.1	150-225mm Random Rubble Masonry in cement mortar 1:5 (Buttom up to 1.5 m)	cum	19	16,186.00	307,534.00
3.2	150-225mm Random Rubble Masonry in cement mortar 1:5 (since to bottem 1.50m up to 3.00 m)	cum	19	16,995.00	322,905.00
3.3	150-225mm Random Rubble Masonry in cement mortar 1:5 (since to bottem 3.00m up to 4.50 m)	cum	14	18,185.00	254,590.00
3.4	150-225mm Random Rubble Masonry in cement mortar 1:5 (since to bottem 4.50m up to 6.00 m)	cum	14	19,458.00	272,412.00
3.5	150-225mm Random Rubble Masonry in cement mortar 1:5 (since to bottem 6.00m up to 7.50 m)	cum	10.5	20,820.00	218,610.00
3.6	150-225mm Random Rubble Masonry in cement mortar 1:5 (since to bottem 7.50m up to 9.00 m)	cum	10.5	16,186.00	169,953.00
	Sub Total				**1,546,004.00**

4 CONCRETOR

Grade of concrete used in the construction and recommended mixes as follows.

(a) Grade C20/25 Recommended Mix 1 : 1 ½ : 3 (20mm)
(b) Grade C16/20 Recommended Mix 1 : 2 : 4 (20mm)
(c) Grade C12/15 Recommended Mix 1 : 3: 6 (40mm)

Rate shall include,

(a) Mixing, hoisting, placing and compacting on the surfaces of any material or on formwork.
(b) Forming any construction joint and before concreting edge should be chipped and cleaned.
(c) Vibrating, curing and protecting concrete surfaces from harmful weather conditions.
(d) Forming slope on upper surfaces where required.
(e) Maximum water Cement ratio 0.55
(f) Making good after removal of form work.
(g) Curing should be done.

Instructions

(a) Prior approval for any concrete work should be taken from the Engineer.
(b) The sieve analysis test, silt content test, ect, reports should be submitted for approval of sand and aggregate, if concrete quantity exceed 50 m3, from Quality Control Engineer, Quality Control lab - Kekirawa with contractor's expense, otherwise approval should be taken from the Engineer.
(c) Cement used should be relevent SLS certified products approved for concrete or Engineer's instruction.
(d) Reinforcement and formwork paid separately where not mentioned.

(e) Any mix design should be approved from material testing laboratory - Kekirawa.

(f) One cube test report for properties of concrete should be taken for each and every 5 m3 of concrete, from Quality Control Engineer, Quality Control lab, Kekirawa

Item No	Description	Unit	Quantity	Rate	Amount
4.1	600X225 mm wall rings in R/F Cement con. 1:2:4 (20mm) With 4 nos of 12mm Tor- steel roads & 10mm Tor-steel Stirrup at 450mm c/c including formwork.	cum	3.7	24,981.00	92,466.70
	Sub Total				**92,466.70**

5 BRICK LAYER

Rates for Brickwork shall include for:

(a) Wetting well all the surfaces of the bricks before using.

(b) Plumbing angles.

(c) Normal straight cuttings.

(d) Ranking of joints for plastering.

(e) All the necessary scaffolding.

(f) Ranking of joints for plastering.

Instructions :

(a) Cement used should be relevant SLS Certified Products for Masonry work or Engineer's Instruction.

(b) Average crushing strength of bricks shall be not less than 4.8 N/mm2 .

(c) One compressive strength, physical properties and water absorbtion test should be done for each and every 50,000 units of bricks.

Item No	Description	Unit	Quantity	Rate	Amount
5.1	225mm thick brick work in cement - sand mortar 1:8 (up to first floor level)	cum	4	19,605.00	78,420.00
	Sub Total				78,420.00

6 PLASTERER

Rates for wall finishing shall include for:

(a) Temporary rules, screeds, ground etc.

(b) Ranking out joints of brickwork and backing concrete surface for forming key.

(c) Joints between different surfaces should be formed with chicken mesh or suitable bonding method.

(d) Forming arises and stopping against joinery work, metal work etc.

(e) Making good around pipes, sanitary fittings and fixtures.

(f) Straight cutting and raking cutting holes, notching and other sundries Labour of a like nature.

(g) Preparing sample panel of different finishes described below for the approval of the Engineer or Architect. Each panel not less than 0.5 m2 in area.

