

THE GOVERNMENT OF SRI LANKA

Environmental Assessment &
Management Framework
Agriculture Sector Modernization Project

Ministry of Primary Industries
&
Ministry of Agriculture
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ACRONYMS

ASMP	Agriculture Sector Modernization Project
CBO	Community Based Organization
CBSL	Central Bank of Sri Lanka
CCD	Coast Conservation Department
CEA	Central Environmental Authority
DWC	Department of Wildlife Conservation
DSWRPP	Dam Safety and Water Resources Planning Project
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EAMF	Environment Assessment and Management Framework
EHSG	Environmental Health and Safety Guidelines
EMP	Environmental Management Plans
EPL	Environmental Protection License
FD	Forest Department
FFPO	Fauna and Flora Protection Ordinance
FO	Forestry Ordinance
FD	Forest Department
GDP	Gross Domestic Product
GoSL	Government of Sri Lanka
IDA	International Development Association
IEE	Initial Environmental Examination
IUCN	International Union for Conservation of Nature
LA	Local Authority
MGP	Matching Grants Program
MGS	Matching Grants Secretariat
MoA	Ministry of Agriculture
MoPI	Ministry of Primary Industries
NEA	National Environmental Act
NGO	Non-Governmental Organization
OP	Operational Policy
OM-MGP	Operational Manual of the Matching Grant Program
PA	Protected Area
PAA	Project Approving Agency
PC	Provincial Council
PCG	Partial Credit Guarantee
PEA	Provincial Environmental Act
PDO	Project Development Objective
PFI	Participating Financial Institutions
PMC	Project Management Committee
PMU	Project Management Unit
PPRC	Project Progress Review Committee
SEA	Strategic Environmental Assessment
ToR	Terms of Reference
TRC	Technical Review Committee
US\$	United States Dollar

Chapter 1: Introduction to Agriculture Sector Modernization Project (ASMP)

1.1. Introduction and Background

Agriculture in Sri Lanka remains critically important for rural livelihoods, poverty reduction, and economic growth. About one third of the population is engaged in agriculture with the sector contributing around 10 percent of total Gross Domestic Product (GDP) and 24 percent of total exports. While Sri Lanka has been successful in achieving self-sufficiency in rice production – the country’s basic staple food – the agriculture sector remains characterized by relatively low productivity and diversification levels; comparatively limited capacity, incentives, and technology choices for smallholder farmers to improve productivity and diversify; structural constraints, such as labor shortages, land fragmentation, low organizational levels; relatively weak linkages between producers and domestic and international markets; and underexploited opportunities for processing and value-addition.

The Government’s *National Program for Food Production 2016-2018* outlines production targets, policy approaches, and technical and institutional measures to increase agricultural production and productivity with the overall aim to reduce dependence on imports and improve the sector’s contribution to the national economy and exports. The program explicitly highlights the need for diversification away from basic staples towards higher value crops (fruits, vegetables), specialized crops (spices), aquaculture, and livestock. The focus on diversification and commercialization is also an important shift towards more market and demand orientation. Diversification is to be achieved by gradually freeing up farmland that was previously mandated for rice production but may no longer be needed as rice productivity is increasing. Fruits, vegetables, specialized niche crops and other agricultural products generally generate higher incomes as compared to rice but also demand more intensive labor input and require new skills, higher levels of technology and innovation, better and environmentally sustainable crop management, and new financing and marketing arrangements, all of which provide new opportunities for development and job creation. The program further emphasizes the need for an integrated approach that involves smallholder farmers, government, commercial private sector, and research institutions as partners.

Agriculture modernization will require differentiated strategies for different parts and production arrangements across the country. In the northern and eastern parts of the country, comprising primarily the dry zone, there is significant scope for agricultural productivity growth both through traditional and non-traditional agriculture and the potential for better linkages to domestic and export markets, including value-added production. In other parts of the country, more robust and scaled-up private commercial investment and innovation through agri-enterprises and agri-enterprise-farmer partnerships is needed for value addition and farmer integration into high value chains through scaling up and diversification into more commercial crops.

The proposed project design provides a framework for the government to experiment with innovative approaches to address these issues across the country and to overcome the low productivity equilibrium and strengthen agriculture’s contribution to the economy and employment creation. The overall strategic thrust reflected in the project design is to support the government’s overall agriculture sector development policy and addressing these issues through: (a) developing an enabling framework and incentive structure for small, medium, and large enterprises to invest in commercial agriculture and value chains; (b) promoting partnership arrangements between private sector partners and smallholder producer for better linkages; (c) demonstrating new agriculture technologies and innovations at sufficient scale to enhance productivity, resilience, and diversification at scale in selected prioritized lagging regions; (d) promoting technology diffusion through capacity building and training and new models for extension service delivery; and (e) supporting sector policy analysis and research for reform.

This document is the Environmental Management and Assessment Framework (EAMF) for ASMP prepared in keeping with World Bank's safeguard policies and submitted in lieu of a specific project environmental assessment for appraising the environmental aspects of the project

1.2 The project objective and description

The Project Development Objective is to *improve agriculture productivity, farmer organizational arrangements and achieve the adoption of innovative agriculture technologies and marketing practices in the project areas*. The project will be implemented over a period of five years. The project design is structured along four components:

Component 1: Agriculture Value Chain Development (*Total US\$ 102.73 million, IDA US\$ 58.63 million*). The component seeks to promote commercial and export-oriented agriculture through attracting and leveraging investments from farmer producer organizations and agribusinesses for high value agriculture production and value addition. It will provide the enabling environment, incentives, and access to finance for such investments through matching grants, technical assistance support, linkages to the commercial banking sector, and a partial credit guarantee (PCG). It will strengthen farmer producer organizations and promote smallholder–agribusiness partnerships; improve the linkages of smallholders in agricultural value chains; increase their competitiveness, business orientation and market position; and making them more attractive business partners in the value chain. The expected component outcomes include: an increased number of farmer producer organizations and agribusinesses investing into higher value agriculture production and value chains; increased benefits derived by farmer producer organizations and rural communities from partnerships through productivity, higher agriculture income, and employment; and increased value of commercial output from value chains.

1. Component 1 comprises the following sub-components:

- (a) *Sub-component 1.1: Investment Preparation Support* (*Total US\$ 7.41 million, IDA US\$ 7.41*), supporting: (i) a training program on the principles and procedures of the Matching Grants Program for PMU field officers of MOPI, TRG, the Board of the Matching Grant Program, staff from commercial banks, technical service providers, and other stakeholders; (ii) public advertisements and information workshops at national, provincial and district levels for prospective applicants; as well as annual conferences to review the performance of the Matching Grants Program; (iii) honoraria and incremental operating costs associated with the review and approval of grant applications through the TRG and Board; (iv) international advisory support to operationalize the Matching Grants Program; (v) salaries and associated allowances of a Matching Grants Officer, an Agribusiness Expert and an Office Assistant to be recruited and housed in the Matching Grants Secretariat of the PMU; (vi) salaries and associated allowances for support staff to the Secretariat at provincial or district levels, including a matching grants officer, a matching grants assistant, and a procurement staff in the Department of Export Agriculture in Kandy and in the three regional support offices (Kilinochchi, Ampara, Matara); (vii) office equipment, office rental, vehicle rental and incremental operating cost for the Matching Grants Secretariat and the regional support offices; and (viii) technical assistance support and mentoring for applicants to the Matching Grant Program to assist in the preparation of quality investment proposals; and (ix) technical assistance support to support the project's environmental and social safeguards requirements within the Matching Grants Program.
- (b) *Sub-component 1.2: Matching Grants to Producer Organizations and Agro-Businesses* (*Total US\$ 88.20 million, IDA US\$ 44.10 million*), supporting a Matching Grants Program to attract and leverage investments from farmer producer organizations and agribusinesses. Matching grants would be provided under two windows:

- (i) Matching grants of US\$ 5,000 up to US\$ 75,000 would be provided for investments to be developed and implemented by farmer producer organizations. Matching grants would co-finance investment proposals from such organizations on a 50/50 cost sharing basis. Eligibility criteria for farmer producer organizations to participate in the Matching Grant Program would include: formal registration under Sri Lanka's Company Act, 2007 at the time of application; appointment of an accountant; a minimum cash contribution of 10 percent of the total investment cost to be deposited into a bank account in the name of the organization at the time of application; and availability of commercial financing of up to 40 percent of the total investment. Upon approval of the investment proposal and matching grant, farmer producer organizations would enter into a project agreement with the PMU of MOPI. Disbursement of the approved matching grant amount would be in pre-defined tranches under a service-based contractual arrangement. Details on management, governance, ownership structure, capitalization, auditing and others of such farmer companies are described in detail in the Operations Manual. Procurement and disbursement procedures are also described in the Operations Manual.

In order to attract and support women-led farmer producers organizations, proposals for matching grant support would receive higher scorings and the ratio matching grant to own contribution could be increased flexible, for example to: 60/40.

- (ii) Matching grants of US\$ 75,000 up to US\$ 500,000 would be provided to agribusiness for agriculture value chain investments. Established and new start-up agribusinesses would be eligible to apply for and access the matching grants. Matching grants would be provided on a 50/50 cost sharing basis, with contributions from agribusinesses to be provided through own-sourced or commercial financing. Requirements for higher contributions from own financing sources can be specified for well-established agribusinesses.

Applications for matching grant support would be evaluated on criteria, such as outreach and capacity building to smallholder farmers, regional focus (with higher scorings for proposals in poor lagging regions, as well as criteria of technical quality, innovative potential, business rationale and others. Upon approval, the PMU would enter into a service-based contractual arrangement with the agribusiness that would specify the contractual obligations of partners and the payment terms for the matching grant.

Matching grants would be awarded based on a transparent application, evaluation and selection process that are described in the Operations Manual. Grants can be used flexibly, as described in the respective approved investments plans, for example, to: expand and/or diversify agriculture production; introduce new production models, technologies and equipment; improve product quality, processing, marketing, and value-added of agricultural products; promote and improve food safety standards; and provide extension and other support services.

Grants provided under both windows would not be used to finance annual inputs (seeds, fertilizer) on a recurrent basis. A detailed negative list of items not to be financed under the matching grants is included in the Operations Manual. It is expected that investment proposals and matching grants would be implemented over a period of no more than two to three years.

- (c) *Sub-component 1.3: Partial Credit Guarantee (Total US\$ 7.12 million, IDA US\$ 7.12 million), supporting a PCG to share financial risk with PFIs that have expressed interest in lending to*

beneficiaries of the Matching Grant Program. The PCG would be administered by the Regional Development Department of the CBSL that has demonstrated prior experience with administrating financing schemes for farmers and SME agribusinesses through both public and private financial institutions. The PCG will operate on the basis of the World Bank Group Principles on PCG Schemes, published in December 2014, covering the governance, management, administration, sustainability, and monitoring of PCGs. The applicable principles are described in the PCG in Annex 4. Detailed operating modalities of the PCG will be described in a PCG Operational Manual.

PFI will undergo a pre-qualification process to become eligible for participation in the PCG. Eligibility criteria will be transparent, open to all institutions and based on exceeding the current prudential requirements on capital adequacy, solvency, liquidity, portfolio quality (non-performing loan ratio), as well as credit policies, existence of safeguard policies, and corporate governance standards. Prior experiences in lending to agricultural sector, farmers, producer organizations, agro-businesses and prior experience with similar schemes will also be considered. It is expected that up to 6-7 PFIs will be selected initially and more institutions can be included as the PCG is rolled out. PFIs can be both private banks and public sector banks.

Coverage of the PCG will be partial as per the World Bank Group Principles, covering 50 percent of the loan amount *pari-pasu*. The PCG will operate on an individual loan basis and pricing will be designed in order to minimize market distortions. Only loan applicants who are benefitting from capacity building and matching grant under the project will be eligible under the PCG scheme. This will help reduce default risk but also ensure that the PCG adheres to the project target group. The PCG, will operate on an individual loan level rather than a portfolio level. During implementation, pricing and recovery models will be further developed so as to minimize market distortions and reflect risks and administrative costs. The proposed maximum loan size eligible for PCG could be US\$500,000, in line with the financing needs beyond the matching grant, with maximum loan maturity of 7 or 8 years. Loan eligibility criteria will be developed to ensure that the loans are for productive purposes within the scope of the matching grants sub-component.

Component 2: Productivity Enhancement and Diversification Demonstrations (US\$ 62.31 million, IDA US\$ 58.63 million). 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. Expected component outcomes include: increased market and orientation of farmers individually and in farmer producer organizations; enhanced agricultural commercialization; and the demonstration and introduction and adoption of innovative technology packages. Component 2 comprises the following sub-components and activities:

- a) *Sub-component 2.1: Farmer Training and Capacity Building (Total Cost US\$ 6.20 million, IDA US\$ 6.20 million)*, supporting knowledge building and capability improvements of smallholder farmers and the establishment of farmer organizations to help them to respond better to market opportunities

Individual farmer capacity building will be implemented through a comprehensive training program through a selected national training service provider in coordination with the national agricultural extension service system and include the: (i) development of detailed curricula building on existing elements of curricula under the theme of *farming as a business*. This will include training modules on markets and marketing understanding, record keeping at farm levels, preparation of crop and livestock budgets (calculation of production costs and cash flows), use of modern communication technology (SMS, internet, IT based systems, etc.), farm level risk assessment and mitigation, etc.; (ii) preparation of a roll-out strategy for up to 600 villages; (iii) training of some 10 master trainers and some 200 Trainers of Trainers, and (iv) rolling out the

training to villages across the country, using a farm business school approach with a combination of class-room and villages on-farm training.

Farmer Producer Organization training and development will include the following activities, which would also be carried out through contracted national service providers: (i) a rapid value chain and farmer producer organization assessments to prioritize the key value chains where farmer organization and joint action is critical for commercialization and value addition. This activity would also assess potential market opportunities; identify existing constraints; devise solutions to address them, and determine the corresponding capacity building needs. The assessment will also include a stock taking of existing farmer producer organizations, their size functions and bottlenecks for business development.

The sub-component would further support: (ii) a training needs assessment of existing and potential farmer producer organizations; (iii) development of detailed curricula development, including training modules on group formation and registration, legal requirements, farmer producer group management (meetings, record keeping, financial planning, market and marketing understanding), commercial lending, use of modern communication technology (SMS, internet, IT based systems, etc.), etc.; (iv) preparation of a roll out strategy for reaching out to some 500 farmer producer groups; (v) training of some 10 master trainers and some 200 Trainers of Trainers; (vi) rolling out the training to some 500 existing and new farmer producer organizations; (vii) the provision of basic office equipment (computer, office furniture) for farmer producer organizations; and (viii) formal legal registration cost.

The activities will be supported by an organizational development specialists (facilitators) to be placed in the provincial agricultural offices. It is expected that most of the trained and established farmer producer organizations would become eligible for application under the Matching Grants Program under Component 1.

(b) *Sub-component 2.2: Modern Agriculture Technology Parks (Total Cost US\$ 33.44, IDA US\$ 33.44 million)*, supporting the introduction, demonstration, and scale-up of innovative agriculture technology packages that are not yet available or practiced by smallholder farmers but would support productivity improvements, diversification, commercialization, more sustainable and climate resilient production patterns (high value products, new varieties, technology, soil, water, fertilization etc.).

The sub-component will support 7 agriculture technology demonstration parks in the selected districts of Jaffna, Mullaitivu, Anuradhapura (Northern Province), Batticaloa (Eastern Province), Monaragla (Uva Provinces), Matale (North-Central Province), and Polonnaruwa (Central Province) which have been identified based on high poverty headcounts and agriculture development potential.

Table 2: Basic Statistics of the Selected Districts for Agriculture Technology Parks

District	Population	Geographical area (km ²)	Agricultural land under small holding (Hectares)	Number of land holdings less than 1/4 acres	Number of land holdings above 1/4 acres
Jaffna	597,000	1,025	16,942	66,526	25,303
Mullaitivu	94,000	2,617	16,293	6,349	11,814
Anuradhapura	893,000	7,179	149,590	26,351	150,613

Batticaloa	541,000	2,854	33,989	78,897	20,890
Monaragala	472,000	5,636	91,869	8,603	81,723
Matale	502,000	1993	50,973	21,154	64,806
Polonnaruwa					

These agriculture technology demonstration parks will be established to demonstrate entire value chain approaches for selected crops, involving: farmer mobilization and training, agriculture production, post-harvest handling and/or processing, and marketing. Each park will include at least eight to 10 entire villages. The number of villagers could be higher depending on the nature of the technology package and the necessary scale to support viable processing units or marketing channels. In each district, these parks would seek to establish profitable farmer companies at a larger scale; support employment of local communities; improve food security and diversification; integrate food production and supply chains vertically; and bring most advanced modern technologies and best practices to the value chains. This would also include training on technologies, business operation, and marketing. Examples of such technology demonstrations would, for example, include: fruits and vegetables production and marketing systems combination with sprinkler and drip irrigation systems, organic farming, improved homestead gardening combined with greenhouse and tunnel cultivation, fertigation technologies, diversification of rice production systems, and various small-scale processing technologies and others. Technology demonstrations could also include other field crops and rice diversification approaches.

The sub-component will also support the organization of two international technology for a/ conference in the first and second year of project implementation, inviting international service providers to discuss and present their agricultural development models successfully implemented and demonstrated in similar agro-ecological and socio-cultural environments. Based on the outcome of these fora/ conference, suitable service providers will be invited to prepare detailed proposals for the introduction, pilot testing, and operationalization of new and innovative technologies, and training following a ‘turn-key’ approach. The approach will focus on topics requiring innovative solutions not necessarily obvious or yet well- known to the local farming communities or farmer organizations or within the government system. Based on a selection and technical review process, private operators/service providers will be contracted under the project to design, implement, operate and ultimately hand-over the technology demonstration parks to the participating communities and farmer producer organizations.

Selection criteria for such demonstrations will include the following: (i) clear innovative elements in the proposed technology demonstration involved; (ii) market-orientation and expected sustainable financial returns; (iii) activity cannot be implemented by the existing public extension service; (iv) demonstration effects which could lead to and expansion and replication in other locations; and (v) Sri Lanka-based private sector institutions, or the local representatives in case of institutions based outside the country, or domestic service providers can implement the activity in cooperation with farmer organizations.

To ensure technology and knowledge transfer to the public extension service, service providers will be required to involve government extension staff and Agrarian Services Departments in the activity, through partnership arrangements that would be specified in each respective contract between the project and the service provider. The detailed implementation modalities of the technology demonstration approach are described in the Operations Manual [to be finalized by negotiations] and will be included in the Procurement Plan.

- (c) *Sub-component 2.3: Production and Market Infrastructure (US\$ 18.37 million, IDA US\$ 14.70 million)*, supporting: (i) the up-grading and rehabilitation of small-scale irrigation infrastructure

and existing water tanks and irrigation systems in the selected priority project areas and linked to the agriculture technology demonstration parks; (ii) the 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; and (iii) village level storage and product handling facilities, including drying platforms and sheds, composting facilities of crop residues, storage facilities and others. Infrastructure investment would complement investments in the agriculture technology demonstration parks under *sub-component 2.2*. Procurement and management of civil works contracts would be under the responsibility the Provincial Councils through the Provincial Project Management Units (PPMUs) and would be implemented in close coordination with the PMU of MOA.

- (d) *Sub-component 2.4: Analytical and Policy Advisory Support (Total Cost US\$ 4.30 million, IDA US\$ 4.30 million)*. The component will provide support to: develop an evidence-based policy, legal and regulatory framework; address knowledge gaps as well as policy and regulatory inconsistencies as they may arise from time to time with policy decisions emanating from different parts of the government; and formulate sector and sub-sectoral strategies to provide the suitable enabling environment for a sustainable and competitive modern agriculture and food system. The expected outcomes of this component include: policy analysis integrated into the government's policy decision making process; a strengthened socio-economic analytical foundation in the formulation of long-term sector and sub-sector development strategies; improved coordination across various parts of the government on economic policies and regulations affecting the enabling environment for private investment in the agriculture and food sector.

The sub-component will be implemented by the Center for Agriculture Research Policy (CARP). Day-to-day activities will be managed by a small policy unit to be established in CARP with project support. The unit would report to the Chairman of CARP, a position held by a highly-respected person with convening power across Ministries and disciplines to affect proper coordination and link with the higher level economic and political decision-making processes.