(h) Plastered area to be protected from sunlight to avoid cracking.

(i) Cement used should be relevant SLS Certified Products or Engineer's Instruction.

(j) The approval for sand should be taken from the Engineer.

Item No	Description	Unit	Quantity	Rate	Amount
6.1	20mm thick plinth plastering to circular wall in 1:3 cement - sand mortar finished smooth with neat cement floating	sqm	79.4	1,075.00	85,355.00
	Sub Total				**85,355.00**

7 MISCELLANEOUS

Instructions

(a) Prior approval for the type of barbed wire should be taken from the Engineer before using.

(b) Concrete post should be in grade 20 concrete

(c) Test should be done anytime request by the Engineer, from Quality Control Engineer, Quality Control Lab - Kokinawa, with contractor's expense

Item No	Description	Unit	Quantity	Rate	Amount
7.1	DeWatering (Pump outlet - 2 " or above)	Hour	400	675.00	270,000.00
	Sub Total				**270,000.00**

Provincial Engineering Department - NCP

BOQ FOR

Estimate for the Balance works of Agriculture well (dia. 20', depth 30') at Yoda Ela Feild Area of FCRDI - Maha Illuppallama

Divisional Engineer's Office
Provincial Engineering Department-NCP
Mahailluppallama.

Estimate for the Balance works of Agriculture well (dia. 20', depth 30') at Yoda Ela Feild Area of FCRDI - Maha Iluppallama

Description	No	Item	Amount
This estimate provide for all the cost of labour, materials,tools, transport and overhead etc. All as per detail in the body of the estimate and attached B.O.Q	1.0	Estimate cost	2,613,801.70
	2.0	Physical contigencies 10%	261,380.17
	3.0	Financial Contingencies 0.02%	52,276.03
	4.0	Engineering Consultancy fee 5%	130,690.09
		VAT - 8%	209,104.14
		Total Cost	3,267,252.13

Prepared By:

E.N.S. EDIRISINGHE
Technological Service
Technical Officer
Divisional Engineer's Office
Mahailuppallama

Signature

Name : E.N.S. EDIRISINGHE
Designation :

Checked & Recommended By :

(D.A.)

U.L.R.G. WERAGODA
DIVISIONAL ASSISTANT
Divisional Engineer's Office
Mahailuppallama

Signature

Name : U.L.R.G. WERAGODA
Designation :

Approved By:

(D.E.)

Signature

Name : H.M.R.M. ABERATHNA
Designation :

Eng.H.M.R.M. ABERATHNE
DIVISIONAL ENGINEER
Divisional Engineer's Office
Mahailuppallama

Estimate for the Balance works of Agriculture well (dia. 20', depth 30') at Yoda Ela Feild Area of PCRDI - Maha Illuppallama

ITEM NO	DESCRIPTION	AMOUNT
1	PRELIMINARY	205,000.00
2	EXCAVATION & EARTHWORK	336,556.00
3	MASON	1,546,004.00
4	CONCRETOR	92,466.70
5	BRICK LAYER	78,420.00
6	PLASTERER	85,355.00
7	MISCELLANEOUS	270,000.00
	TOTAL CIVIL COST	2,613,801.70

Estimate for the Balance works of Agriculture well (dia. 20', depth 30') at Yoda Ela Feild Area of FCRDI - Maha Illuppallama

1 **PRELIMINARY**

Instructions

(a) As per the instruction given by the Engineer following works should be complete.

Item No	Description	Unit	Quantity	Rate	Amount
1.1	Construct & maintain temporary building for consultancy site office (size not less than 10'X10') with cement paving & required facilities(Minimum facilities are Table, Chair, 4'x3' notice board, drinking water) as per the instruction given by Engineer	Item Allow			50,000.00
1.2	Allow for Environmental Mitigation Measures	Provisional Sum			40,000.00
1.3	Allow for Supplying and erecting Project Sign Board (1800mm x 1200mm) as per plan and directed by Engineer / TO	Provisional Sum			30,000.00
1.4	Conducting Hydro Geological investigation to find suitable locations and submittion of report per each well including; a. Results of Geophysical investigation (Number of testbed locations and most promising locations) b. Obtaining Water resource Board approval	Provisional Sum			30,000.00
1.5	Allow for Bank charges for Providing Security Bonds.	Provisional Sum			25,000.00
1.6	Allow for Premium of insurance for property materials at site, injures cause to workmen etc.	Provisional Sum			30,000.00
	Sub Total				205,000.00

2 **EXCAVATION & EARTHWORK**

Rates for Excavation and Earthwork shall include for:

(a) Trimming sides, keeping clean, leveling, grading and consolidating bottom of bases and trenches etc.

(b) Leveling and consolidating where required under slabs or sub-floor layers.

(c) Back filling and well ramming around foundation

(d) Keeping all excavations free from storm or percolating water to keep excavation dry at all stages of construction.

(e) Any necessary additional excavation for working spaces, planking and strutting etc.

(f) Providing shoring work where necessary.

(g) Approval for constituent materials and test reports for properties of soil should be taken from Quality Control Engineer, Quality Control lab - Kekirawa with contractor's expense as request by the Engineer.

(h) Minimum one compaction test should be done for each and every 50 m3 or request by the Engineer, from Quality Control Engineer, Quality Control lab - Kekirawa

Item No	Description	Unit	Quantity	Rate	Amount
2.1	Earth Excavation in Sinking well from ground to 3m deep in any metirials except rock requiring part return filling rammed and surplus disposed of with in site as directed	cum	36	986.00	35,496.00
2.2	Excavation in well in soft disintegrated rock (Not requiring Blasting) up to depth of 3.00m - 9.00m & depositing excavated materials to not Exceding 3.00m	cum	183.2	1,425.00	261,060.00

2.3	Allow for Additional works of site clearing, Back filling For Consolidated As directed; Leveling Site Area & make clear for unloading construction matirials arround the working area of well and make necessary drains & tyding up site as instruction given by engineer	Item allow	1	40,000.00	40,000.00
	Sub Total				**936,556.00**

3 MASON

Rates for Masonry work shall include for:

(a) All joggles, clamps, dowels, ties, and templates.

(b) Rough and fair cutting forming splays.

(c) Angles, reveals and returns.

Instructions :

(a) Cement used should be relevent SLS Certified Products for Masonry work or Engineer's instruction.

(b) Average crushing strength of 10 blocks shall be not less than 2.8 N/mm2 .

(c) One compressive strength, physical properties and water absorbtion test should be done for each and every 1000 units of blocks.

Item No	Description	Unit	Quantity	Rate	Amount
3.1	150-225mm Random Rubble Masonry in cement mortar 1:5 (Buttom up to 1.5 m)	cum	19	16,186.00	307,534.00
3.2	150-225mm Random Rubble Masonry in cement mortar 1:5 (since to bottem 1.50m up to 3.00 m)	cum	19	16,995.00	322,905.00
3.3	150-225mm Random Rubble Masonry in cement mortar 1:5 (since to bottem 3.00m up to 4.50 m)	cum	14	18,185.00	254,590.00
3.4	150-225mm Random Rubble Masonry in cement mortar 1:5 (since to bottem 4.50m up to 6.00 m)	cum	14	19,458.00	272,412.00
3.5	150-225mm Random Rubble Masonry in cement mortar 1:5 (since to bottem 6.00m up to 7.50 m)	cum	10.5	20,820.00	218,610.00
3.6	150-225mm Random Rubble Masonry in cement mortar 1:5 (since to bottem 7.50m up to 9.00 m)	cum	10.5	16,186.00	169,953.00
	Sub Total				**1,546,004.00**

4 CONCRETOR

Grade of concrete used in the construction and recommended mixes as follows.

(a) Grade C20/25 Recommended Mix 1 : 1 ½ : 3 (20mm)

(b) Grade C16/20 Recommended Mix 1 : 2 : 4 (20mm)

(c) Grade C12/15 Recommended Mix 1 : 3: 6 (40mm)

Rate shall include,

(a) Mixing, hoisting, placing and compacting on the surfaces of any material or on formwork.

(b) Forming any construction joint and before concreting edge should be chipped and cleaned.

(c) Vibrating, curing and protecting concrete surfaces from harmful weather conditions.

(d) Forming slope on upper surfaces where required.

(e) Maximum water Cement ratio 0.55

(f) Making good after removal of form work.

(g) Curing should be done.

Instructions

(a) Prior approval for any concrete work should be taken from the Engineer.