The sub-component will facilitate access by key government decision makers to the best available analytical expertise and policy advice to: (i) evaluate policies and regulations and recommend adjustments, reforms or new policies needed to make agriculture more competitive, responsive to market demand, 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; and (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.

The specific responsibilities of CARP will be to: (i) develop an annual program of studies and analytical work at the start of each year; (ii) based on study findings guide the technical and policy level consultations and discussions of the CPCU and the participating ministries; (iii) monitor the consistency of economic policies across various parts of the government; and (iv) host an annual conference on Sri Lanka's agricultural policy with the participation of top policy makers in various concerned ministries and departments, academics and researchers, private sector representatives engaged in agriculture and food business (both domestic, imports and exports), and other stakeholders participating. The conference would bring together available knowledge on topical subjects and identify priority analytical and policy research topics that would constitute the

component's annual work program for the following year. The policy analysis and research program would be implemented through a multi-year framework agreement with a competitively selected consortium of domestic and international researchers to provide independent and objective analysis. Competition will be open to both local and international agencies/consortia with the proviso that local bidders would have to partner with a reputable and well recognized international research organization, and that the international bidders will have local institutional collaboration with a University or researcher organization or a local consortia of researchers.

This sub-component may also provide some limited support for equipment to MOA proposed Center of Excellence and some start-up support to conceptualize a *National Information System for Agriculture*, with the medium-term objective to build capacity for data collection and management in support of policy formulation, enhanced public service provision, and improved risk monitoring in agriculture. The system would promote the coordinated organization, standardization and integration of data and information, supported by remote sensing and meteorological data and analysis capacity, and enhance communication and interoperability between the various agencies and accessibility to the public and private sectors.

Component 3: Project Management, Monitoring and Evaluation (Total Cost US\$ 8.02 million, IDA US\$ 7.74 million). This component will support the PMUs of MOPI and MOA in project management and coordination, technical supervision, financial management, procurement, social and environmental safeguards, and monitoring and evaluation (M&E). The component will support: (a) project orientation workshops, training and study tours; (b) engagement of technical assistance and short term experts for overall project management; (c) design and installation of a project M&E and Management Information System; (d) M&E surveys and reviews (baseline, mid-term and end of project impact evaluation through an external agency/ institute); (e) the regular supervision of environmental and social safeguards implementation; (e) procurement of office equipment, office renovation or rental, and vehicles; and (f) incremental operating costs. The component will provide support to the Provincial Project Management Units (Northern, North- Central, Central, Eastern, Uva) to recruit PPMU staff and for training in project management and operational expenses.

1.3 Project Reach

The project is national in scope and it is expected that project sites would be located in all three major agro-ecological zones, including the wet zone (average annual rainfall above 2500 mm); the intermediate zone (annual rainfall between 1750-2500 mm); and the dry zone (annual rainfall less than 1750 mm). The dry and intermediate zones cover about 66% of the agriculture land area and receive about 30% of the country's annual surface water yield. They are extensively used for agriculture and require irrigation water to be productive. The bulk of the country's irrigation infrastructure is hence located in the dry zone. The wet zone, on the other hand, comprises 34% of the agricultural land area and receives 70% of the country's annual surface water yield. The three major plantation crops, tea, coconut and rubber, most other export crops such as spices and various types of fruits are grown here under rain-fed conditions.

The project's proposed agriculture technology demonstrations parks included under Component 2 and the complementing production infrastructure investments will be located in the 5 priority districts of Jaffna, Mullaitivu, Anuradhapura, Pollonaruwa, Matale, Batticaloa, and Moneragala. While exact project sites are not yet known and will be determined as part of a detailed feasibility study process during implementation, the districts are located in the dry zone (except for Moneragala, which is located partly in the intermediate zone and dry zone and Matale which is located in the intermediate zone) and have been identified based on high poverty rates and high absolute numbers of poor. The majority of these districts are located in the former conflict affected areas and are characterized by poor or dilapidated public infrastructure, lack of productive infrastructure at the farm level, and poor access to markets, as well as limited livelihood and

employment opportunities. (Please refer Annex 16, for further details on the Agro ecological zones of the broader project areas)

1.4 Objective of the Environmental Assessment and Management Framework

Projects and Programs financed with IDA resources need to comply with World Bank Operational Policies. Therefore, components and related activities eligible for funding under this project will be required to satisfy the World Bank's safeguard policies, in addition to conformity with environmental legislation of the GOSL.

However, since details of sites and specific investments of the project are not available at this stage, site-specific Environmental Assessments (EA) cannot be conducted. What is possible at this stage would be to carry out an identification of generic issues that are typically associated with activities that would potentially be funded by the project and apply the information to site specific environmental assessments, as and when the need arises.

Therefore, the purpose of this document is to outline a framework for environmental assessment and management, giving details of potential environmental issues and guidelines on what type of environmental assessment tools to be applied for various sub-project activities. This will serve as the basis in the preparation of, site-specific specific Environmental Assessments and/or Environmental Management Plans (EMPs). As stated earlier, it is being submitted in lieu of a project EA and has formed the basis for appraising the environmental aspects of the project. It will be made available for public review and comment in appropriate locations in Sri Lanka and in IDA's Public Information Center in accordance with World Bank's policy of Access to Information.

It is expected that detailed environmental assessments (EAs and EMPs) for sites and/or for activities will be carried out (in accordance with this Framework) by the implementing agencies and will be reviewed and cleared by the Central Environmental Authority or designated Project Approving Agency (PAA), as applicable, under prevailing national environmental legislation in Sri Lanka for nationally prescribed projects (refer sections 2.1 to 2.4) if applicable and by IDA for all physical activities prior to the approval of disbursement of funds.

The objectives of this Environmental Assessment and Management Framework are:

- a. To establish clear procedures and methodologies for the environmental planning, review, approval and implementation of subprojects to be financed under the Project
- b. To carry out a preliminary assessment of environmental impacts from project investments and propose generic mitigation measures.
- c. To specify appropriate roles and responsibilities, and outline the necessary reporting procedures, for managing and monitoring environmental and social concerns related to subprojects
- d. To determine the training, capacity building and technical assistance needed to successfully implement the provisions of the ESMF
- e. To provide practical resources for implementing the ESMF

Chapter 2: Introduction to Agriculture Sector in Sri Lanka

For more than 2,500 years, Sri Lanka has been an agrarian based society and agriculture still remains a key component of the economy as well as the island's cultural base. Despite the gradually declining economic importance of agriculture and fishery in Sri Lanka over the years, most rural people, who constitute the major segment of Sri Lanka's population, are dependent on rainfall-based sources of income, such as agriculture, livestock production and inland fishery. Consequently, the agriculture sector is afforded high priority in the development agenda of the Government of Sri Lanka.

2.1 Current Status of Agriculture Sector in Sri Lanka

Sri Lanka's agriculture is characterized by a non-plantation cropping sector and a plantation sector. Of the country's approximately 2.3 million hectares of agricultural land, 80 percent is used for non-plantation foods crops, comprising rice, maize, fruits, vegetables, and other crops that are primarily grown in small-holdings. About 1.65 million smallholder farmers operate on average less than 2 hectares and contribute 80 percent of the total annual food production. Commercial crops (minor export crops) include cinnamon, pepper, cocoa, and coffee and are grown on small and medium land holdings as well. Plantation crops—coconut, rubber and tea—are cultivated in large estates and small and medium land holdings. Typically, non-plantation crops are grown under irrigated conditions while plantation and minor export crops are grown in the rain-fed areas. Monsoonal rainfall patterns shape the agricultural seasons and irrigation patterns. Two thirds of the agricultural area are located in the dry zone where the bulk of the country's irrigation infrastructure is located.

Sri Lanka's has successfully attained self-sufficiency in rice and recently also in maize production. Rice production has increased steadily from 2.9 million tons (2002) to 4.8 million tons in 2014, in part because previously inaccessible land was reopened for cultivation after the end of the conflict but also through the introduction of high-yielding varieties, the expansion of irrigation capacity, and distinct policy choices, such as fertilizer subsidies for paddy, restrictions on crop choices, and import substitution. Achieving self-sufficiency has meant that the agriculture production structure has remained concentrated in the low value food crops. In 2013, about 45 percent of the cultivated area was under rice cultivation (up from 37 percent in 1980) but the share of rice in the overall value of crop production was only 18 percent.

With rice self-sufficiency secured, the time is now opportune to diversify the production structure out of the relatively low value food crops and towards high-value agriculture. This structural shift is critical to sustain income growth going into the future, accelerating poverty reduction and re-reversing the trend in shared prosperity. Average rice yields of 4.06 tons/hectare are relatively low. Agricultural productivity, as measured by total factor productivity (TFP) has only grown by an average of 0.6 percent per year since 1980, significantly lagging behind other South and East Asian countries. At the same time, sector policy has neglected the domestic fruits and vegetable sectors. Despite growing domestic demand and potential for export growth, higher-valued crops have not expanded. Instead, demand has been met by increased imports, for example of potatoes, chili, and onions. Most of the fruits and vegetables generate higher income as compared to rice but demand more intensive labor input, higher levels of technology input, better crop management, and investments in post-harvest, marketing, and better organized value chains overall.

2.2. Overall farming systems and Agricultural Land Use

Sri Lanka is divided into 46 agro-ecological regions that take into account soil, annual rainfall and its seasonal distribution, and altitude. Sri Lanka's traditional farming systems have developed over hundreds of years with farmers managing production systems in these regions to best suit local environmental

conditions. This has led to a rich agro-biodiversity in the island in terms of rice, cereals, pulses, vegetables, root and tuber crops, spices and fruits.

Rice fields, crop plantations, vegetable plots, chena plots and home gardens constitute the main agricultural land uses in Sri Lanka. This includes land under food crops (consisting of rice paddies, horticultural crops, other field crops and spices), plantation crops (comprising mainly tea, rubber, coconut and sugarcane), minor export crops, and other beverage crops such as coffee. The category termed other field crops (OFC) includes over 100 species. Among these are cereals, grain legumes, condiments and oilseeds, onion and potato. Crops such as onion, potato and vegetables generally remain a small farmer activity, though some of these crops are also grown on a semi-commercial scale. Fruits, vegetables (i.e. up-country, which includes vegetables such as carrots, lettuce and other colder weather crops, and low-country vegetables which are more native in nature), and ornamental plants also form an important component of agricultural export earnings as they contribute to ensuring food security and national income generation

Changes in climatic conditions may, however, change the conditions that define the agro-ecological regions, and reduce the productivity of crops and livestock that are adapted to them. Currently, more than 2,000,000 ha are under some form of agriculture in Sri Lanka (**Table 1**). However, much of the agricultural lands are located in the water deficient Dry Zone where increased productivity of crops (other than paddy) depends entirely on rainfall.

Table 1: Extent of land under different agricultural uses in Sri Lanka

Land use	Area (ha) in 2009
Paddy	977,561
Vegetables (including, root and tuber crops)	85, 663
Fruits	85,066
Other Field Crops	130,297
Plantation crops (Tea, rubber, coconut and sugarcane) ⁺	716,320
Minor export crops (coffee, cocoa, cinnamon, pepper, cardamom, cloves, arecanut, cashew, betel) [†]	119862

Source: Sector Vulnerability Profile: Agriculture and Fisheries- November 2010

A positive feature is that the varied climatic conditions in farming systems of the island have given rise to a wide range of crop species and land races that are suited for varied conditions of soils, rainfall and altitude as well as to diseases and insect pests. Genetic diversity is particularly high among rice, cereals, cucurbits, vegetables such as tomato and eggplant, indicating potential for crop improvement in the face of climate change as an adaptation measure.

2.2.1 Rice paddies

The gross total extent of land sown for paddy cultivation in 2009 was nearly 980,000 ha during both *Yala* and *Maha* seasons, including the paddy lands of the North and East. Sri Lanka's paddy fields are both rainfed and irrigated from rainwater stored in tanks, built during the island's hydraulic civilization, and large multi-purpose reservoirs built in recent times. Paddies in the Dry Zone are rainfed from the North-East monsoon during the *Maha* season and irrigated in the non-rainy period or *Yala* season. Paddy fields in the Wet Zone are rainfed and comprise terraced systems in hilly areas, and open systems in flat lowland areas, to suit the local terrain and rainfall.

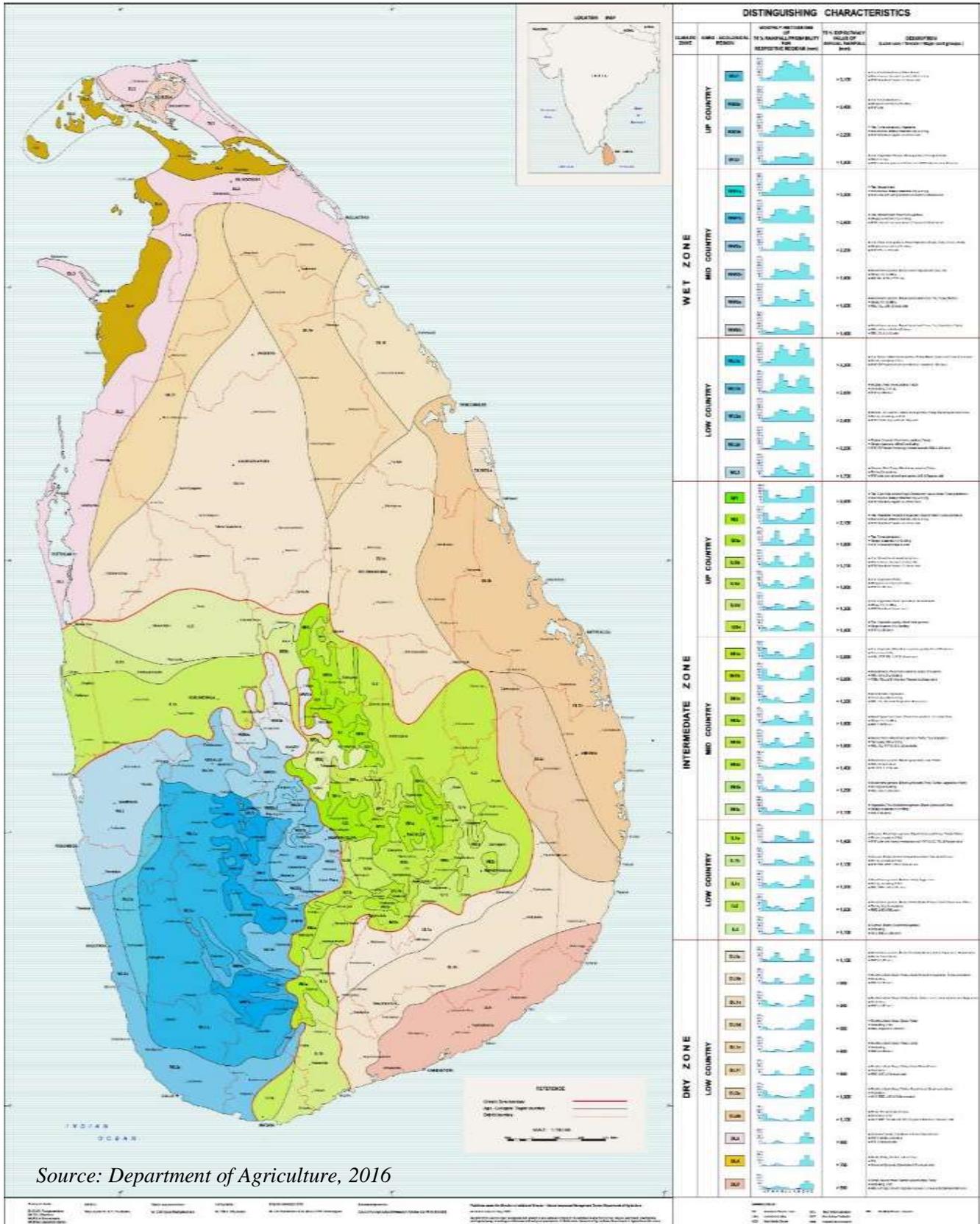
The national paddy production was 3.65 million MT of rough rice in 2009,⁵ which is adequate to satisfy the country's domestic requirements. However, it is seen that total paddy production in 2009 declined by 5.8% compared to the highest ever production of 3.87 million MT in 2008, mainly due to insufficient water for cultivation during the *Yala* season as a result of delay in the onset of monsoon rains, and the consequent delay in release of water for cultivation.

Overall, the extent of paddy lands has increased since the end of the ethno nationalistic conflict, due to the reuse of a large extent of abandoned paddy lands in the Northern and Eastern provinces.

The long history of paddy cultivation in Sri Lanka that spans over two thousand years is closely linked with climatic variations in the region where rice is grown, resulting in a high varietal diversity of rice (*Oryza sativa*). Among these are several indigenous rice varieties that can tolerate different climatic and soil conditions, and are highly resistant to pests and disease. For example, there are traditional upland varieties well known for their drought tolerance; varieties grown in the coastal areas and floodplains of rivers that possess tolerance of submergence and flash floods; a few rice varieties cultivated at higher elevations (over 1000 m) that grow at low temperatures; and several varieties that show broad-based resistance to serious pests, high salinity and other adverse soil conditions. Sri Lanka also has five species of wild rice, including one with a rhizome (*Oryza rhizomatis*) which is perennial. Among the traditional and wild varieties of rice many have characteristics that are important for varietal improvement. For example, *Oryza nivara*, Podiwee, Murungakayan and *O. eichingeri* are resistant to blast; Dahanala and Kalubalawee are resistant to thrips; Rathuheeneti, *O. eichingeri*, Suduhanditan, Balamawee, Sudurusamba, Mawee and Hondarawalu are resistant to the brown plant hopper (BHP); *O. granulata* is resistant to drought.

Figure 1-Agro Ecological Regions of Sri Lanka

AGRO - ECOLOGICAL REGIONS OF SRI LANKA



Source: Department of Agriculture, 2016

2.2.2 Plantation agriculture and other export crops

The Plantation Sector comprises tea, rubber, coconut and sugarcane, which together with other minor export crops such as coffee, cocoa, spices (including cloves, cinnamon, nutmeg, mace, pepper, cardamom, etc.), cashew, arecanut, betel leaves, essential oils and un-manufactured tobacco are important in terms of export earnings. Around 709,000 ha are under tea, rubber and coconut; 7320 ha are under sugarcane, and 119,862 ha are under coffee, cocoa, cloves, cinnamon, pepper, cardamom, cashew, arecanut and betel leaves. About 300,000 small scale growers are involved with the cultivation of export crops, of whom the majority are smallholders. Tea and rubber plantations are concentrated in the Central and Sabragamuwa Provinces; coconut plantations are mainly located in the Kurunegala, Puttalam and Gampaha Districts; cinnamon and citronella plantations are found mainly in the Southern Province.

Research carried out at the respective Tea, Rubber and Coconut Research Institutions, as well as selection by growers, has resulted in considerable diversification of cash crops from the originally introduced germplasm. This has served to produce high-yielding varieties that are also resistant to pests and disease and adverse climatic conditions.

2.2.3 Home gardens and horticulture crops

There are about 1.42 million home gardens in Sri Lanka, accounting for about 76,483 ha. They make a substantial contribution to agricultural production in the country, and play a perceptible role in maintaining canopy cover in the island, ameliorating the local climate, and providing timber and wood products. Home gardens constitute a traditional system of perennial cropping for a wide range of valuable crops, and are known to be particularly important for providing construction and industrial wood and maintaining high species and genetic diversity of fruit, vegetables and spices that can be used to improve capacity of such crops to withstand climate change. Forest analogue home-gardens, such as the typical 'Kandyan home gardens' demonstrate diverse agricultural systems, and are the main agricultural holdings for horticultural crops. They are also repositories of indigenous traditional knowledge on agricultural practices that could be of value when formulating adaptation measures for climate change. Home gardens in the Wet Zone, particularly in the Western wet lowlands are, however, now being increasingly fragmented, with the decreasing land-man ratio in the region. This is leading to considerable localized loss of canopy cover and the erosion of indigenous horticultural crop diversity. *Chena*, or slash and burn cultivation, though environmentally destructive, is also a major source of cereals and vegetables that have been subject to selection by farmers over time.

The Department of Agriculture is continually engaged in research and development projects, extension services, seed production and quality improvement programs for development of the horticultural sector, headed mainly by the Horticulture Research and Development Institute (HORDI). These efforts include the release of several hybrid varieties that have qualities to withstand climate change. For example, two new hybrid varieties of tomato, '*Bhathiyaa and Maheshi*', and one variety, (i.e. *KC-1*) that were released are tolerant to high ambient temperature coupled with a high yield.

2.2.4 Livestock

Livestock is an important component of the agricultural sector. At present there are about 1,136,860 neat cattle and 371,790 buffalo, 377,460 goats, 8,000 sheep and 81,310 pigs, 13,615,290 chickens and 15,244 ducks country wide.¹⁰

Most of the livestock comprise imported high yielding breeds to address the increase in livestock production. Sri Lanka also has several local breeds that are well adapted to the local environment and harsh conditions, but are relatively low yielding. These locally adapted breeds now show a significant drop in population size due to the move towards high yielding imported breeds and cross-breeding. This requires special measures to conserve the indigenous livestock breeds with traits that are useful to adapt to climate change.

Among the extant indigenous breeds are a type of locally adapted native cattle (*Bos indicus* var *ceylonicus*) or “Batu Harak” and the white cattle of Thamankaduwa that are reared for draught and milk, hardy indigenous goats including a locally adapted breed Kottukachchiya, and village chicken that are poor egg producers but are highly adapted to a harsh environment. The locally adapted breeds show traits such as high adaptability to the environment, high resistance to tropical diseases, high fecundity, early maturity, good mothering ability, longevity and low cost of production.

2.2 Environmental impacts attributed to the agriculture sector

Sector specific environmental issues are discussed further in Annex 7, the following sections provide a brief overview of the key areas of environmental impacts that are attributed to the agricultural sector are of national concern.

2.3.1 Land degradation and deforestation

Soil erosion, loss of soil fertility and water logging in irrigated lands of the dry zone and intensive farming in steep slopes have resulted in land degradation in existing agricultural areas across the country. The main manifestations of the land degradation issue are loss of arable lands, decreasing agricultural productivity and loss of irrigation capacity due to siltation of reservoirs and intensification of natural hazards according to studies conducted by the United Nations Environment Program in 2009. Despite the soil conservation act in operation, poor soil conservation methods and insecurity of tenure in agricultural lands preclude the permanent investment in soil conservation. Poor water management, lack of awareness on land degradation, high demand for agricultural lands, drought and uncertainty of rainfall, failures of land-use policies, lack of government incentives and inadequate capacity of governmental organizations to implement a systematic program on conservation as well as loss of forest cover, shifting cultivation, have been identified as direct causes for soil erosion with regard to the agricultural sector activities. Nearly 1.6 million ha of agricultural land in Sri Lanka are affected by soil fertility decline. Soil fertility decline is caused by soil erosion and excessive up take of nutrients by crops. Declining crop yields have been reported during the last two decades due to soil fertility degradation. Studies have shown that in the case of tea, the loss of 1 cm of topsoil cover is associated with a decline in yield of 44 kg/ha/yr, while in the case of rubber the decline in yield could be nearly 174 kg/ha/yr. Though the soil fertility decline due to excessive uptake of nutrients by crops can be corrected to some extent by application of extra fertilizer the soil fertility decline due to loss of surface soil cannot be renewed easily. It is usually costly and will require considerable time and effort.

Though the current status of deforestation is minimal, during the last century the forest cover was depleted substantially, due to forest clearing for irrigation, agriculture, settlements, hydropower generation, and timber extraction and shifting cultivation during the late 1970s and 1980s, post the implementation of the Mahaweli Irrigation Project. Recent studies have reported that shifting cultivation and expansion of tea plantations still remain area of concern and among the main threats faced by the forests in the wet zone but deforestation due to these reasons has been much less in the last decade in comparison to forest cover loss due to development of infrastructure and housing.

Pollution of Inland Waters

Pollution of inland waters take place primarily through agricultural practices, industrialization and urbanization. In agricultural areas the widespread and enhanced use of agro - chemicals and fertilizers has Led to the discharge of domestic waste into waterways. The pressures created by these three sources have led to eutrophication and blooming in stagnant water bodies; nitrate pollution in ground water; spread of disease due to organic pollution; reduction of land values near water ways and general economic losses to the country.

Trends in pesticide use and pest control in Sri Lanka

Pesticides have been in use in agricultural practices in Sri Lanka since the 1950s, yet pesticides are not manufactured in Sri Lanka to date. Due to the positive trends observed via the scope and use of pesticides their import has grown over the years. All pesticides are imported as finished or formulated products or as technical grade materials for local formulation. There is very little solid statistical data available in the country to deduce the amounts and variations based on geography of pesticide use. Statistics on pesticide imports are among the few reliable indicators of quantities of pesticides used in agriculture. The DOA has conducted studies on pesticide use and attempt to monitor their use as well. In 1977, liberalized policies lead to an increase in the import of pesticides, favoring direct importation of finished products rather than intermediaries required for local formulations. According to the DOA, annual pesticide imports comprise mainly of herbicides, insecticides and fungicides and their use has shown a notable increase during the 1990s. It is clear that pesticide consumption has risen over time and continues to fluctuate with changes in planted acreage, infestation levels and other factors such as farm product prices. Herbicide consumption fluctuates around 2,300 tons per year. Insecticide consumption had increased by 25 per cent in 1999 (2,428 tons) compared to the previous year (1,942 tons), as per the data collected by the DOA. A list of banned pesticides is maintained by the DOA and made available to the public as well (Annex 1). However the DOA has not sorted and compiled different lists for herbicides.

The DOA also records that insecticide use in rice declined as a result of the Integrated Pest Management (IPM) Program, but increased on vegetables and other field crops like chili and onion. Vegetable growers most commonly depend on insecticides, typically used in heavy doses, followed by fungicides. Weedicide is not used to a great extent in vegetable production, except by farmers who cultivate onions. An array of insecticides is adopted and very little attention is paid to conforming to application frequencies, quantities and health and safety indications. Local farmers commonly misuse pesticides, mixing different varieties and striving to over application for better results, unaware that toxicity levels often increase and misuse facilitates greater environmental and health hazards. According to pesticide consumption data from 1995 to 2000, collected by the Food and Agriculture Organization (FAO), organophosphates were the highest used pesticide category within insecticides, amides in herbicides and dithiocarbamates in fungicides, within Sri Lanka.

Locally, pest control depends mostly on the use of synthetic pesticides. Ready-to-use products that can easily be procured from local vendors and applied when and where required. Abuse and misapplication of pesticides is a common phenomenon in Sri Lanka. Farmers often totally disregard recommendations and strive to indiscriminate use of pesticides based on their own experience. Some farmers do not have sufficient information and knowledge on the safe and efficient use of pesticides also. . Even though many farmers are aware of the detrimental effects of pesticide use, due to the economic gains involved it still remains the most popular method of pest control. Awareness on implications to human health, the environment and crop ecosystems have still not been able to drive a strong push towards alternatives to exclusive chemical pest control, like varietal resistance and IPM. Thus awareness and transfer of technical knowledge structured over the economic benefits of green/sustainable agriculture plays a key part in altering existing trends in pesticide use and pest control.

Control of pesticide use in Sri Lanka

According to the FAO continuous dependence on use of pesticides had brought a dramatic increase of imports since the enactment of the Pesticide 31 Law, from 2 309 metric tons in 1980 to 5 120 metric tons in 2003. A comprehensive pesticide control procedure is in existence within the country yet enforcement is low. The process includes; the registration of products, risk/benefit analysis, field monitoring and enforcement, laboratory testing, imports regulations and banning and restricting. Over the years, the use of pesticides has been prohibited and these products have been banned. Only registered pesticides can be imported in to the country and they are also classified under the customs ordinances. A stringent process that allows only limited trial quantities of 10litres/kilograms and requirement of written approvals by relevant officials is in place. However even with controls and awareness facilitation programs are in place they are not exercised at the user level fully, the long term consequence of misuse are often overlooked.

Chapter 3: Environmental laws, regulations and institutions in Sri Lanka and World Bank environmental safeguard policy requirements

In Sri Lanka, there are over 80 legislative enactments that directly or indirectly relates to protecting and conserving the natural environment and human health. While most of these laws address specific issues pertaining to environment in the respective sector, it was the introduction and enactment of the National Environmental Act (NEA) that provided the overarching legal basis for regulation of pollution and protection of the environment from all sources in a comprehensive manner. The following section outlines the broad legal and institutional framework in Sri Lanka for environmental management and World Bank's environmental safeguards requirements, which will be relevant to the proposed project.

3.1 National Environmental (Amendment) Act No. 53 of 2000

As mentioned earlier, a law to incorporate and cover all aspects of environment was made for the first time in 1980. This is the National Environmental Act (NEA) No. 47 of 1980, the basic national decree for protection and management of the environment. The NEA has seen several amendments in the past in a bid to continually make improvements and to respond to the challenging needs of the time. There are two main regulatory provisions in the NEA implemented by the Central Environmental Authority (CEA) through which impacts on the environment from the process of development is assessed, mitigated and managed.

- The Environmental Impact Assessment (EIA) procedure for major development projects. Regulations pertaining to this process have been published in 1993 and are available with the CEA.
- The Environmental Protection License (EPL) procedure for the control of pollution. Regulations pertaining to this process have been published in 1990 and are available with the CEA.

3.1.1 Environmental Impact Assessment

Sri Lankan Government recognizes EIA as an effective tool for the purpose of integrating environmental considerations with development planning. The application of this technique is considered as a means of ensuring that the likely effects of new development projects on the environment are fully understood and taken into account before development is allowed to proceed. The importance of this management tool to foresee potential environmental impacts and problems caused by proposed projects and its use as a means to make projects more suitable to the environment are highly appreciated.

The legal provision for EIA in Sri Lanka was first included in the Coast Conservation Act No. 57 of 1981 (see below). These provisions were restricted to the Coastal Zone as defined by this Act. The broader legal framework for the EIA process in Sri Lanka was laid down by the amendments made to NEA in 1988 through National Environmental (Amendment) Act No. 56 of 1988. The provision relating to EIA is contained in Part IV C of the National Environmental Act. The procedure stipulated in the Act for the approval of projects provides for the submission of two types of reports Initial Environmental Examination (IEE) report and Environmental Impact Assessment (EIA) report. Such reports are required in respect of "prescribed projects" included in a Schedule in an Order published by the Minister of Environment in terms of section 23 Z of the act in the Gazette Extra Ordinary No. 772/22 dated 24th June 1993. This amendment makes EIA mandatory for whole of Sri Lanka and transformed Central Environment Authority (CEA) into enforcement and implementing agency.

Further, any developmental activity of any description whatsoever proposed to be established **within one mile of the boundary of any National Reserve**, should receive the prior written approval of the Director of Wildlife Conservation. The Fauna and Flora (Protection) Ordinance mandates that the project proponent should furnish an IEE or EIA report in terms of the National Environmental Act for this purpose. In order for a project to be approved the project proponent should submit either an Initial Environmental Examination (IEE) report or an Environmental Impact Assessment (EIA) report. If it's an EIA report that has been submitted there is mandatory period of 30 days during which the public can inspect the document and comment on the report. Further, a public hearing may be held to provide an opportunity to any member of the public to voice their concerns. A decision whether to approve the project will be made only after public consultation is done and necessary major issues are resolved.

The EIA process is implemented through designated Project Approving Agencies (PAAs). PAA's are those organizations that are directly connected with such a prescribed project. At present, 23 state agencies have been recognized by the Minister as PAAs which include the DWC, FD and CEA. A given organization cannot act both as the PAA as well as the project proponent. In such cases the CEA will designate an appropriate PAA. Similarly when there are more than one PAA the CEA must determine the appropriate PAA. In the event of doubt or difficulty in identifying the appropriate PAA, CEA itself will function as the PAA.

Application to ASMP – The EIA/IEE regulations will apply to any new activities proposed under the MGP and under any physical interventions proposed under Component 2 if initial screening reveals they have potential to trigger adverse environmental impact.

3.1.2 Environmental Protection License

The Environmental Protection License (EPL) is a regulatory/legal tool under the provisions of the National Environmental Act. The EPL procedure has been introduced to prevent or minimize the release of discharges and emissions into the environment from industrial activities in compliance with national discharge and emission standards, to provide guidance on pollution control for polluting processes and to encourage the use of pollution abatement technology such as cleaner production, waste minimization etc. Here the industries are classified into three lists named A, B and C. List A comprise of 80 potentially high polluting industries, List B comprise of 33 medium polluting industries and List C comprise of 25 low polluting industrial activities.

For List A and List B industries the project proponent must submit a duly filled application (can be obtained from CEA headquarters, provincial and district offices or downloaded from www.cea.lk) for each prescribed activity to provincial or district office of CEA who will evaluate the application and determine the relevancy of issuing an EPL and the adequacy of the details furnished and determine and appropriate inspection fee. Then the project proponent must pay the prescribed fee to CEA headquarters, provincial or district office of CEA and submit the receipt to the relevant provincial or district office of the CEA. Then a team of officers will carry out an inspection and submit a report based on the site visit and the information provided. If the Issue of EPL is recommended the project proponent can obtain the EPL upon payment of license fee.

For List C industries issue of EPL is delegated to local authorities (Municipal councils, Urban councils or *Pradeshiya Sabha*). The procedure to be followed is the same except the Local Authority will appoint a Technical Evaluation Committee that will make the final decision regarding the issue of EPL based on the field assessment report and information furnished by the industrialist. The EPL can be renewed by

submitting a renewal application three months prior to the date of expiry to the relevant authority who will conduct an inspection and determine whether the EPL should be renewed.

Application to ASMP – EPLs will be required for activities under taken under the categories, relevant to the agriculture sector and project activities, as specified in the Gazette namely Parts A, B & C (Presented in Annex X).

3.1.3 Strategic Environment Assessments

Although project level EIA is an effective tool in addressing environmental impacts at project level, it often fails to take into account cumulative impacts of several projects. Under such circumstance Strategic Environment Assessment (SEA) is a more effective tool in identifying cumulative impacts on the environment of a specific policy or program of works. At present SEA is still not a mandatory requirement in Sri Lanka. However, the Cabinet of Ministers has approved implementation of SEA for policies, programs and plans in Sri Lanka. Therefore, all Ministries, Departments and Authorities who are responsible for implementing a new policy, plan or program should carry out a SEA for the new policy, plan or program prior to its implementation and submit a copy of the SEA report to the Central Environmental Authority for review and comments.

Application to ASMP –May not be applicable to the nature of project interventions proposed under the project.

3.2 Coast Conservation Act (CCA) No.57 of 1981

The projects located wholly or partly within the coastal zone (the area lying within a limit of three hundred meters landwards of the Mean High Water line and a limit of two kilometers seawards of the Mean Low Water line) must undergo the approval process that is laid down in the Coast Conservation Act irrespective of its size. Only those projects located totally outside the Coastal Zone will be subject to the approval process laid down in the National Environmental Act. Therefore, any development work taking place within this zone falls under the jurisdiction of Coast Conservation Department (CCD). According to the CCA, Director of the CCD has the discretion to request for an EIA/IEE from the project proponent if the initial screening reveals significant impacts in the coastal areas by the project. The process is very much similar to the NEA excepting that the Director of the CCD reserves the right to request for an EIA/IEE and also to make a final decision.

Application to ASMP – Since most sub-project activities are likely to take place within terrestrial landscapes and existing agricultural areas, application of CCA is unlikely. However, any activity with potential to cause negative impacts on the coastal need to comply with the EIA/IEE regulations of the CCA in addition to the coastal laws.

3.3 Fauna and Flora Protection Ordinance (FFPO) Amended Act No. 49 of 1993

EIA provisions are also included in the Fauna and Flora (Amended) Act No. 49 of 1993. According to this Act, any development activity of any description what so ever proposed to be established within a national reserve or within one mile from the boundary of any national reserve, is required to be subjected to EIA/IEE, and written approval should be obtained from the Director General, Department of Wildlife Conservation prior to implementation of such projects. The FFPO follows a similar process as the NEA in conducting

scoping, setting the terms of referenc, preparation of EA, review of EA and public consultation and disclosure. The decision of project approval or disapproval is finally granted by the Director of the Department of Wildlife Conservation.

Application to ASMP – Since sub-project activities are likely to take place in existing agricultural areas, no major issues with regard to the FFPO are envisioned. However, any activity which will be implemented adjacent areas of protected areas/ wildlife reserves will require clearance from the relevant authorities. No resources can be extracted, for project purposes, from within or adjacent to designated areas under the Fauna and Flora Protection Ordinance and declared Forest Reserves/Sanctuaries under the Forest Ordinance.

3.4 The North Western Provincial Environmental Statute No. 12 of 1990

Provincial Environmental Act (PEA) of 1991 implemented by the North Western Provincial Council applies for areas coming under the North Western Province. Environmental Assessments are required for prescribed projects that have been gazetted in Gazette Extraordinary 1020/21 of 27th March, 1998. It specifies two lists of project types (a) where EIA/IEE is mandatory and (b) where the EA can be requested if the PAA decides so. The process is similar to that of the NEA and will be headed by one of the two listed PAAs; (a) Provincial Environmental Authority or (b) Provincial Ministry of Fisheries and Aquaculture.

(A detailed account of the EIA/IEE procedure under each of these acts are provided in Annex 1)

Application to ASMP – Similar to IEE/EIA regulations applicable under the NEA. In areas of the North Western Province, this Act will supersede the NEA if it is not an area under the DWC or CCD.

3.5 Compliance with World Bank Operational Policies

World Bank policies and guidelines, pertaining to environmental and social safeguards that may require consideration under this project are as follows:

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment (OP/BP/GP 4.01)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Natural Habitats (OP/BP 4.04)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Pest Management (OP 4.09)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Physical Cultural Resources(OP 4.11)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Forests(OP/BP 4.36)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Safety of Dams (OP/BP4.37)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Projects in Disputed Areas (OP/BP/GP7.60)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Projects on International Waterways (OP/BP/GP 7.50)	<input type="checkbox"/>	<input checked="" type="checkbox"/>

The main environmental safeguard policy to be triggered under this project will be OP/BP/GP 4.01 on Environmental Assessment. The other three environmental safeguard policies namely, OP/BP/GP 4.36 and 4.04 on forestry and natural habitats respectively, have been identified as there will be activities inside such habitats and will be considered to ensure minimal adverse environmental impacts due to the project.

3.5.1 Compliance with OP 4.01 on Environmental Assessment

This policy is triggered if a project is likely to have potential (adverse) environmental risks and impacts in its area of influence. The policy requires environmental assessment (EA) of projects proposed for World

Bank financing to help ensure that they are environmentally sound and sustainable, and thus to improve decision making. The EA should take into account the natural environment, human health and safety and social aspects in an integrated way. It should also take into account the variations in project and country conditions, the findings of country environmental studies, national environmental action plans, the country's overall policy framework and national legislation, the project sponsor's capabilities related to the environment and social aspects, and obligations of the country, pertaining to project activities, under relevant international environmental treaties and agreements.

When OP 4.01 is triggered, the World Bank classifies proposed projects into one of four categories, depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts.

- (1) A proposed project is classified as Category A if it is likely to have significant adverse environmental impacts that are sensitive, diverse or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works.
- (2) A proposed project is classified as Category B if its potential adverse environmental impacts on human populations or environmentally important areas including wetlands, forests, grasslands and other natural habitats are less adverse than those of Category A projects. These impacts are site specific; few if any are irreversible; and in most cases mitigatory measures can be designed more readily than for Category A projects. The scope of an EA for Category B projects may vary from project to project, but it is narrower in scope when compared with Category A projects.
- (3) A proposed project is classified as Category C if it is likely to have minimal or no adverse environmental impacts. For example, technical assistance projects on institutional development, computerization, and training fall in Category C.
- (4) A proposed project is classified as FI when the Bank provides funds to participating national banks, credit institutions and other financial intermediaries (FIs) for on lending at the FIs' risk to final borrowers. In the case of such projects, the FI screens each subproject proposed for financing, and classifies it into any one of three categories: A, B or C. FIs must prepare an Environmental and Social Management Framework, following the Bank's consultation and disclosure requirements as in the case of other safeguards documents (e.g., EAs, RAPs, IPPs). The ESMF, including the screening process for categorization of subprojects, must be spelled out in the operational manual.