(b) The sieve analysis test, silt content test, ect. reports should be submitted for approval of sand and aggregate, if concrete quantity exceed 50 m3, from Quality Control Engineer, Quality Control lab - Kelaniawa with contractor's expense, otherwise approval should be taken from the Engineer.

(c) Cement used should be relevent SLS certified products approved for concrete or Engineer's instruction.

(d) Reinforcement and formwork paid separately where not mentioned.

(e) Any mix design should be approved from material testing laboratory - Kekirawa.

(f) One cube test report for properties of concrete should be taken for each and every 5 m3 of concrete, from Quality Control Engineer, Quality Control lab, Kekirawa

Item No	Description	Unit	Quantity	Rate	Amount
4.1	600X225 mm well rings in R/f Cement con. 1:2:4 (20mm) With 4 nos of 12mm Tor- steel roads & 10mm Tor-steel Stirrup at 450mm c/c including formwork.	cum	3.7	24,991.00	92,466.70
	Sub Total				
5	BRICK LAYER				92,466.70

Rates for Brickwork shall include for:

(a) Wetting well all the surfaces of the bricks before using

(b) Plumbing angles.

(c) Normal straight cuttings.

(d) Ranking of joints for plastering.

(e) All the necessary scaffolding.

(f) Ranking of joints for plastering.

Instructions :

(a) Cement used should be relevent SLS Certified Products for Masonry work or Engineer's Instruction.

(b) Average crushing strength of bricks shall be not less than 4.8 N/mm2.

(c) One compressive strength, physical properties and water absorbtion test should be done for each and every 50,000 units of bricks.

Item No	Description	Unit	Quantity	Rate	Amount
5.1	225mm thick brick work in cement - sand mortar 1:8 (up to first floor level)	cum	4	19,605.00	78,420.00
	Sub Total				
6	PLASTERER				78,420.00

Rates for wall finishing shall include for:

(a) Temporary rules, screeds, ground etc.

(b) Ranking out joints of brickwork and backing concrete surface for forming key.

(c) Joints between different surfaces should be formed with chicken mesh or suitable bonding method.

(d) Forming arises and stopping against joinery work, metal work etc.

(e) Making good around pipes, sanitary fittings and fixtures.

(f) Straight cutting and raking cutting holes, notching and other sundries Labour of a like nature.

(g) Preparing sample panel of different finishes described below for the approval of the Engineer or Architect. Each panel not less than 0.5 m2 in area.

(h) Plastered area to be protected from sunlight to avoid cracking.

(i) Cement used should be relevent SLS Certified Products or Engineer's Instruction.

(j) The approval for sand should be taken from the Engineer.

Item No	Description	Unit	Quantity	Rate	Amount
6.1	20mm thick plinth plastering to circular wall in 1:3 cement - sand mortar finished smooth with neat cement floating	sqm	79.4	1,075.00	85,355.00
	Sub Total				
7	MISCELLANEOUS				85,355.00