World Bank OP 4.01 is very clear that for all Category A projects and as appropriate for Category B projects during the EA process, the project sponsor should consult project-affected groups and local non-governmental organizations (NGOs) about the project's environmental aspects and take their views into account. The project sponsor should initiate such consultations as early as possible. For Category A projects, the project sponsor should consult these groups at least twice (a) shortly after environmental screening and before the terms of reference for the EA are finalized, and (b) once a draft EA report is prepared. The EA should particularly incorporate such comments to improve the project's social acceptability and environmental sustainability. In addition, the project sponsor should consult with such groups throughout project implementation, as necessary to address EA related issues that affect them.

ASMP has been placed under environment **Category B**. Although project activities are expected to be environmentally beneficial in the long-term, implementation of certain activities will have the potential to trigger adverse environmental impacts which are likely to be localized and can be mitigated. Even though the project will operate in known agricultural areas, great care will be taken to address environmental issues at the earliest stage possible in order to minimize their potential impacts.

This means that (a) all activities that fall under the prescribed categories stipulated in the NEA and other local laws (as mentioned earlier) environmental assessments will be done according to local regulations

and reviewed by the World Bank for clearance. (b) all other sub-projects that do not require screening according to local regulations but having some level of environmental impacts will be screened using appropriate methodology (as proposed in this manual), depending on the nature and scale of potential impacts, and mitigated. The borrower is responsible for carrying out the EAs and for implementing the necessary safeguards.

The project is expected to bring positive environmental benefits to the project areas through the introduction and expansion of modern technology applications that help improve current cropping patterns and farming methods, increase efficiency in the management of water resources, protect agriculture soils, and roll out integrated pest management. However, two components under the project may involve activities that could have significant environmental impacts if not mitigated properly, especially during the construction phase. Component 1 will support commercial agriculture and agro-products processing. Component 2 would finance the establishment of agriculture technology demonstration parks and improvements of rural infrastructure, including access roads and tracks, rehabilitation of small irrigation schemes, land preparation, market facilities, and others. The project's process-oriented and demand-driven framework approach does not allow to determine project investments and specific project locations for investments under these components at appraisal. However it is known that these will be conducted in existing agricultural areas. Specific investments and implementation sites will be determined during implementation as part of the project's matching grant program and the detailed design of the proposed agriculture technology demonstration parks.

3.5.1.1 Compliance with OP 4.01 Annex C Environmental Action Plans (or Environmental Management Plans)

According to Annex C of the World Bank OP4.01 an Environmental Management Plan (EMP) is an essential element of EA reports for Category B projects. The EMP should consist of a set of mitigation, management, monitoring, and institutional measures to be taken during implementation and operation to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels. The plan should also include the actions needed to implement these measures. In preparation of an EMP, the EA consultant should:

- (a) Identify the set of responses to potentially adverse impacts;
- (b) Determine requirements for ensuring that those responses are made effectively and in a timely manner
- (c) Describe the means for meeting those requirements.

More specifically, the EMP should include the following components:

- The EMP should identify feasible and cost-effective measures that may reduce potentially significant adverse environmental impacts to acceptable levels. The plan includes compensatory measures if mitigation measures are not feasible, cost-effective, or sufficient.
- The EMP should define monitoring objectives and specify the type of monitoring needed, with linkages to the impacts assessed in the EA report and the mitigation measures described in the EMP.
- To strengthen the project sponsor's environmental management capability, EMPs should mention any technical assistance that may be needed by the borrower.
- For all three aspects (mitigation, monitoring, and capacity development), the EMP should provide (a) an implementation schedule for measures that must be carried out as part of the project, showing phasing and coordination with overall project implementation plans; and (b) the capital and recurrent cost estimates and sources of funds for implementing the EMP.
- The EMP must be integrated into the project's overall planning, design, budget, and implementation.

During project implementation, the project sponsor should report on compliance with:

- (a) Measures agreed with World Bank on the basis of the findings and results of the EA, including implementation of any EAP, as set out in the project documents
- (b) The status of mitigatory measures; and
- (c) The findings of monitoring programs.

3.5.2 Compliance with other Safeguard Policies Triggered

Pest Management (OP 4.09): The policy has been triggered as expansion, intensification and diversification of agricultural activities under the project could lead to changes in the application of pesticides for pest and disease control. As per the policy, a separate standalone Pest Management Plans (PMP) has been prepared for the project based on Integrated Pest Management (IPM) principles. The PMP describes the relevant national regulatory framework, current status of pest and disease control, monitoring and supervision mechanism, major experience and problems, and lessons learnt from past projects. It specifies a range of non-chemical methods and a training and monitoring program to facilitate implementation. While a list of all chemicals likely to be used during project activities that meet Bank requirements, and namely, comply with the World Health Organization's recommended categories, has been included in the PMP, the project will not be procuring pesticides.

Natural Habitats (OP/BP 4.04): The policy has been triggered as the project will bring improvements to agricultural practices that are expected to reduce the pressure on these areas and the likelihood of encroachment into sensitive natural habitats. However, some activities might negatively impact natural habitats because of the proximity of project interventions to catchments of rich natural areas close to agricultural lands and the minor irrigation tanks. These include the construction and/or upgrading of rural infrastructure. Project supported agriculture-related activities would take place on existing farmland and no expansion or creation of new farmland into fragile habitats is foreseen.

Safety of Dams (OP/BP 4.37): Project interventions under Component 2, specifically sub-component 2.3, may include the up-grading and rehabilitation of small-scale irrigation infrastructure and existing water tanks and irrigation systems in selected areas. These may be linked to the agriculture technology demonstrations parks. OP/BP4.37 applies due to the dependence on water conveyance and control via the irrigation systems and because of the links of smaller tanks with the water storage and operation of upstream medium/large dams, which is typical for Sri Lanka's cascading tank and irrigation infrastructure. It is expected that the rehabilitation of small irrigation schemes and small tanks, to be financed under the project, will not include dams and embankments more than 15 meters high and will not include medium to large scale dams. Typical interventions would include repairs and improvements such as protection of downstream slopes of dam embankments (e.g. runnel filling and providing lateral drains, etc. to provide safe passage of rainwater and seepage drainage), providing toe-filters and toe drains to improve downstream drainage and arresting excessive seepage flows, upstream slope protection (e.g. rearranging and/or providing rip-rap to prevent scouring), strengthening of the structural stability of spillways and sluice structures etc. While, the anticipated project activities will result in an overall enhancement of the safety of dams (tank bunds) against the risk of failure, the project will not finance construction of new tanks (new dams/tank bunds).

Physical Cultural Resource (OP/BP/GP 4.11) While the policy on Physical Cultural Resources has not been triggered as project activities are expected to be carried out in known and existing agricultural and inhabited areas. In order to mitigate the risk, given the uncertainty regarding the exact locations of activities to be carried out under the project, due diligence mechanisms with regard to the identification and management of PCRs have been embedded within the requirements under OP/BP/GP 4.01.

3.6. Adequacy of GOSL Environmental Clearance

The composite GOSL environmental clearance process, in principle, is consistent with World Bank environmental and public disclosure requirements. The exception being the screening criteria adopted in the GOSL process under the NEA, where project thresholds are used to determine the type of clearance required and the content of public consultation. However, all activities with an impact on the environment under the proposed project will be subjected to environmental analysis regardless of the project threshold, prior to disbursement of funds. The CEA's regulated EA procedure is more than two decades old and substantial experience has been made by the CEA in evaluation of EIAs/IEEs. Hence, there will be no need for the project to provide technical assistance to the CEA and other PAAs to provide support to the project on environmental matters. Although the GOSL's clearance procedure is adequate fairly reliable, IDA will still review **Environmental Management Plans/Assessments/Screening Forms**, prepared under the project and provide necessary concurrence for the approval of disbursements of funds.

Chapter 4: Generic assessment of environmental issues and mitigation measures

4.1 Overview

While the project is classified as environmental category B, and the project is expected to bring positive environmental benefits to the project areas through the introduction and expansion of modern technology that promotes sustainable practice and applications that help improve current cropping patterns and farming methods, increase efficiency in the management of water resources, protect agriculture soils, and roll out integrated pest management. There still remain risks associated with implementation of project activities, given the uncertainty regarding the exact locations of activities to be carried out under the project and project interventions that will involve physical interventions to the environment, such as those identified in Component 2.

This EAMF has been designed to achieve sound environmental practice within the purview of ASMP. The EAMF provides the mechanism to allow program implementation by screening out or enhancing acceptability of sub-project proposals on the basis of environmental criteria. By a simple process of elimination, the first step in the screening process is to identify subproject activities not suitable for funding. All processes described in the EAMF can be adjusted based on implementation experience.

The EAMF will be a living document and will be reviewed and updated periodically as needed.

It is recommended that the following types of subprojects are not financed and therefore should be considered as a "Negative List":

- Sub-projects that involve the significant conversion or degradation of critical natural habitats such as sensitive ecosystems.
- Activities that could lead to invasion or spread of weeds and feral animals or the use of toxic chemicals, intensive use of pesticides.
- Activities that could dangerously lead to the exposure of sensitive/critical/vulnerable habitats
- Construction of large new infrastructure within or directly adjacent (in buffer zones) to protected areas
- Illegal Activities as defined specifically under the Forest Ordinance and Fauna and Flora Protection Ordinance.

4.2 Component specific impacts

The following section of the framework tries to identify possible environmental impacts that could arise in each component and how best they could be assessed and addressed during project implementation.

Component 1:

Sub-component 1.2: Matching Grants to Producer Organizations and Agro-Businesses

The agricultural sector faces a number of challenges in managing land productivity which often results in encroachment of the forest for search of new land for cultivation. Soil erosion, crop disease management, water use efficiency, water pollution from excessive use of chemicals, and cultivation of unsuitable crop varieties are among the key areas where focus in terms of environmental management are a priority.

Supporting the commercial agriculture and agro-products processing will require that stringent environmental screening, identification of potential environmental and impacts and management in terms of set up and operations of the activity. Among other best practices would be organic cultivation and at the same time careful soil management needs to be taken care of to prevent soil erosion and top soil degradation. As specific sites and nature of the agro-business activities are not known, best practices that need to be employed and general recommendations cannot be employed as the nature of the activity varies and depend upon the soil type, area of cultivation ,i.e. dry zone or wet zone, and topography, crop type and the specific agriculture sector. This is why site specific Environmental Management Planning plays a key role, and has been incorporated in to the Matching Grants Program. In addition, via strengthening technical knowledge and extension services focusing on the careful and minimal use of chemical fertilizer and pesticides/weedicides through good practices such as Integrated Pest Management and Integrated Plant nutrition Management via the project's Pest Management Plan, activities that facilitate sustainable agricultural development should be essentially promoted. With the project's main thematic areas being the promotion of sustainable practice and applications that help improve current cropping patterns and farming methods, increase efficiency in the management of water resources, protect agriculture soils, and roll out integrated pest management, it is expected that this component will bring about more positive impacts than negatives via providing the technical capacity on environmentally sound agricultural practices.

Component 2:

Sub-component 2.2: Establishment of Modern Agriculture Technology Parks

The sub-component would support between 4 to 6 agriculture technology demonstration parks in selected districts in the Northern, Eastern, and Uva Provinces, which have been identified based on high poverty headcounts and agriculture potential. The exact location of where these interventions will be taking places will only be deduced during the project implementation stage. Environmental screening will be an essential part of the site selection process in order to ensure project-supported agriculture-related activities would take place on existing farmland and no expansion or creation of new farmland into fragile habitats is foreseen. The project will bring improvements to agricultural practices that are expected to reduce the pressure on these areas and the likelihood of encroachment into sensitive natural habitats. In addition the screening will also result in environmental management planning to be up taken for planned project interventions, which will play a key role in ensuring operational environmental impacts of these agriculture demonstration parks, which will predominantly be positive impacts, are well managed.

Sub-component 2.3: Up-grading Production and Marketing Infrastructure

This component will entail physical interventions under the following purview; (i) the up-grading and rehabilitation of small-scale irrigation infrastructure and existing water tanks and irrigation systems in selected priority areas, linked to the agriculture technology demonstrations parks; (ii) the improvement of existing production and market access roads and construction of new field access tracks to improve transportation, access to markets and accessibility for agricultural machinery; and (iii) village level storage and product handling facilities, including drying platforms and sheds, composting facilities of crop residues, storage facilities and others. Infrastructure investment would focus on public infrastructure and would be linked to gaps identified under the technology parks development (sub-component 2.2). The procurement and management of civil works contracts would be under the responsibility the PMU of the Ministry of Agriculture and would be implemented through the local governments.

Impacts to physical and ecological environment during construction phase of physical interventions outlined under Sub-component 2.3 are outlined below

Impacts on soil at construction and material extraction sites and yard

Impact description	Duration of the impact	Level of impact
Loss of productive top soil due to site preparation work	Long-term	Moderate
Soil erosion caused by clearing and grubbing operations which removes the vegetative cover in the immediate surroundings	Long-term	High
Soil erosion caused by mining and quarrying operations	Long-term	Moderate
Contamination of soil by heavy metals and chemicals discharged by construction vehicles and from material storage sites	Short-term	High
Erosion of uncovered temporary stock piles and soil dumps	Short-term	Low

Impacts on surface and ground water sources occur due to following activities

Impact description	Duration of the impact	Level of impact
Siltation of waterways due to modifications to surface water flow and drainage patterns	Long-term	Moderate
Degradation of surface water quality due to equipment and material piling on the site	Short-term	Low
Degradation of water quality due to waste water from worker camps	Short-term	Moderate
Degradation of water quality in water bodies in the vicinity of quarry and borrow sites	Short-term	Moderate
Reduction in groundwater recharge due to drainage and excavation, especially in dry areas	Long-term	High

Impacts on ambient air quality and noise within construction sites, material extraction sites and yards

Impact description	Duration of the impact	Level of impact
Operation of construction vehicles and plants (AC plant and concrete batching plants) that emit obnoxious gases	Short-term	Moderate
Exposure of soil surface due to excavation, clearing of surface vegetation which generates dust	Short-term	Moderate
Mining operations of metal and gravel for construction material will emit dust and other particulate matter	Short-term	Moderate
Improper storage of chemicals that could emit fumes of stored chemicals	Short-term	High
Increased noise nuisance and vibration issues to public living close to construction areas and quarries	Short-term	Moderate

Impacts on ecosystems, fauna and flora

Impact description	Duration of the impact	Level of impact
Clearing of vegetation for construction activities may lead to disturbance to natural habitats (wetlands, forest areas, lagoons, etc.)	Long-term	High
Clearing of surface vegetation in quarry sites and burrow sites may lead to the loss of land/ natural habitats	Long-term	High
Loss of important fauna and flora due to construction works	Long-term	Moderate
Disturbance to animal migration routes and patterns	Long-term	High
Changes to aquatic ecosystems due to siltation of waterways, changes to speed and volume of water flow	Long-term	High
Contamination of biota by emissions to air, water and soil during construction and material extraction works	Short-term	Moderate
Loss of standing crops, fruit trees and commercially valuable trees due to construction works close to home gardens, chena lands and paddy fields	Long-term	Moderate

Social Impacts during Construction

(Social Impacts have been identified in detailed and relevant due diligence mechanisms are presented in a separate Social Management Project, prepared for the project)

Impact description	Duration of the impact	Level of impact
Occupational health and safety to workers	Short-term	Moderate
Disturbances to communities in areas where physical interventions will take place	Short-term	Moderate
Blockage of access to public amenities, homes etc. during construction period	Short-term	Moderate
Impacts to communities due to presence of outside labor gangs	Short-term	Low

Generic EMPs and environmental guidelines for potential investments types and an outline of general mitigation measures to be included in the Environmental Management Plans Construction Projects are given in Annex 11.

Chapter 5: Environmental Management Framework

5.1 Environmental screening of sub-project proposals under Matching Grant Scheme (MGP)

The following environmental screening and evaluation criteria will be adopted as a component of the screening process of grant applications for financing under the Matching Grant Program implemented under Component of 1 of the ASMP by the MoPI. The PMU of the MoPI will be responsible for ensuring the stringent environmental screening of all project concept notes and there on forth proposals, submitted.

The screening process and evaluation criteria presented will be reflected in the Operational Manuel of the Matching Grant Program (OM-MGP) as well and is built in to the outlined eligibility assessment criteria of grant applications. The following steps have been developed in line with the OM-MGP.

5.1.1 Environmental Screening Steps under the Grant Application Assessment Steps

Step 1: Calling for Grant Applications

Communication and Awareness Exercises.

All national and regional workshops which will be used to convey more detailed information on process and procedures involved in the MGS will need to ensure that safeguard management requirements and norms outlined in the EAMF, that are part of grant process are clearly communicated to applicants. The Environmental officer of the PMU at the MoPI will be responsible for collaborating with the Grant Secretariat, MOA and other relevant stakeholders in ensuring that all communication mechanisms used in calling for grant applications indicate the procedural requirements outlined for compliance to environmental safeguards.

Building Capacity for Concept Note (CN) and Financial Proposal (FP)

Building capacity of the potential applicants will also be an integral part of the process of calling applications. This is necessary because some well qualified applicants for large grant window as well as some service providers assisting applicants for small grant window may need additional guidance in writing CNs and FPs in compliance with the reporting requirements of the MGS.

For this purpose, the Grant Secretariat will adopt several means, for example, providing training and workshops on proposal writing, maintain a help desk and websites providing hands-on-guidance for preparing proposals. The training programs developed for proposal writing will include a module on environmental screening and relevant documentation required for the application process.

Step 2: CN and Proposal Appraisal and Selection of Grant Applications

A three stage process managed by the Grant Secretariat is used for submitting and reviewing grant proposals as shown in the Figure below. The grants will be awarded through an open selection procedure in three consecutive stages:

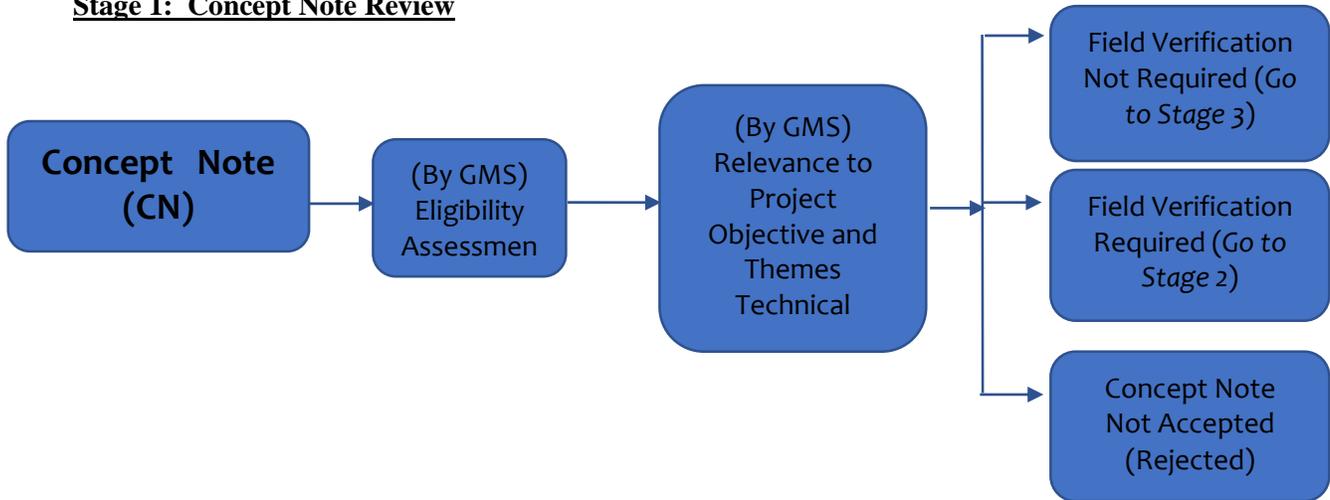
1. Stage 1: Screening of the CN
2. Stage 2: Field Verification of the CN
3. Stage 3: Appraisal of the FP

In this process, applicants in response to call for proposals, first submit a short CN (or expression of interest, using a specified format. The three-stage approach, which allows for reducing the number of full proposals that need to be prepared, evaluated and rejected, enables reducing energy and time and using resources the

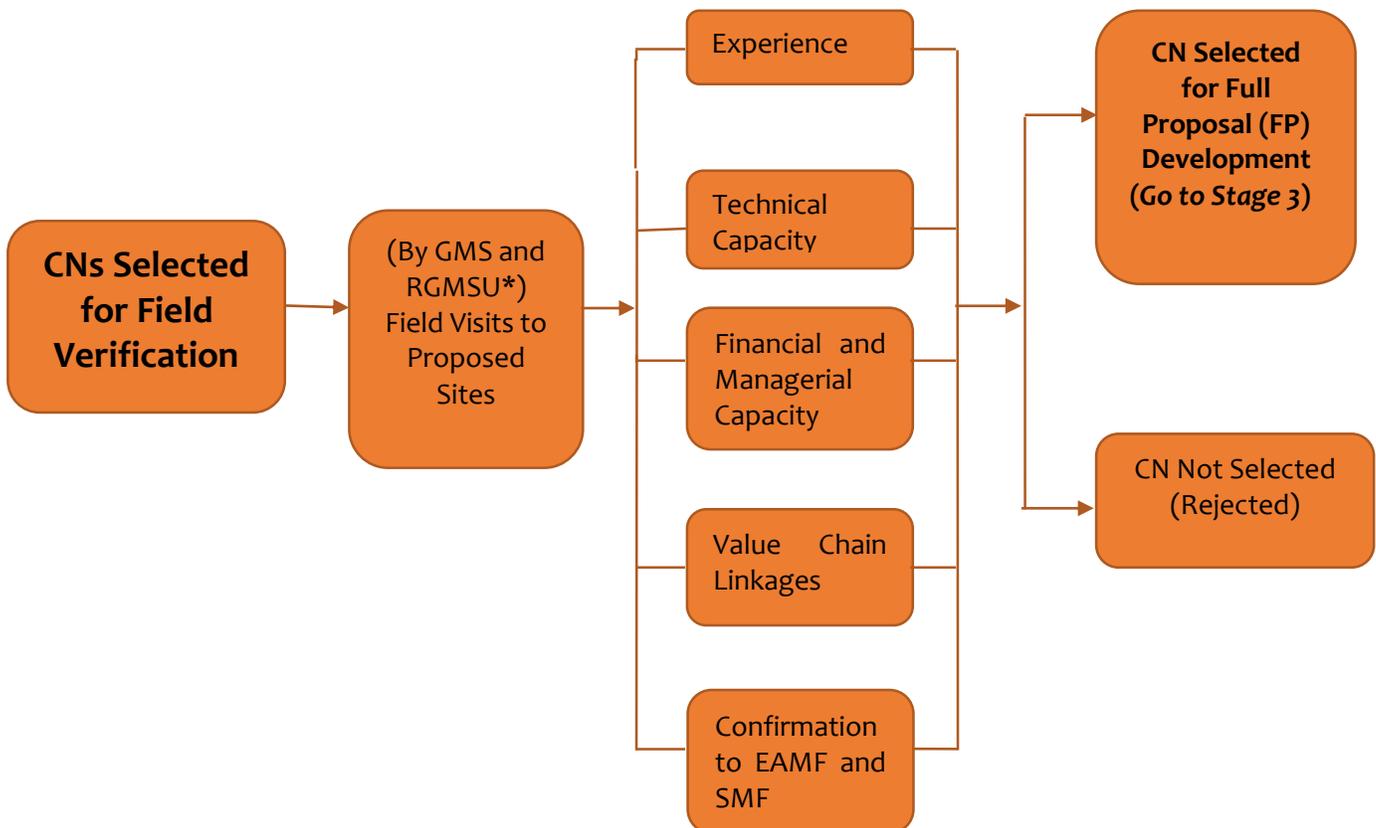
transaction costs for the secretariat and applicants.

Figure 2: Grant Proposal Review and Selection Process

Stage 1: Concept Note Review

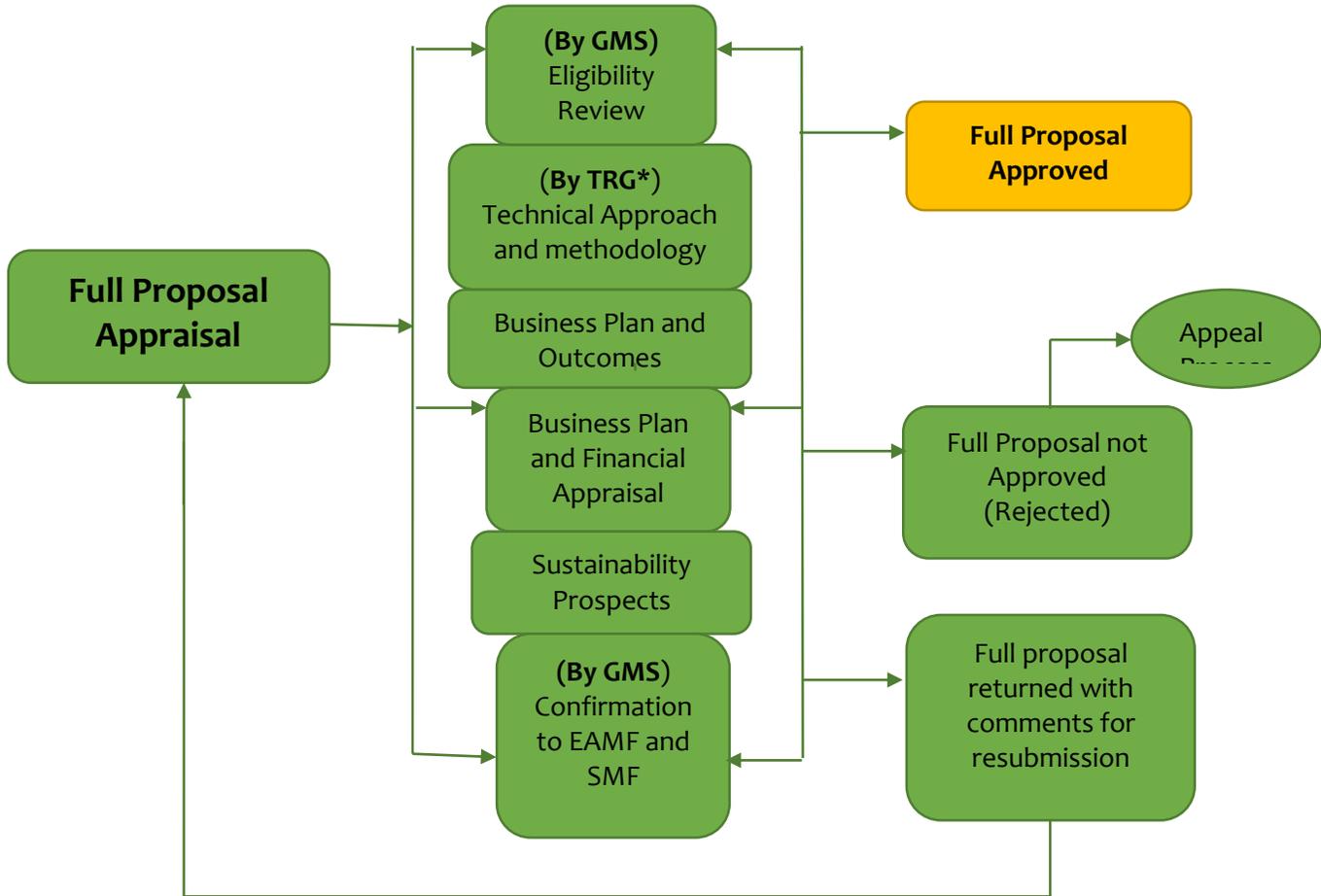


Stage 2: Field Verification of Concept Note: Environmental Screening Forms Verified and Recommendations provided to CN Submitter



*** RGMSU-Regional Grant Management Support Unit**

Stage 3: Full Proposal Stage: Will Include all relevant environmental management requirement as outlined in the EAMF(IEE/EA and/or EMP and/or EPL).



***TRG-Technical Review Committee**

Step A: Concept Note Review

At Stage 1, which is the first screening stage, applications for the grant windows together with the CNs will be reviewed and screened by the Secretariat focusing on compliance against eligibility of documentation, financial, and technical submission guidelines. CNs are screened by the secretariat against a checklist, set criteria, and screening format.

Initial environmental screening will be carried out using the declaration provided by the applicant with the CN (**Part II of the CN Form, presented in Subsection 6.4 of MGP-OP and Annex 1** of this document). The screening form will assist in assessing the potential environmental impacts of the concept presented.

The Environmental officer will then fill out the **Environmental Impact Categorization Form presented in Annex 2**, outlining the rationale for the categorization awarded as presented in per **Table 2** and provide guidance on the subsequent action. This form will be endorsed and a copy will be presented back to the applicant, while maintaining a copy of records as well.

At Stage 2, some of the CNs would be subject to field verification, based on the recommendation of the Secretariat at Stage 1 screening. At this stage, after the approval of CN following a successful field verification of the information in the CNs and evaluation of the CN, authors of promising concept notes are then invited to submit full proposals for further review and possible funding. The CNs that will not comply with the CN eligibility requirements and/or unsuccessful field verification will be rejected by the GMS. At this stage, the applicants of any rejected CN have the option of making an appeal to the Appeals Body with further justification and facts requesting the latter to reconsider the CN. The Appeals body will review the appeal and forward the appeal to the GMS for reconsideration with its comments and observations. The decision either to approve the CN with further adjustments or to reject the CN will rest with the GMS and it will be the final decision.

Where field verification is deemed necessary, the Environmental Officer will join the GMS and RGMSU team, partaking in the field visit, to conduct verification of the environmental screening declaration provided and conformity to the requirements deemed under the EAMF. He/She will capture the observations made in the Environmental Impact Categorization Form.

Table 2: Categorization of Concept Notes Based on Environmental Screening

Category	Nature of Assessments Required Post Screening
Category A+	<p>Negative listing of subprojects (these are ineligible for funding under MGS) . As presented in Section 4.1</p> <ul style="list-style-type: none"> • Sub-projects that involve the significant conversion or degradation of critical natural habitats such as sensitive ecosystems. • Activities that could lead to invasion or spread of weeds and feral animals or the use of toxic chemicals, intensive use of pesticides. • Activities that could dangerously lead to the exposure of sensitive/critical/vulnerable habitats • Construction of large new infrastructure within or directly adjacent (in buffer zones) to protected areas • Illegal Activities as defined specifically under the Forest Ordinance and Fauna and Flora Protection Ordinance.
Category A	<p>The subproject will have a majority of medium-large scale environmental impacts that will need to be assessed and mitigated.</p> <p>Subprojects that will require Initial Environmental Examination (IEE) or Environmental Impact Assessment (EIA) based on national environmental regulations and requirements (they should also meet Bank’s OP 4.01 requirements) to mitigate</p>

Category	Nature of Assessments Required Post Screening
	potential environmental risks and/or environmental clearances from relevant authorities and or Environmental Protection Licenses (EPLs).
Category B	<p>The subproject will have a majority of small-medium scale environmental impacts that can be managed by site specific mitigation measures.</p> <p>Subprojects requiring adoption of Environmental Management Plans (EMPs) and/or EPLs as stipulated by the CEA as presented in Annex 5.</p>
Category C	<p>Subproject have low-negligible environmental impacts and thus will not need further management.</p> <p>Subprojects that do not require formal environmental and social assessment, nor preparation of EMPs and do not have identifiable negative environmental impacts.</p>

Environmentally responsive CNs falling under one of the three categories (Category A, Category B, and Category C) will be passed on for technical evaluation (Table 2). Any CNs falling under Category A+ will not be accepted. The Environmental Officer based in the PMU will be responsible for reviewing the environmental declaration and sharing necessary technical guidance for the follow steps, as per the EAMF, for the proposal stage. **Section 5.3** of the EAMF outlines the nature of further Environmental Management Instruments that will be required under the MGP and provides guidance to be shared with applicants.

Grant applicants will be solely responsible for the preparation of the recommended safeguards instruments, via using the required technical expertise, and seeking the recommended environmental clearances/EPLs from relevant government authorities, where applicable. Guidance documents, such as the country specific sectoral environmental guidelines, presented in **Annex 6 and 7** and the World Bank Group Environmental Health and Safety Guidelines and Industrial Guidelines (**Annex 7**) can be used in this process accordingly. Specific guidelines for Perennial Crop Production, Annual Crop production and Food and Beverage Processing have been developed as part of the Industrial guidelines.

Step B: Proposal Appraisal

At Stage 3, the FPs will be subject to a comprehensive appraisal, including review and clearance of all environmental documents submitted along with the proposal.

The Environmental Officer of the PMU at the MoIP will hold the responsible for that the environmental management documents submitted with proposals are in conformity to the requirements of the EAMF. He/She will provide written notes of approval, rejection or recommendation for edits, with regard to the relevant environmental documents, and/or specific recommendations on actions required to be followed by the applicant during the implementation if the proposal is approved for financing.

All comments or observations, including those mentioned above on the environmental management documents (if any) will be shared with the applicant by the GMS. The applicant will be asked to attend to the comments and resubmit the proposal for a reappraisal. The TRG member(s) and Environmental Officer of the PMU at the MoIP will reappraise the resubmitted FPs with changes and adjustments recommended by the reviewer.

After a maximum of two rounds of appraisal, the TRG members will either recommend the FP for grant award or rejection. Applications which fulfill all eligibility criteria and satisfy the selection criteria at most will be proposed for financing.

The GMS will return all rejected FPs to the applicant with copy to the service provider (if any) with a brief report encompassing the reasons for rejection, results of the scoring and recommendations and comments of the TRG.

Step 4: Implementation of Grant Application Proposal

Routine monitoring of the implementation of relevant EMPs and adherence to relevant guidelines during implementation grant proposals will be a key requirement. All environmental compliance monitoring and reporting should be conducted as stipulated in **Section 5.3.1.7**.

Step 5: Project Closure and Project Completion Report

In order to ensure that at the closure of implementation of environmental safeguard activities under approved projects, a project completion review should be conducted. This will be a review of all compliance monitoring reviews conducted and include a final observation based review of the project site and activities.

5.2 Environmental screening of sub-project proposals under Component 2

Environmental screening is counted to be a useful tool in identifying environmental safeguard issues in large investment programs consisting of many sub-projects. As such, all most sub-projects (excepting those that obviously are environmentally benign or low impact) under Component 2 of the ASMP will be subjected to an environmental screening using the form provided in **Annex 8**.

The main objective of Environmental Screening of sub-projects will be to (a) determine the anticipated environmental impacts, risks and opportunities of the sub-project (ii) determine if the anticipated impacts and public concern warrant further environmental analysis, and if so to recommend the appropriate type and extent of Environmental Assessment needed. The previous chapter provides recommendation on the level of environmental analysis for selected activities as broad guidance; however, the final judgment will be made post the screening exercise. Screening should go hand in hand with project concept development. This way environmental opportunities and risks can be appropriately and easily integrated into subsequent design stages, rather than being brought in at the last minute. The environmental screening report should be prepared by an environmental expert/s with field visits and available data and information (*implementation arrangements are given in the subsequent chapter*). Once the report is ready it will be made available to the project implementing agency to take necessary actions particularly in relation to the recommendation given in the report.

5.2.1 Screening Method

Preparation of the screening reports will be conducted in four distinct stages, namely (i) field visits, data collection and stakeholder consultation; (ii) data analysis and interpretation; (iii) impact identification; and (iv) filling the screening including recommendations for next steps. The methodologies for each of these steps are explained briefly below. The proposed screening report format is given in Annex 8.

5.2.1.1 Data collection and stakeholder consultations

Data will be primarily collected through field visits, discussion with stakeholder agencies and known sources of literature. In addition, supportive tools such as GIS based mapping using GPS coordinates covering the sub project sites, where ever possible is encouraged.

Literature Survey will broadly cover the following aspects and attributes necessary for environmental screening:

- Project details/ Reports/ Maps/ documents including design details available with the implementing agencies
- Literature on flora/ fauna/ biodiversity/land use/soil/geology/ hydrology/ climate /socio economic profiles and environmental planning collected from GOSL agencies
- Hydrological/ rainfall/ drainage datasets

5.2.1.2 Field Visits:

Each sub-project sites will be visited by the expert/s filling the screening form together with representatives from the design team to assess the existing environment (physical, biological and socio economic environment) and gather information with regard to the proposed sites and scale of the proposed sub projects and any prevalent issues. During these visits rapid reconnaissance surveys will be conducted in order to record the faunal, floral diversity, where necessary, to verify and support information gathered through the literature survey.

5.2.1.3 Focus Group Discussions/ Meetings:

Focus group discussions will be carried out with other stakeholder agencies, local authorities and community to discuss pertinent issues. In addition, the community/visitors will be consulted to record their views and opinions about the proposed site-specific investment.

5.2.1.4 Data Analysis and Interpretation

Data collected from field visits and stakeholder discussions will be analyzed by the expert and discussed with the technical team of the project proponent for feedback.

5.2.1.5 Impact identification

This will be carried out by the safeguards expert through discussion with the technical team.

5.2.1.6 Filling screening reports

The screening report will be filled with details on the proposed project intervention, physical/ecological baseline conditions of the site, assessment of potential impacts, feedback from community/public/visitor consultations and recommendations for the type of environmental assessment required. If the findings confirm that anticipated impacts are not significant enough for a stand-alone EA and that an EMP would suffice to mitigate the likely impacts, the screening exercise would be completed with the preparation of a site specific EMP. If the likely impacts are significant and would require greater environmental analysis, the screening report would recommend the appropriate assessment type for the implementation agency to carry out before designs are finalized. A description of the commonly used environmental management tools are given below.

Annex 6 provides guidelines for EMP preparation and Guidelines presented in Annex 7 should be used in looking at operational impacts and their management, during the operational phases of the proposed Agro Tech Parks.

5.3. Description of further Environmental Management Instruments under the MGP and Component 2

The following environmental tools will be relevant for both the MGP and the Physical interventions to be implemented under Component 2. The screening will identify as per the nature of the proposals/sub-projects which of these environmental management tools will need to be undertaken accordingly.

5.3.1.1 Environmental Impact Assessment (EIA)

EIA and IEE are effective tools for evaluating the environmental risks and opportunities of project proposals and improving the quality of outcomes. Ideally the EIA/IEE should be carried out at the end of the preliminary design phase so that the impacts of each planned activity can be evaluated and alternatives can be worked out for activities that have major impacts. The outcomes of the EIA/IEE should then be used to finalize the project design which should ensure that the impacts of the given project are minimal. The importance of this management tool as means of foreseeing potential environmental impacts caused by proposed projects and its use in making projects more suitable to the environment has been highly effective. Since its introduction in 1969 in the US, many countries and international organizations have accepted EIA as an important planning and environmental management tool.

As a decision making tool, EIA has its strengths and weaknesses. It plays a crucial role at the project level decision making. However, in the entire development process application of EIA as a tool to bring in environmental sustainability comes fairly at a late stage. At this point, it may be too late to change certain policy decisions and the choices are limited. With SEA, environmental decisions can be moved further upstream where better alternatives to environmentally unsustainable policies and programs can be sought at a broader strategic level. See the section below for a comparison between SEA and EIA.

If a specific subproject requires environmental assessment the first step will be to provide CEA the preliminary information on the proposed project, in order for the process to be initiated (See Annex 3-4 for the description of major steps of the environmental assessment process with responsibilities and time frames). The best time for a project proponent to submit the preliminary information on the proposed project is as soon as the project concept is finalized and the location of the project is decided.

5.3.1.2 Environmental Management Plan (EMP)

Certain activities will have explicit impacts on the natural environment and thus require a specific plan to institute and monitor mitigation measures and take desired actions as timely as possible. An Environmental Management Plan (EMP) must be kept as simple as possible, clearly describing adverse impacts and mitigation actions that are easy to implement. The scale of the subproject will determine the length of the EMP. A small-scale subproject's EMP can be elaborated in a few paragraphs or in tabular format, keeping it as simple as possible with concrete mitigation actions, timelines and responsible persons.