Instructions

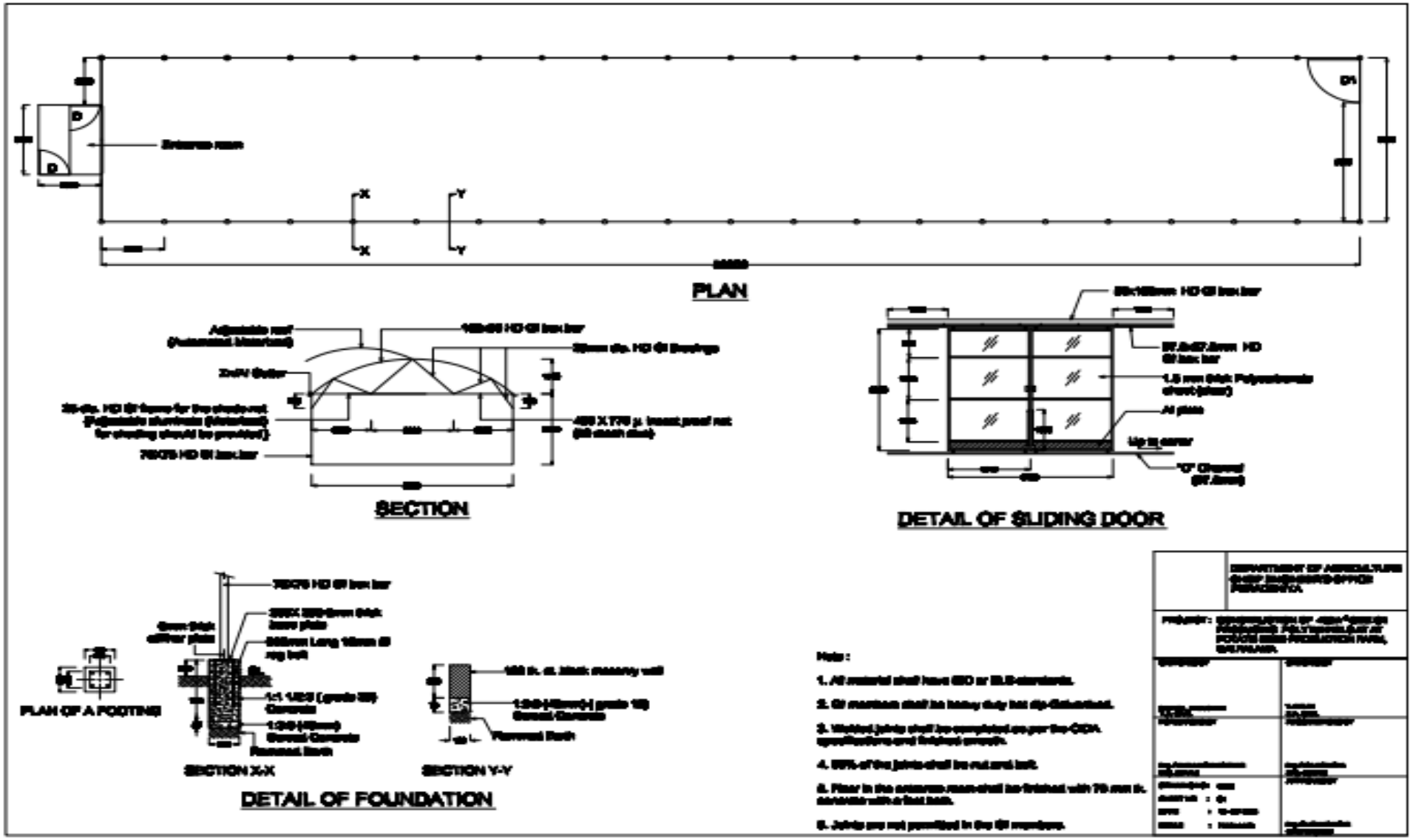
(a) Prior approval for the type of barbed wire should be taken from the Engineer before using.