The basic elements of an EMP are;

- a. A description of all possible significant adverse impacts that are likely to arise due to the project that the EMP is intending to deal with;
- b. A description of planned mitigation measures, and how and when they will be implemented;
- c. A program for monitoring with measurable indicators that will allow to determine the effectiveness of the mitigation actions
- d. A description of who will be responsible for implementing the EMP

e. A cost estimate and source of funds

(Refer Annex 6 for guidelines for developing EMPs)

It is essential to involve local communities during the development of the EMP since they are likely to be the most affected parties due to the proposed development. Further, most of the local knowledge is important in identifying, designing and planning the implementation. In addition, the success of the implementation of the EMP will depend on community support and action.

The PAA will request the project proponent to prepare an Environmental Management Plan (EMP), to address any potential environmental and social issues as well as incorporate the PAA/CEA's approval conditions. Ideally, all EIAs and IEEs which identifies adverse environmental impacts should prepare an EMP as part of the report.

In World Bank funded projects, a standalone EMP is only considered appropriate in situations where a detailed environmental analysis is not required.

As the nature of the physical interventions identified under the ASMP are of medium scale, it will be Mandatory that all proposals/ physical interventions implemented will require an EMP to mitigate sub-project specific impacts identified during the screening exercise. EMPs are to be prepared at the stage of project design and included in bidding documents, to be costed for accordingly, and will be part and parcel of contract documents. Activities outlines in the EMPs will be implemented by the respective contractors implementing the subproject and monitored accordingly by the project implementing agency.

A set of Generic EMPs and guidelines to facilitate sound EMP preparation for all subprojects during the implementation stage are presented in Annex 10 through to Annex 13.

5.3.1.2.1 Environmental Monitoring within EMPs

Monitoring is the continuous and systematic collection of data in order to assess whether the environmental objectives of the project have been achieved. Good practice demands that procedures for monitoring the environmental performance of proposed projects are incorporated in all relevant environmental management instruments. Monitoring provides information on the occurrence of impacts. It helps identify how well mitigation measures are working, and where better mitigation may be needed. Each respective safeguards instrument prepared will require a monitoring program to be included for the respective activities. The monitoring plan should identify what information will be collected, how, where and how often. It should also indicate at what level of effect there will be a need for further mitigation. How environmental impacts are monitored is discussed below.

- Responsibilities in terms of the people, groups, or organizations that will carry out the monitoring activities be defined, as well as to whom they report amongst others. In some instances, there may be a need to train people to carry out these responsibilities, and to provide them with equipment and supplies;
- Implementation Schedule, covers the timing, frequency and duration of monitoring are specified in an implementation schedule, and linked to the overall sub project schedule;
- Cost Estimates and Source of resources for monitoring need to be specified in the monitoring plan;
- Monitoring methods need to be as simple as possible, consistent with collecting useful information, so that the sub project implementer can apply them.
- The data collected during monitoring is analyzed with the aim of:

- Assessing any changes in baseline conditions;
- Assessing whether recommended mitigation measures have been successfully implemented;
- Determining reasons for unsuccessful mitigation;
- Developing and recommending alternative mitigation measures or plans to replace unsatisfactory ones; and
- Identifying and explaining trends in environment improvement or degradation.

5.3.1.4 Procedure to obtain the Environment Protection License (EPL)

Environmental Protection License procedure implemented under the National Environmental Act plays a major role in environment protection by having the diverse sectors of industry to comply and adopt pollution control methodologies.

Environmental Protection License (EPLs) is required for activities that could harm the environment through the release of pollutants. EPLs aim to prevent or minimize the release of environmentally harmful waste and pollution, in compliance with the national discharge and emissions standards. Additionally, EPLs are a way of strengthening the regulatory system as regards the environment.

EPLs require the industry or activity to take adequate measures to control water, air, noise and other pollutants and to dispose of wastes so as to minimize environmental impacts. In most cases applicants will have to take appropriate measures to abate the pollution if these discharges and emissions exceed the stipulated environmental standards having assessed the level of pollution of the industry in question.

Approval will be given only after the CEA is satisfied with the methodologies adopted by the applicant that are in compliance with the National Environmental Act and its regulations. If approved, the EPL will be issued by the CEA or by a delegated authority for a designated period of time.

EPLs are given according to three categories as specified in the Gazette namely Parts A, B & C depending on the level of pollution. The sectors that fall in to Parts A & B are granted for a period of one year and renewal be made annually by the Central Environmental Authority. Those that fall into Category C are granted for a period of three years and are granted by the local authority where the industry is located. EPLs may then be renewed at least one month prior to its expiry and need revalidation in case any anticipated changes or alterations are carried out to the activities that were originally approved. All activities, that fall under the agriculture and agro-processing sectors that require EPLs are presented in Annex 5.

In the case of new industries, the applicant needs to obtain an Environmental Clearance to initiate the project and commission before the EPL is obtained. Once commissioned the applicant could then request for the EPL. The environmental clearance can be obtained from the CEA or the local authority concerned depending on the category that the project falls into under the stipulated legislature.

5.3.1.5 Confirming to the Safety of Dams Policy

Since 2008 to date, the GoSL has been implementing a national dam safety assurance program, including the 5 project districts that will be covered under Component 2, with financial assistance from the World Bank through the Dam Safety and Water Resources Planning Project (DSWRPP). During the preparation of the DSWRPP, the GoSL employed international consultants and local experts to assess the safety risks of all major dams of the country. Based on this assessment, a total of thirty two (32) major dams identified with high and moderate safety risks were selected for intensive safety remedial interventions under the

DSWRPP. The GoSL has added thirty (30) more dams to the program for safety improvement interventions with the additional financing approved in 2014. Under the DSWRPP, the GoSL has engaged international consultants and local experts acceptable to the Bank to: carry out full level dam safety inspections and geotechnical and hydrological studies; design safety assurance and remedial works; install dam safety monitoring instrumentation; supervise the execution of civil and electromechanical safety assurance works; and prepare detailed operation and maintenance manuals for the dams included in the project. In addition, the designs and execution of the civil and electromechanical works and instrumentation are being carried out under the guidance and supervision of an independent dam safety review panel with a Terms of Reference (ToR) approved by the Bank. This panel consists of technical professionals from related engineering disciplines and has been endorsed by the Bank. The records of the technical inspections and investigations, hydrological studies, detailed designs of dam safety remedial works, construction drawings, and O&M manuals are available with the concerned dam owner implementing agencies, the Irrigation Department and the Mahaweli Authority. In addition projects financed by the GoSL and other donor agencies have conducted rehabilitation work on medium-small scale dams across the country, predominantly in the Northern and Eastern Provinces, over the last decade.

Given that there is an ongoing and effective dam safety program targeting all large to medium scale Dam's, upstream of small irrigation structures and smaller dams along the cascading system, it can be established that full-level inspections, dam safety assessments, and safety remedial measures have already been conducted and details are documented by the GoSL satisfactorily to the Bank, the provisions of OP/BP4.37 on Dam Safety has been complied with.

The project will be working on small scale irrigation infrastructure, managed by the Agrarian Services Department of the MoA. These small dams are earthen dams with bunds less than 5m in height. While, the anticipated project activities will result in an overall enhancement of the safety of dams (tank bunds) against the risk of failure, the project will not finance construction of new tanks (new dams/tank bunds).

All irrigation sector project interventions need to complete the screening form presented in Annex 9, in addition to the Environmental Screening. This step will be completed for the verification of dam safety status of upstream medium-large scale dams that are hydrologically connected to the respective tank/scheme, if any and outline the follow up actions. The Environmental Officer, will need to collaborate with field offices (Provincial or District) belonging to the Irrigation Department/Mahaweli Authority.

Post the screening, in the presence of such upstream hydrologically connected dams, which have not been rehabilitated or strengthened and thus have Dam Safety implications, the following steps need to be taken.

- (a) an inspection and evaluation of the safety status of the existing dam, its appurtenances, and its performance history;
- (b) a review and evaluation of the mandated dam owners operation and maintenance procedures, and
- (c) preparation of a written report of findings and recommendations for any remedial work or safety-related measures necessary to upgrade the existing dam to an acceptable standard of safety.

Necessary additional dam safety measures or remedial work may be financed under the proposed project. When substantial remedial work is needed, these will be undertaken using the following procedures.

- (a) A competent professional will be hired to design and supervise the work
- (b) Due to the size of the Dams under the projects context are less than 5m, competent professional will be hired to design and supervise the work which can be conducted as per generic dam safety measures designed by qualified engineers.

5.3.1.6 Environmental Compliance Monitoring

Supervision of the EMPs, along with other aspects of the project, will cover monitoring, evaluative review and reporting in order to achieve, among others, the following objectives:

- determine whether the project is being carried out in conformity with environmental and social safeguards and legal agreements;
- identify issues as they arise during implementation and recommend means to resolve them;
- recommend changes in project concept/design, as appropriate, as the project evolves or circumstances change; and identify the key risks to project sustainability and recommend appropriate risk management strategies to the Proponent.

An appropriate environmental supervision plan will be developed aiming to ensure the successful implementation of the EMPs across the project.

Quarterly, the PMUs will collaborate with project proponents in the field and, will monitor the implementation of the respective environment mitigation measures outlined for both interventions under the MGP and Component 2. Annually, the Project Implementation in collaboration with the Environmental The environmental officers based in the PMUs will have responsibility of carrying out this monitoring by regularly visiting the project sites, and pursuing the following corrective measures as required.

Compliance monitoring comprises on-site inspection of construction activities to verify that measures identified in the EMPs are included in the clauses for contractors are being implemented. This type of monitoring is similar to the normal technical supervision tasks ensuring that the Contractor is achieving the required standards and quality of work.

A standard Environmental Compliance Monitoring Checklist for Project Activities is presented in **Annex 14**.

5.3.1.7 Environment Audits

Most of the development projects in Sri Lanka follow EAMFs and develop EMP's that are not implemented ardently at the end which will render the entire process an exercise in futility. Therefore, monitoring of the project during the construction and implementation phase is a must to ensure environmental compliance of a project. This could be achieved through regular environmental audits.

The purpose of the environmental audit is to

- Collect, analyze and interpret monitoring results to detect changes related to implementation and operation of specific activities
- To verify the monitoring parameters are in compliance with national set standards
- To compare the predicted impacts with actual impacts and evaluate the accuracy of predictions
- To evaluate the effectiveness of implementation of the EMP
- To identify shortcomings in the EMP if any and incorporate it into the EMP if deemed necessary
- To identify and report if there is non-compliance with the EMP

The auditors must first develop a structured questionnaire based on the EMP for the purpose of conducting the audit. Then during the site visit data can be collected using this questionnaire through interview surveys of officers responsible for implementation of the EMP and site records, logs etc., The audits can be carried out at regular intervals or on *ad hoc* basis or when mitigation is not carried out as defined by the EMP leading to public concern.

Expected outcomes of the Environment Audit are

- Ensure that EMP is implemented properly
- Ensure that the mitigation measures are effectively minimizing the identified impacts as well as identify new impacts that may have been excluded in the EMP that require mitigation. Then make necessary adaptive changes to the EMP to ensure that the all significant impacts are effectively mitigated.
- Identify noncompliance with EMP if any and provide recommendations as to how to deal with such non compliance

An environmental audit for ASMP will be conducted, twice during the project implementation period. Once prior to the project Mid Term Review and year from the project stipulated closing date. The audit will entail to cover all activities outlined in the ESMF. review a sample of (i) the screening forms prepared by each project implementing agency (ii) standalone environmental assessments/management plans (iii) application of the NEA and its clearance procedures followed by the project, as the case be, and based on site visits ensure conformity with conditions, guidelines and comments stipulated in these and other related documents. The audit will not only capture the compliance status of a detailed Terms of Reference (TOR) for the Environmental Audit is presented in **Annex 15**.

5.4 Stakeholder Consultation and Information Disclosure

For all types of environmental analyses conducted under ASMP (including screening), communities in the project sites should be consulted within a structured and culturally appropriate manner. Further, environmental assessment documentation and EMPs should be made available to the public (in accordance with the World Bank's policy on Access to Information) by the PMU prior to tendering of works contracts through the website of the project and notices through media, as appropriate. These should be made available in local languages relevant to the area. This EAMF would also be disclosed to the public via the website of the project executing ministry and through World Bank's Infoshop.

The process of consultation should be documented and account taken of the results of consultation, including any actions agreed resulting from the consultation. Public disclosure of the relevant safeguards documentation will be a pre-requisite for tendering civil works contracts. The contract documents for each contract package will mandatorily include the relevant environmental mitigation provisions stipulated in the EMPs (which would have community concerns reflected, if any) for the given sub-projects.

Given below is a brief framework for planning consultation under the ASMP. It has to be noted that only the appropriate consultation method will be applied to sub-projects during implementation and the responsibility of consultation lie primarily with the project implementing agencies.

5.3.1 Objectives of stakeholder consultations

The prime objectives of stakeholder consultation are;

- Provide the stakeholders an opportunity to inform and influence the decision making process.
- Partner with the stakeholders so as to make the project widely accepted and to lower the potential impacts

5.3.2 Elements of Effective Stakeholder Consultations

Some of the most concerned elements of effective consultations are as follows;

- well targeted
- early enough so as to make sure to get the stakeholder views adequately reflected in the project decisions
- transparent – provide all the information without hiding anything
- make the consultation process very simple and understandable so that clear answers and comments can be obtained
- ensure gender equity
- documentation of consultation
- based on the principle of "Two way Process"
- focus the consultation on Risks, impacts, mitigation measures and opportunities.

5.3.3 Suggested Methods

Participatory workshops, focus group meetings and face to face and informal individual interviews are the three most commonly adopted methods of stakeholder consultations and a mix of these can be employed under ASMP, as determined by the requirement.

(i) Participatory workshops

Participatory workshops are effective when a large number of stakeholders with different interests and specializations get involved. Conducting effective participatory consultation workshops should consist of following elements;

- (ii) Orient the workshop towards a clear destination. In this connection it is necessary for the evaluator to present a very good project brief and the purpose of the consultation.
- (iii) The evaluator should be able to build bridges and consensus among stakeholders.
- (iv) Divide the participants into sub groups to represent adequate mixture of different interest groups and allow the sub groups to brainstorm among the group members and submit their views and comments as those of not individuals but of the sub groups.

This method is recommended for technical assistance sub-projects such the formulation of strategic landscapes plans where mostly conservation agencies, local planning bodies, NGOs and communities would get involved.

(ii) Focus groups discussions

The focus group consultation meetings are relevant when the stakeholders have similar interest thus their objectives are focused towards one common objective. This kind of consultation meetings are recommended for projects that serve common interests such as provision of basic services in the agriculture development.

(iii) Stakeholder group meetings

Stakeholder consultations are extremely useful in creating the right kind of understanding about the project among those it will likely affect or interest, and to learn how these external parties view the project and its attendant risks, impacts, opportunities and mitigation measures.

(v) Individual - face to face interviews

When the stakeholders are not large in number and represent specialised areas of interest face to face interviews which are informal are very effective. This system is very flexible, permits in depth discussions to understand the issues and is low cost. However individual stakeholder consultations should be well planned as if not it may lead to "heavy focus on individual issues and interest". This method is recommended for the kind of consultation envisaged as part of sub-project screening as the sub-projects under ASMP are relatively small in size, potential impacts are very specific, and stakeholders are small in numbers.

The stakeholder consultation process should be continuous. However since practical difficulties exists for continued consultation, at least consultation needs to be carried out at three stages; project preparatory / design stage, project implementation stage and project end stage so as to make sure that stakeholder concerns, interest, comments are adequately built into the whole project management process.

Chapter 6: Institutional Arrangement for Implementation of the project

6.1 Overall arrangements

Project implementation will entail the creation of project management unit (PMU) at both the MoA and the MoPI. The institutional responsibilities and arrangements for project implementation would be established for the participating ministries at the national and subnational levels, as follows:

Component 1

Ministry of Primary Industries (MoPI). MoPI will be responsible for implementing Component 1, sub-components 1.1 and 1.2, and will oversee the following project-relevant units and entities:

Project Management Unit (PMU). A PMU will be set up in MoPI to be responsible for overall project management of Component 1, sub-components 1.1 and 1.2, including annual work and budget planning, coordination of the Department of Export Agriculture in Kandy and the three regional offices (Kilinochchi, Ampara, Matara), procurement, fund withdrawal and financial reporting; technical and institutional aspects of implementation; general oversight, field supervision and acceptance checks; and training and capacity building, and the periodic progress reporting to the Bank.

The PMU would be led by a Project Director and include: a Deputy Project Director, a Financial Management Specialist/ Accountant; a Procurement Officer, a M&E officer, an Environmental Officer, and a Social Development Specialist, as well as various technical subject matter specialists that would be recruited on demand basis. Matching Grants Program Secretariat.

A separate Secretariat would be set up in the PMU of MoPI to manage the day-to-day implementation of the matching grants program, including public advertising and solicitation of value chain investment proposals, providing and managing technical assistance support to improve proposals of agro-enterprises and farmer cooperatives to meet project eligibility criteria and ensure technical and business feasibility.

Component 2

Ministry of Agriculture (MoA). Under MoA, the following project-relevant units and entities would be set up or would be set up under Component 2.

A second PMU, will be set up in MoA to be responsible for overall day-to-day coordination and management of Component 2. The PMU would be responsible for annual work and budget planning; coordination with provinces/ districts in public outreach and community mobilization, procurement and contract management, fund withdrawal and financial management, including and financial reporting; technical and institutional implementation aspects, field supervision and acceptance checks; and training and capacity building. The PMU will comprise a Project Director, Deputy Project Director, Financial Management Specialist/ Accountant; Procurement Officer, M&E officer, Environmental Officer, and Social Development Specialist. Technical subject matter specialists can be appointed with project support as needed.

Responsibilities of Project Management Units

- The PMU's main role will be to ensure operational compliance as per the World Bank policies as defined in the Project Appraisal Document, Financing Agreement and Operations Manual and Government policies as applicable.
- Each PMU will be led by a Project Director and will include a team of specialized staff responsible

for project management, financial management, procurement, environmental safeguards, social safeguards, monitoring and evaluation, civil works design review and contract management, as well as support staff such a secretary, fiduciary support staff and a driver.

- The PMU will also recruit specialized consultants necessary for specific technical assistance for overall implementation of activities.
- The PMU will liaise closely and also ensure overall coordination of all Project entities to ensure necessary data and information are shared and collated for reporting to Project Steering Committee and the World Bank. (*Ref Appraisal stage PAD, 2016*)

6.2 Institutional arrangements for implementation of the EAMF

Due to the lack of staff with prior technical experience working in Environmental Safeguards, both PMUs will need to second/hire environmental specialists to focus on the tasks and responsibilities outlined in the EAMF.

The Environmental Officer at the PMU in MoPI; will be responsible for the implementation of all steps presented under the environmental screening for the Grant Application Assessment for the MGP (presented in Chapter 5). Providing technical guidance to applicants on preparation of environmental management instruments and monitoring/reporting on compliance of due diligence mechanisms set forth the EAMF. He/she will be responsible for the preparation of quarterly compliance summaries and formally communicating to IDA on environmental safeguards matters.

The Environmental Officer at the PMU in MoA; will be responsible for the implementation of all steps presented under the requirements for environmental screening of sub-project proposals under Component 2 (presented in Chapter 5). The preparation of environmental instruments, such as EMPs, requesting for environmental clearances from relevant authorities where applicable, and monitoring/reporting on compliance of due diligence mechanisms set forth the EAMF. While at this point, it is envisaged that most project activities under Component 2 will require EMPs. However, in the event IEE/EIA is required, the PMU will outsource detail studies to consultants and manage them. The PMU Environmental Officer will be responsible for ensuring the delivery of such outsourced tasks. He/she will be responsible for the preparation of quarterly compliance summaries and formally communicating to IDA on environmental safeguards matters. He/she will be responsible for the preparation of quarterly compliance summaries and formally communicating to IDA on environmental safeguards matters.

6.3 Monitoring and evaluation

As part of the overall sub-project monitoring, environmental issues will be required to be monitored. Monitoring of compliance with EMP specifications by the contractor is essential for proper environmental management and will be conducted primarily by the implementing agencies. Ensuring compliance with environmental safeguards is an integral part of the monitoring program. Regular IDA missions will include specialists to monitor the project's compliance with World Bank safeguard policies. The progress of environmental monitoring will be formally communicated to IDA through regular progress reports and updates as per the compliance monitoring.

Chapter 7: Capacity Building and Training

7.1 Institutional capacity building for safeguard management

Sri Lanka's environmental clearance process has been in place for almost three decades and most of the experience and knowledge of EIAs were built by the Central Environmental Authority (CEA) and other institutions. While the MoPI is an entirely new entity, the MoA while being in operation for a long time does not partake in the implementation of national level environmental regulations in any way, thus the internal capacity is assessed as poor. Thus they are not entirely familiar with IEE/EIA procedures and post EA and EMP clearance monitoring. Such monitoring tends to be the weakest aspect of the Sri Lankan EIA cycle. The project will thus place strong emphasis on environmental due diligence mechanisms within the sector and post clearance monitoring and will provide training necessary within the implement agencies to strengthen their capacity.

As per the capacity assessment of the strengths of these entities relation to the implementation of environmental safeguards in line with program implementation, both the lead implementing bodies, the MoA and MoPI have limited and prior experience with Bank funded projects respectively. On the other hand for the implementation of sustainable agricultural practices such as pest management via integrated pest management, the MoA does have sufficient capacity and technical expertise as they implement national programs of pest and pesticide management.

A comprehensive capacity building program on the EAMF and environmental management within the sector, will be built in to the implementation modality to provide the client with the required capacity building and technical assistance and guidance to implement the project EAMF. The capacity building instruments are envisioned to be included as a part of the Technical Assistance being provided via the project.



Annexes



Annex 1: Matching Grant Scheme Forms: Part II of the CN Form – Initial Environmental Responsiveness Form

The following form will be completed by the Grant Applicant and submitted along with CN Form of the Operations Manuel

Please fill the following providing details where required in the column provided for Further Details.

All questions pertain to the project site and activities proposed within the site under the concept proposal submitted for review.

All information provided in this screening form will be subject to field verification, thus be mindful to provide accurate and precise information.

	Screening Questions	Yes	No	Scale of Expected Impact			Further Details
				H	M	L	
A	Siting of the activity						
a.	Are there any environmentally and culturally sensitive areas within the project site and/or 500 meters from the Project site, proposed in this proposal?						
	Protected Areas / Forest Reserve						
	Migratory pathways of animals						
	Archeological sites						
	Sensitive Receptors (Temples, Schools, Hospitals)						
	Wetlands						
	Mangroves strands						
	Estuarine						
	Buffer zone of PAs/FRs						
	Waterways (Streams, rivers, lakes)						
	Special area for protecting biodiversity						
b.	Is the project area proposed in this proposal located in high risk zone;						
	landslide prone area						

	steep slopes						
	highly degraded land in hilly terrain						
	riverine area susceptible to annually flooding,						
	An area with visible large scale soil erosion						
c.	Does the site /project require any of the following, if so indicate which ;						
	Reclamation of land, wetlands						
	Clearing of forest						
	Felling of trees						
d.	Are there any plants (endemic and threatened species) of conservation Importance within the project site?						
e.	Are there any animals (endemic and threatened species) of conservation Importance within the project site?						
B	Potential Environmental Impacts. Indicate if the activity / sub-project will cause any of the following						
	• Land disturbance or site clearance? Including the clearance of slopes.						
	• Negative effects on rare (vulnerable), threatened or endangered species of flora or fauna or their habitat?						
	• Negative effects on designated wetlands?						
	• Spread of invasive plants or animals?						
	• Negative effects on wildlife habitat, populations, corridors or movement?						
	• Will this project involve land clearance on slopes greater than 45 degree?						
	• Is this project likely to eliminate indigenous plant species of ecological Significance via the introduction of alien/new species to the area?						
	• Destruction of trees and vegetation?						
	• Impact on fish migration and navigation?						

• Obstruction of natural connection between river and wetlands inside project area or natural drainage system?						
• Water logging due to inadequate drainage?						
• Insufficient drainage leading to salinity intrusion?						
• Negative effects on surface water quality, quantities or flow?						
• Negative effects on groundwater quality, quantity or movement?						
• Increased demand of water requirements leading to reduction of water supply for competing uses?						
• Increase probability of spread of diseases and parasites?						
• Significant sedimentation or soil erosion or shoreline or riverbank erosion on or off site?						
• Loss of existing buildings, property, economic livelihood?						
• Negative impact on soil stability and compactness?						
• Generate significant amounts of solid waste (organic/inorganic)						
• Generate significant amounts of waste water						
• Changes to the land due to material extraction?						
• Traffic disturbances due to Project activities						
• Lead to the excessive use of pesticides/chemical fertilizers						
• Increased noise due to Operation of machinery.						
• Increased noise due to day-to-day Operational activities?						
• Increased wind-blown dust/particulate matter due to project activities						
• Degradation or disturbance of historical or culturally important sites?						
• Health and safety issues?						
Will the activity / sub-project require						
• Setting up of ancillary production Facilities?						

• Significant demands on utilities and Services?						
• Accommodation or service amenities to support the workforce during project activities.						

Note: Criterion for Grading Scale of Intensity impact

Score	Nature of Environmental Change/ Impact
Low	There are no to negligible impact as the environmental changes are within the existing limits of natural variations and the Natural environment is completely self-recoverable post the activity.
Moderate	Environmental changes due the activity exceed the existing limits of natural variations and result in damage to the separate environmental components. Natural environment remains self-recoverable and can be restored via mitigation measures,
High	Activity induced environmental changes result in significant disturbance to particular environmental components and ecosystems. Certain environmental components lose self-recovering ability thus stringent mitigation measures will be required.

Annex 2: Matching Grant Application: Environmental Impact Categorization Form

The Environmental officer will fill out the Environmental Impact Categorization Form presented below, outlining the rationale for the categorization awarded as presented in per the table below and provide guidance on the subsequent actions and safeguards instrument preparation.

This form will be endorsed and a copy will be presented back to the applicant via the GMS.

The Environmental officer will maintain a copy of the form for record purposes.

	Screening Questions	Scale of Impact			Comments from field verification to confirm rating provided for Scale
		H	M	L	
A Siting of the activity					
a.	Are there any environmentally and culturally sensitive areas within the project site and/or 500 meters from the Project site, proposed in this proposal?				
	Protected Areas / Forest Reserve				
	Migratory pathways of animals				
	Archeological sites				
	Sensitive Receptors (Temples, Schools, Hospitals)				
	Wetlands				
	Mangroves strands				
	Estuarine				
	Buffer zone of PAs/FRs				
	Waterways (Streams, rivers, lakes)				
	Special area for protecting biodiversity				
	b.	Is the project area proposed in this proposal located in high risk zone;			
landslide prone area					
steep slopes					
highly degraded land in hilly terrain					
riverine area susceptible to annually flooding,					
An area with visible large scale soil erosion					

c.	Does the site /project require any of the following, if so indicate which ;				
	Reclamation of land, wetlands				
	Clearing of forest				
	Felling of trees				
d.	Are there any plants (endemic and threatened species) of conservation Importance within the project site?				
e.	Are there any animals (endemic and threatened species) of conservation Importance within the project site?				
B Potential Environmental Impacts. Indicate if the activity / sub-project will cause any of the following					
	• Land disturbance or site clearance? Including the clearance of slopes.				
	• Negative effects on rare (vulnerable), threatened or endangered species of flora or fauna or their habitat?				
	• Negative effects on designated wetlands?				
	• Spread of invasive plants or animals?				
	• Negative effects on wildlife habitat, populations, corridors or movement?				
	• Will this project involve land clearance on slopes greater than 45 degree?				
	• Is this project likely to eliminate indigenous plant species of ecological Significance via the introduction of alien/new species to the area?				
	• Destruction of trees and vegetation?				
	• Impact on fish migration and navigation?				
	• Obstruction of natural connection between river and wetlands inside project area or natural drainage system?				
	• Water logging due to inadequate drainage?				
	• Insufficient drainage leading to salinity intrusion?				
	• Negative effects on surface water quality, quantities or flow?				

• Negative effects on groundwater quality, quantity or movement?				
• Increased demand of water requirements leading to reduction of water supply for competing uses?				
• Increase probability of spread of diseases and parasites?				
• Significant sedimentation or soil erosion or shoreline or riverbank erosion on or off site?				
• Loss of existing buildings, property, economic livelihood?				
• Negative impact on soil stability and compactness?				
• Generate significant amounts of solid waste (organic/inorganic)				
• Generate significant amounts of waste water				
• Changes to the land due to material extraction?				
• Traffic disturbances due to Project activities				
• Lead to the excessive use of pesticides/chemical fertilizers				
• Increased noise due to Operation of machinery.				
• Increased noise due to day-to-day Operational activities?				
• Increased wind-blown dust/particulate matter due to project activities				
• Degradation or disturbance of historical or culturally important sites?				
• Health and safety issues?				
Will the activity / sub-project require				
• Setting up of ancillary production Facilities?				
• Significant demands on utilities and Services?				
• Accommodation or service amenities to support the workforce during project activities.				

Note: Criterion for Grading Scale of Intensity impact

Score	Nature of Environmental Change/ Impact
Low	There are no to negligible impact as the environmental changes are within the existing limits of natural variations and the Natural environment is completely self-recoverable post the activity.
Moderate	Environmental changes due the activity exceed the existing limits of natural variations and result in damage to the separate environmental components. Natural environment remains self-recoverable and can be restored via mitigation measures,
High	Activity induced environmental changes result in significant disturbance to particular environmental components and ecosystems. Certain environmental components lose self-recovering ability thus stringent mitigation measures will be required.

Recommendations of the Social and Environmental Management Specialists

- A. Indicate the overall rating for Environmental impacts based on the ratings provided in the form above.
- B. Based on the Scale of Impacts identified, please which environmental instruments are warranted? (EMPs are mandatory for all subprojects)

Safeguard Instrument Required	Yes	No
Environmental Management Plan		
Environmental Protection License		
Clearance from National Authority (CEA, CCD, NBRO Etc) Please indicate the name of the authority:		
Initial Environmental Examination (IEE)		
Environmental Impact Assessment (EIA)		

- C. If any of the answers provided above are YES, please provide recommendations and guidance to the applicant for the preparation of those plans)?
- D. Are there any additional steps the applicant is required to undertake?
- E. Indicate the Environmental Category Assigned for the Proposal as per the table given below.
- F. List all documents shared with the applicant as guidance for environmental safeguards instrument preparations

Environmental Category Assigned for Proposal

Category	Nature of Assessments Required Post Screening
Category A+	<p>Negative listing of subprojects (these are ineligible for funding under MGS) . As presented in Section 4.1</p> <ul style="list-style-type: none"> • Sub-projects that involve the significant conversion or degradation of critical natural habitats such as sensitive ecosystems. • Activities that could lead to invasion or spread of weeds and feral animals or the use of toxic chemicals, intensive use of pesticides. • Activities that could dangerously lead to the exposure of sensitive/critical/vulnerable habitats • Construction of large new infrastructure within or directly adjacent (in buffer zones) to protected areas • Illegal Activities as defined specifically under the Forest Ordinance and Fauna and Flora Protection Ordinance.
Category A	<p>The subproject will have a majority of medium-large scale environmental impacts that will need to be assessed and mitigated.</p> <p>Subprojects that will require Initial Environmental Examination (IEE) or Environmental Impact Assessment (EIA) based on national environmental regulations and requirements (they should also meet Bank’s OP 4.01 requirements) to mitigate potential environmental risks and/or environmental clearances from relevant authorities and or Environmental Protection Licenses (EPLs).</p>
Category B	<p>The subproject will have a majority of small-medium scale environmental impacts that can be managed by site specific mitigation measures.</p> <p>Subprojects requiring adoption of Environmental Management Plans (EMPs) and/or EPLs as stipulated by the CEA as presented in Annex X</p>
Category C	<p>Subproject have low-negligible environmental impacts and thus will not need further management.</p> <p>Subprojects that do not require formal environmental and social assessment, nor preparation of EMPs and do not have identifiable negative environmental impacts.</p>

Name of Environmental Officer	
Signature	
Date	

Annex 3: Policy Framework: Environmental Assessment and Impact Mitigation

The importance of the Environmental Impact Assessment as an effective tool for the purpose of integrating environmental considerations with development planning is highly recognized in Sri Lanka. The application of this technique is considered as a means of ensuring that the likely effects of new development projects on the environment are fully understood and taken into account before development is allowed to proceed. The importance of this management tool to foresee potential environmental impacts and problems caused by proposed projects and its use as a mean to make project more suitable to the environment are highly appreciated. The Environmental Impact Assessment (EIA) unit of the Central Environmental Authority (CEA) is involved in the implementation of the EIA procedure under the National Environmental Act.

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

Realizing the need for integrating environment, economic and social considerations with the planning and decision making process in a more formal manner, the Government of Sri Lanka decided to introduce Environmental Impact Assessment for development projects. The importance of the Environmental Impact Assessment as an effective tool for the purpose of integrating environmental considerations with development planning is highly recognized in Sri Lanka.

The Environmental Impact Assessment (EIA) unit of the Central Environmental Authority (CEA) is involved in the implementation of the EIA procedure under the National Environmental Act. Administration of the EIA process, co-ordination between Project Approving Agencies (PAA's) that have been appointed for this purpose, preparation of manuals and guidelines on EIA and maintenance of a data base on EIA is done by the CEA.

EIA under the National Environmental Act (NEA)

EIA was mandated island wide by the 1988 amendments to the National Environmental Act. Part IV C of the Amendment Act No. 56 of 1988 mandated that CEA require “prescribed” development project proposals to be subjected to Environmental Impact Assessment, where adverse and beneficial impacts of the proposed projects on the environment would be identified together with measures to minimize such adverse impacts.

The procedure stipulated in the Act for the approval of projects provides for the submission of two types of reports Initial Environmental Examination (IEE) report and Environmental Impact Assessment (EIA) report. If the environmental impacts of the project are not very significant then the project proponent may be asked to do an Initial Environmental Examination (IEE), which is a relatively short and simple study. However, if the potential impacts appear to be more significant, the project proponent may be asked to do an Environmental Impact Assessment (EIA) which is a more detailed and comprehensive study of environmental impacts. Such reports are required in respect of “prescribed projects” included in a Schedule in an Order published by the Minister of Environment in terms of section 23 Z of the act in the Gazette Extra Ordinary No. 772/22 dated 24th June 1993 (ANNEX II). Once an EIA report is submitted NEA provides for a public inspection and comment on the report during a mandatory period of 30 days. A public hearing may be held to provide an opportunity to any member of the public (who has submitted his comments) to be heard in support of his comments if the PAA considers it to be in the public interest to do so. A decision whether to approve the project has to be arrived at thereafter. IEE reports have been exempted from this requirement. However, an Initial Environmental Examination report shall be deemed to be a public document for the purposes of sections 74 and 76 of the Evidence Ordinance (Chapter 21) and shall be open for inspection by the public.

The EIA process is implemented through designated Project Approving Agencies (PAAs) specified under Section 23 Y of the NEA. At present 23 state agencies, including Ceylon Tourist Board have been specified by the Minister as contained in Gazette Extra Ordinary No. 859/14 dated 23rd February 1995 and Gazette Extra Ordinary No. 1373/6 of 29th December 2004. The National Environmental Act stipulates that all “prescribed projects” must receive approval from the appropriate project approving agencies (PAAs), which must be those that are “concerned with or connected with such prescribed projects”. A PAA, which is also the project proponent, is disqualified from acting as the PAA for the project by NEA-EIA Regulation 2(1) of June 1993. When the PAA is also the project proponent, the CEA is required to designate an appropriate PAA. Again in cases where there are more than one PAA is involved, the CEA must determine the appropriate PAA. In the event of doubt or difficulty in identifying the appropriate PAA, it has been practice for the CEA to take on the role of PAA.

Prescribed projects

Prescribed projects are listed in two groups in Schedule included in the first ministerial order of June 24, 1993. Part I of the Schedule includes 31 projects and undertakings if located wholly or partly outside the Coastal Zone. The projects in this group irrespective of size if located wholly or partly within the coastal zone must undergo the approval process that is laid down in the Coast Conservation Act. In other words only those projects located totally outside the Coastal Zone will be subject to the approval process laid down in the NEA.

Item 19 in this list of 31 projects and undertakings is described as the “Development of Industrial Estates and Parks exceeding an area of 10 hectares”. Once an industrial estate or industrial park is approved under Part IV VC of the NEA, any individual project or undertaking located in it, even though prescribed, will be exempted from the approval process. Projects and undertakings, which are listed as Items 20 to 30, belong to the category of high polluting industries. They will be required to go through the EIA process only if they are located outside an approved industrial estate or industrial park.

Implementation of projects in environmentally sensitive areas that are listed in Part III of the Schedule is not prohibited, but regardless of their magnitude such projects and undertakings must go through the approval process. This itself acts as a disincentive to project proponents. Similarly, even though Part I of the Order exempts projects and undertakings proposed to be established within the Coastal Zone from the approval process set out in Part IV C of the NEA, the law requires that such projects must be subject to the NEA approval process if they are located in environmentally sensitive areas of the Coastal Zone. In short, the EIA process set out in the Coast Conservation Act applies to projects prescribed under the NEA only when they are located wholly within the Coastal Zone but not in any environmentally sensitive area therein.

Part II of the Schedule of prescribed projects includes Item 32 industries (Items 33 to 52). Item 32 is described as “All projects and undertakings listed in Part I irrespective of their magnitudes and irrespective of whether they are located in the coastal zone or not, if located wholly or partly within the areas specified in Part III of the Schedule”. The industries included as Items 33 to 52 are not described by magnitude and are subject to the approval process only if located within the environmental sensitive areas mentioned in Part III of the Schedule.

Operational Procedure for EIA/IEE

The Basic Information Questionnaire (BIQ) form prepared by the CEA (**Annex 2**) has to be filled by the project proponent and submitted to the CEA. On examination of the BIQ, the CEA decides on the need for an EIA/IEE. If its determined that an EIA/IEE is required, the CEA will decide a suitable Project Approving Agency (PAA).

The PAA in turn will appoint a technical committee (TC) to scope the project based on the preliminary information. If the PAA determines that the project would have no long-term adverse environmental impacts, an initial environmental examination (IEE) would be considered adequate. The project proponent must submit a detailed IEE for review and approval by the PAA. The IEE should identify potential environmental and social issues and the possible remedial actions. Upon reviewing the IEE, if the TC identifies any substantial environmental issues that may arise as a result of the proposed project, the proponent will be advised to undertake a detailed EIA and issue the Terms of Reference (TOR) for the EIA. In developing the TOR, the PAA will also consider the views of other state agencies and the public. If the PAA decided that no further environmental analysis is needed, the process ends with approval/rejection of the IEE.

If an EIA is a necessity, then the project proponent must conduct the EIA according to the TOR issued, prepare the report in all three languages and submit it to the PAA. The PAA will then declare open the EIA report for a period of 30 days for public comments and the comments received will be conveyed to the proponent. The project proponent can then prepare a response to the public comments and submit it to the PAA. The TC will then evaluate the report with respect to adherence to the TOR, quality of the report contents and adequacy of the responses to public comments.

Based on the recommendations of the TC, the PAA in concurrence with CEA would either grant approval for the implementation of the proposed project subject to specific conditions or refuse approval for implementation of the project, giving reasons for doing so. The PAA will also specify a period within which the approved project should be completed. If the project proponent is unable to complete the project within the specified period, written permission for an extension must be obtained from the PAA, 30 days prior to the expiration of the approved completion date.

EIA in the Coast Conservation Act

The Coast Conservation Act No. 57 of 1981 together with the Coast Conservation (Amendment) Act, No. 64 of 1988 governs the Coastal Zone. This Zone comprises mainly “the area lying within a limit of three hundred meters landwards of the Mean High Water line and a limit of two kilometers seawards of the Mean Low Water line”. The EIA process is part of the permit procedure mandated in Part II of the Coast Conservation Act (CCA) for the approval of prescribed development projects and undertakings within the Coastal Zone. The Act states that the Minister in charge of the subject of Coast Conservation “may, having regard to the effect of those development activities on the long term stability, productivity and environmental quality of the Coastal Zone, prescribe the categories of development activity, which may be engaged in within the Coastal Zone without a permit”. Such activity should not however include any development activity already prescribed under the NEA.