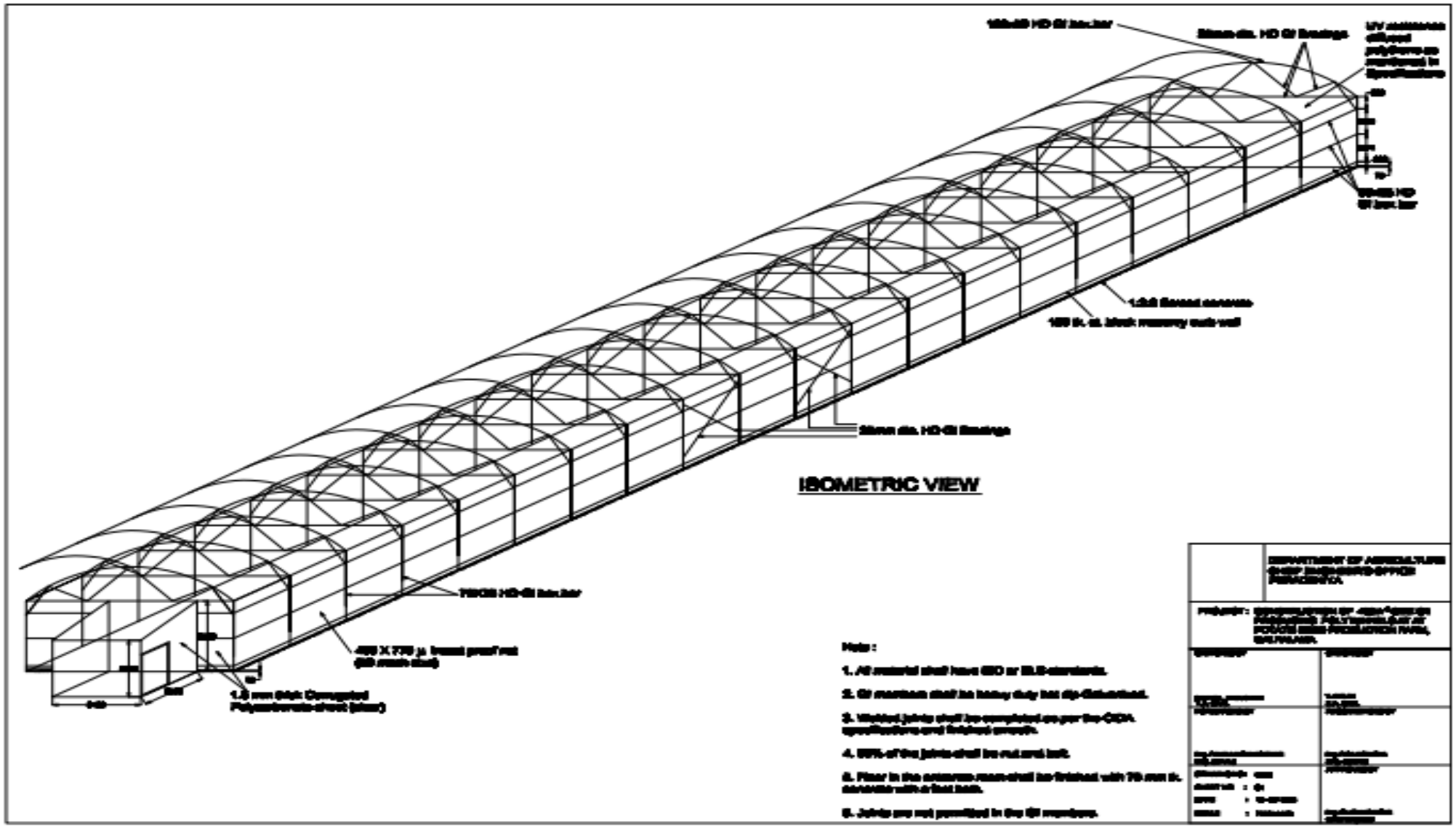
(b) Concrete post should be in grade 20 concrete

(c) Test should be done anytime request by the Engineer, from Quality Control Engineer, Quality Control Lab - Kakamega, with contractor's expense.

Item No	Description	Unit	Quantity	Rate	Amount
7.1	De-Watering (Pump outlet - 2" or above)	Hour	400	675.00	270,000.00
	Sub Total				**270,000.00**

ANNEX 6: DESIGNS OF CONTROLLED ENVIRONMENT POLYTUNNELS




ISOMETRIC VIEW

ANNEX 7: INTERIM GUIDELINES ON COVID-19 OF WORLD BANK

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

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

1. INTRODUCTION

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

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

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

2. CHALLENGES WITH CONSTRUCTION/CIVIL WORKS

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

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

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

3. DOES THE CONSTRUCTION CONTRACT COVER THIS SITUATION?

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

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

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

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

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

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

4. WHAT PLANNING SHOULD THE BORROWER BE DOING?

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

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

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

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

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

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

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

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

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

5. WHAT SHOULD THE CONTRACTOR COVER?

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

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

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

(a) ASSESSING WORKFORCE CHARACTERISTICS

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

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

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

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

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

(c) GENERAL HYGIENE

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

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

(d) CLEANING AND WASTE DISPOSAL

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

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

(e) ADJUSTING WORK PRACTICES

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

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

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

(f) PROJECT MEDICAL SERVICES

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

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

(g) LOCAL MEDICAL AND OTHER SERVICES

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

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

(h) INSTANCES OR SPREAD OF THE VIRUS

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

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

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

(i) CONTINUITY OF SUPPLIES AND PROJECT ACTIVITIES

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

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

(j) TRAINING AND COMMUNICATION WITH WORKERS

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

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

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

(k) COMMUNICATION AND CONTACT WITH THE COMMUNITY

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

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

6. EMERGENCY POWERS AND LEGISLATION

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

- Declaring a public health emergency

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

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

ANNEX

WHO Guidance

Advice for the public

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

Technical guidance

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

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

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

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

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

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

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

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

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

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

ILO GUIDANCE

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

MFI GUIDANCE

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