Section 16 of the Coast Conservation Act (CCA) confers on the Director of Coast Conservation the discretion to request a developer applying for a permit (to engage in a development activity within the Coastal Zone) to furnish an Environmental Impact Assessment relating to the proposed development activity. The CCA does not however specify how and when this discretion should be exercised. The Coast Conservation Department (CCD) interprets this provision as requiring an EIA when the impacts of the project are likely to be significant. The application form for a permit includes several questions, the answers to which would help determine whether the development activity is likely to have significant impacts on the environment.

The Act requires the Director of Coast Conservation, on receiving an EIA Report, to make it available for public inspection and to entertain comments on it. The Act also requires the Director of Coast Conservation to refer the EIA report to the Coast Conservation Advisory Council for comment. The Council is an inter-department, inter-disciplinary advisory body. The Director of Coast Conservation may decide to.

- (1) Grant approval for the implementation of the proposed project subject to specified conditions,
- Or
- (2) Refuse approval for the implementation of the project, giving reasons for doing so.

Part I of the Schedule (annex II) containing the list of projects prescribed under the NEA states that the CCA applies in the case of those projects, which lie wholly within the Coastal Zone. This indicates that the NEA expects the Coast Conservation Dept. to consider these projects as prescribed and that an Environmental Impact Assessment is required albeit under the provisions of the CCA.

In practice however the Coast Conservation Department is guided by their own rules and regulations in determining whether any of the prescribed projects under the NEA require an Environmental Impact Assessment.

Certain parts of the Coastal Zone, which are considered environmentally sensitive and declared as “no-build” areas automatically, rule out the need to consider development projects in such areas. Similarly, development projects proposed for location in environmentally sensitive areas within the Coastal Zone are required to be submitted to the approval process specified in the NEA. Many of these environmentally sensitive areas have already been identified and listed by the Coast Conservation Department as “set-back” areas comprising reservation areas and restricted areas in which development activities are prohibited or significantly restricted.

CCD Planning Division officers submit their recommendations regarding proposed development projects to the Planning Committee of the Coast Conservation Department. The three technical divisions of the Coast Conservation Department recommend the issue of a permit with or without an EIA. Where an EIA is recommended, scoping sessions are convened with representatives of concerned state agencies to determine the Terms of Reference for the EIA.

The long title of the Coast Conservation Act states that the Act is established to regulate and control development activities within the Coastal Zone. Therefore, the Coast Conservation Department is the final authority in determining whether to permit a development activity in terms of the CCA, even though such activity may be required go through the approval process laid down in the NEA.

CCD Planning Division officers submit their recommendations regarding proposed development projects to the Planning Committee of the Coast Conservation Department. The three technical divisions of the Coast Conservation Department recommend the issue of a permit with or without an EIA. Where an EIA is recommended, scoping sessions are convened with representatives of concerned state agencies to determine the Terms of Reference for the EIA.

The long title of the Coast Conservation Act states that the Act is established to regulate and control development activities within the Coastal Zone. Therefore, the Coast Conservation Department is the final authority in determining whether to permit a development activity in terms of the CCA, even though such activity may be required go through the approval process laid down in the NEA.

EIA in the Fauna and Flora (Protection) Ordinance

The Fauna and Flora (Protection) Ordinance No. 2 of 1937, as amended by the Fauna and Flora (Amendment) Act No. 49 of 1993, requires that any development activity of any description whatsoever proposed to be established within one mile of the boundary of any National Reserve, should receive the prior written approval of the Director of Wildlife Conservation. The Ordinance as amended mandates that the project proponent should furnish an IEE or EIA report in terms of the National Environmental Act. The information that a project proponent applying for permission to establish a development project within one

mile of any National Reserve has to submit is much more comprehensive than the information required for the approval process stipulated under the NEA. This is because every development project or activity to be established within one mile of any National Reserve is subject to the approval process of the Department of Wild Life Conservation regardless of its magnitude or category. Success in the implementation of this requirement will be tested to the extent that the term “development activity” is not defined in the Act. This procedure could also discourage any development activity however environmentally compatible it is, proposed to be established within any environmentally sensitive area.

EIA in the Provincial Administration

The Provincial Level environmental protection and management is introduced in Sri Lanka through the 13th amendments to the constitution certified in November 1987, which specifies three lists, the Reserved list, the Provincial Council list, and the Concurrent list. Provincial Councils have the exclusive right to legislate through statutes on matters specified in the provincial Council list. The subject of environmental protection is placed in the Concurrent list as well as on the Provincial Council list. Provincial councils and Parliament can both legislate on matters on the Concurrent list provides it is done in consultation with each other. Only the North Western Provincial Council (NWPC) enacted legislation on environmental protection by Statute No. 12 of 1990. The National Environmental Act remains suspended and inoperative within the North Western Province with effect from 10th January 1991.

Operational Framework for Implementation of EIA under national regulations

Activity	Agency	Duration
Submitting Preliminary information - A project proponent is required to provide the CEA with preliminary information on the proposed project, in order for the EIA process to be initiated. The best time for a project proponent to submit the preliminary information on the proposed project is as soon as the project concept is finalized and the location of the project is decided. The Basic Information Questionnaire (BIQ) form prepared by the CEA can be used for this purpose (Annex 2). When a prescribed project is referred to CEA, the CEA will decide a suitable Project Approving Agency (PAA).	CEA	2 months
Environmental Scoping - Then the PAA will carry out scoping and Terms of Reference (ToR) for the EIA/IEE will be issued to the project proponent	PAA	2 month
EIA/ IEE report preparation	Proponent	3 months
Public participation and evaluation - On receipt of an EIA report, it will be subjected to an adequacy check in order to ensure that the ToR issued by the PAA has been met. It will then be open for public inspection / comments for a period of 30 working days. If there are any public comments on the EIA report, they will be sent to the project proponent for response. Subsequent to the public commenting period the PAA will appoint a Technical Evaluation Committee (TEC) to evaluate the EIA report and make its recommendations. IEE reports are not required to be opened for public comments and are thus subjected to technical evaluation only.	PAA	3 months
Decision making - Based on the recommendation of the TEC, the PAA makes it's decision on whether to grant approval for a project. If the PAA is not the CEA, it should obtain the concurrence of the CEA prior to granting approval	PAA	2 months

Generally the approval is valid for 3 years. If the Project Proponent does not commence work within 3 years of the decision, renewal of the approval from the Project Approving Agencies is necessary. The validity period is usually stated in the letter of approval.

Annex 4 : Basic Information Questionnaire for the CEA

APPLICATION NO	
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CENTRAL ENVIRONMENTAL AUTHORITY

BASIC INFORMATION QUESTIONNAIRE

(Essential information to determine the environmental approval requirement of projects)

- 1 Name of the Project:
- 2 Name of the Developer:
(Company/firm/individual)

Postal Address:

Phone No: *Fax No:*

Contact person
Name
Designation:
Phone No: *Fax No:*
- 3 Brief description of the project (Use a separate sheet)
Attach copy (ies) of pre-feasibility / feasibility study report (s) if available
- 4 Scale / magnitude of the project:
(eg. For a road project: Length of the trace; Tourist hotel: No. of rooms; Agriculture project: Extent of land, solid waste management projects : capacity per/day etc.)
- 5 Main objective(s) of the project:
- 6 Investment and Funding sources:
- 7 Location of the Project
 - i Pradeshiya Sabha:
 - ii Divisional Secretariat:
 - iii District
 - iv Provincial Council

Provide a location map indicating the project site, access to the site, surrounding development and infrastructure within 500 m of the site (1:50000 scale).
- 8 Extent of the project area (in ha):
A copy of the survey plan of the site

9 Does the project wholly or partly fall within any of the following areas?

Area	Y e s	N o	Unaware
100m from the boundaries of or within any area declared under the National Heritage Wilderness Act No 4 of 1988			
100m from the boundaries of or within any area declared under the Forest Ordinance (Chapter 451)			
Coastal zone as defined in the Coast Conservation Act No 57 of 1981			
Any erodible area declared under the Soil Conservation Act (Chapter 450)			
Any Flood Area declared under the Flood Protection Ordinance (Chapter 449)			
Any flood protection area declared under the Sri Lanka Land Reclamation and Development Corporation Act 15 of 1968 as amended by Act No 52 of 1982			
60 meters from the bank of a public stream as defined in the Crown Lands Ordinance (Chapter 454) and having width of more than 25 meters at any point of its course			
Any reservations beyond the full supply level of a reservoir			
Any archaeological reserve, ancient or protected monument as defined or declared under the Antiquities Ordinance (Chapter 188).			
Any area declared under the Botanic Gardens Ordinance (Chapter 446).			
Within 100 meters from the boundaries of, or within, any area declared as a Sanctuary under the Fauna and Flora Protection Ordinance (Chapter 469)			
100 meters from the high flood level contour of or within, a public lake as defined in the Crown Lands Ordinance (Chapter 454) including those declared under section 71 of the said Ordinance			
<i>Within a distance of one mile of the boundary of a <u>National Reserve</u> declared under the Fauna and Flora Protection Ordinance</i>			

10 Present ownership of the project site:

State	Private	Other-specify

If state owned, please submit a letter of consent of the release of land from the relevant state agency

11 Present land use:

12 Present land use : (Please tick the relevant cage/s)

Land use Type		Land use Type	
Paddy		Marsh / Mangrove	
Tea		Scrub / Forest	
Rubber		Grassland / Chena	
Coconut		Built-up area	
Other Plantations / Garden		Other (pl. specify)	

13 Does the site /project require any

	Yes	No	If yes give the extent (in ha)
Reclamation of land, wetlands			
Clearing of forest			
Felling of trees			

14 Does the project envisage any resettlement

Yes	No	If yes, give the number of families to be resettled

15 Does the project envisage laying of pipelines

Yes	No	If yes, give the length of the pipeline (km)

16 Does the project involve any tunneling activities

Yes	No

17 Proposed timing and schedule including phased development:

18 Applicable laws, regulations, standards and requirements covering the proposed project:

19 Clearances / permits obtained or should be obtained from relevant state agencies and / or local authorities. (*Attach required copies of the same*)

The above information is accurate and true to the best of my knowledge. I am aware that this information will be utilized in decision-making by the relevant state authorities.

.....
Date

.....
Signature of Applicant

Annex 5: Prescribed Agricultural/ Agro Processing Activities that Require Environmental Protection Licensing

Activities or Industries under the agriculture and agro processing sectors, that need to obtain Environmental Protection License or clearance has been published under the National Environment Act No. 47 of 1980 as amended by Act Nos. 56 of 1988 and 53 of 2000, in the Extra ordinary Gazette No. 1533/16 of January 25, 2008, and the extract of the prescribed activities are listed below.

5.1. Prescribed Activities – Part A

1. Sugar manufacturing industries or sugar refineries.
2. Coconut oil or cinnamon oil extraction industries where 25 or more workers are employed.
3. Plants or animal oil/fats extraction industries having production capacity of 10 litres or more per day excluding coconut oil and cinnamon oil extraction industries.
4. Instant tea or coffee processing industries.
5. Desiccated coconut mills or coconut processing industries where 10 or more workers are employed.
6. Rice mills having wet process and having a production capacity of 5,000 kilograms or more per day.
7. All hatcheries or poultry farms having 2,500 or more birds or piggery, cattle, goats farms having animals 50 or more or having rating* for mixed farming 2,500 or more.
*Rating for Mixed Farming = No. of Birds + 50 x (No. of Pigs + No. of Cattle + No. of Goats)
8. Animal feed manufacturing industries having a capacity of 25 or more metric tons per day.
9. Cigarettes or other tobacco products manufacturing industries where 50 or more workers are employed.

5.2. Prescribed Activities – Part B

1. Cinnamon oil extracting industry where less than 25 workers are employed.
2. Rice mills having wet process with a production capacity of less than 5,000 kilograms per day.
3. Grinding mills having production capacity of more than 1,000 kilograms per month.
4. Poultry farms have 250 or more and less than 2,500 birds or piggery, cattle, goats farms having animals 5 or more and less than 50 or having rating * for mixed farming 250 and less than 2,500.
*Rating for Mixed Farming = No. of Birds + 50 x (No. of Pigs + No. of Cattle + No. Goats)
5. Animals feed manufacturing industries, having a capacity of less than 25 metric tons per day.

5.3. Prescribed Activities – Part C

1. Coconut oil extraction industries where 10 or more workers and less than 25 workers are employed.
2. .
3. Rice mills having dry process operations.
4. Grinding mills having production capacity of less than 1,000 kilograms per month.
5. Tobacco barns.
6. Cinnamon fumigating industries with Sulphur fumigation having capacity of 500 or more kilograms per batch.
7. Tea factories excluding instant tea processing.

Annex 6: Guidelines for Developing EMPs

Having identified the potential impacts of the relevant sub-component, the next step of the EA process involves the identification and development of measures aimed at eliminating, offsetting and/or reducing impacts to levels that are environmentally acceptable during implementation and operation of the project (EMP). EMPs provide an essential link between the impacts predicted and mitigation measures specified within the EA and implementation and operation activities. World Bank guidelines state that detailed EMP's are essential elements for Category A projects, but for many Category B projects, a simple EMP alone will suffice. While there are no standard formats for EMPs, it is recognized that the format needs to fit the circumstances in which the EMP is being developed and the requirements, which it is, designed to meet. EMPs should be prepared after taking into account comments from the PAA and IDA as well as any clearance conditions. Annex C of OP 4.01 (see main report for annex C) of the World Bank safeguards outlines the important elements of the EMP and guides its preparation. Given below are the important elements that constitute an EMP.

a. Identification of impacts and description of mitigation measures

Firstly, Impacts arising out of the project activities need to be clearly identified. Secondly, feasible and cost effective measures to minimise impacts to acceptable levels should be specified with reference to each impact identified. Further, it should provide details on the conditions under which the mitigatory measure should be implemented (ex; routine or in the event of contingencies) The EMP also should distinguish between type of solution proposed (structural & non structural) and the phase in which it should become operable (design, construction and/or operational).

b. Enhancement plans

Positive impacts or opportunities arising out of the project need to be identified during the EA process. Some of these opportunities can be further developed to draw environmental and social benefits to the local area. The EMP should identify such opportunities and develop a plan to systematically harness any such benefit.

c. Monitoring program

In order to ensure that the proposed mitigatory measures have the intended results and complies with national standards and donor requirements, an environmental performance monitoring program should be included in the EMP. The monitoring program should give details of the following;

- Monitoring indicators to be measured for evaluating the performance of each mitigatory measure (for example national standards, engineering structures, extent of area replanted, etc).
- Monitoring mechanisms and methodologies
- Monitoring frequency
- Monitoring locations

d. Institutional arrangements

Institutions/parties responsible for implementing mitigatory measures and for monitoring their performance should be clearly identified. Where necessary, mechanisms for institutional co-ordination should be identified as often monitoring tends to involve more than one institution.

e. Implementing schedules

Timing, frequency and duration of mitigation measures with links to overall implementation schedule of the project should be specified.

f. Reporting procedures

Feedback mechanisms to inform the relevant parties on the progress and effectiveness of the mitigatory measures and monitoring itself should be specified. Guidelines on the type of information wanted and the presentation of feedback information should also be highlighted.

g. Cost estimates and sources of funds

Implementation of mitigatory measures mentioned in the EMP will involve an initial investment cost as well as recurrent costs. The EMP should include costs estimates for each measure and also identify sources of funding.

h. Contract clauses

This is an important section of the EMP that would ensure recommendations carried in the EMP will be translated into action on the ground. Contract documents will need to be incorporated with clauses directly linked to the implementation of mitigatory measures. Mechanisms such as linking the payment schedules to implementation of the said clauses could be explored and implemented, as appropriate.

Consultation with affected people and NGOs in preparing the MP will be an integral part of all Category A projects and is recommended for Category B projects.

1. Agriculture

1.1 Cultivation

Paddy

Sri Lanka being predominantly an agriculture based country, its economy had been built around agriculture and plantation for centuries. Rice is the main source of food and hence a large land area is allocated for its cultivation in almost all parts of the country amounting to 708,000 hectares. In the dry zone areas, paddy cultivation generally depends on rain water or irrigated water. From the ancient times kings who ruled the country focused on irrigated water for the water stressed dry zone through a chain of cascading man-made tanks and irrigated channels. It was the duty of the King to provide irrigated water to the paddy cultivation. Hence the “*wewa & dagaba*” concept came into being from ancient times.

In contrast, in the wet zone, paddy cultivation mainly depends upon the monsoonal rain. Sri Lanka being a tropical island located close proximity to the Bay of Bengal is subjected to tropical cyclones and heavy monsoonal rains. The island gets its rain mainly from the south-west monsoons from mid-May to October and north-east monsoons from December to March while the two inter-monsoonal periods lie in between. Paddy is cultivated in two seasons, *Yala* and *Maha* which is synonymous with the two monsoonal rain periods, where *Maha* season is during the north-east monsoons while the *Yala* is during the south-west monsoon period.

During the *Maha* season of 2010/11, a total of 525.017 hectares have been harvested and obtained a yield of 1,993, 014 MT. Paddy cultivation is quite demanding when comes to obtaining a high yield. A fair amount of research is taken place and novel varieties that yield bumper harvest have been invented. Seed paddy of these varieties are distributed among the farmers with the view to obtain a high yield.

Other Crops

Other plantation crops such as tea and rubber play a major role in terms of foreign exchange earnings to the country. A variety of non-export crops are grown in various climatic zones for the export market and local consumption. Depending on the climate and soil condition prevailing in the zone, the vegetable varieties and root crops are being grown. Hence agricultural crops fall into "up country" and "low country" varieties. All crop varieties are distributed by a transporting mechanism and the produce is distributed to all parts of the country making it available for consumers scattered in the country.

1.2 Production Process

Paddy

Paddy cultivation has been mechanized in many parts of the island in recent years as with the use of tractors to plough fields as against the use of buffalo. Similarly manual labor for sowing seeds or planting the paddy and harvesting has been replaced largely with mechanized technology such as combine harvesters.

In the ploughing process paddy stalk is buried in the soil as a conditioner and at the same time it nourishes the soil. The Government has carried out awareness campaigns to discourage burning of the paddy stalk and the paddy husk but to use as a soil conditioner. After sowing seed paddy or by planting the seed sprout, it is allowed to grow. From time to time weedicides, pesticides and chemical fertilizer are applied on demand, during the period of growth up until harvesting.

Once harvested, sheaves of paddy are subjected to the separation process of paddy from the shaft where it is done traditionally by getting buffaloes to trample. This process is gradually mechanizing using motored paddy separators. This is an *in situ* process. Collected paddy is then either stored or milled to produce rice.

Other Crops

In commercial agriculture, many crops are now being grown using the latest technology such as ploy tunneling, carefully using the limited land and water resources available. Hence top soil degradation is taken care of. Those that don't use the modern technology still use the traditional farming methods. The Chena cultivation is one such method and is still being practiced in rural areas despite limited land availability in a scale less intense than it was carried out many decades ago. However, use of agro fertilizer and chemical pest control methods are employed widely. Under the Control of Pesticides Act, use of harmful or phased out chemical fertilizer and pesticides have been banned and they are no longer available in the market.

Crops that are processed for value addition are categorized under agro processing. This includes processed tea, coconut processing industries, paddy milling etc. As per current practices, vegetables and pulses have little value addition as they are consumed directly by the locals while fruits are used in both making jams, chutneys & beverages for the local and foreign markets & consumed directly.

Polluting Processes (point source)

In cultivation key polluting steps, although limited, takes place mainly in the cultivating and post harvesting phases.

- (1) Land preparation for cultivation
- (2) Use of fertilizer and pesticides and weedicides
- (3) Harvesting
- (4) Post-harvest storage and transportation

Summary of Key Environmental issues

Solid waste - During the post-harvest phase a large amount of solid organic waste is generated and is generally used as fodder for cattle or organic manure for the next season, thereby encouraging the use of organic farming while discouraging the use of chemical fertilizer.

Wastewater – Over application of chemical fertilizer and pesticides/weedicides causes soil and ground/surface water pollution. Farmers are warned and advised by the district agrarian officers of its harmful effects to the environment and public health. However, as a signatory to the

Rotterdam Convention, Sri Lanka does not use any hazardous chemical mentioned in the Convention.

Recommended pollution prevention and control technologies

In cultivation, it is always best practices that need to be employed general recommendations cannot be employed in cultivation as it varies and depend upon the soil type, area of cultivation i.e. dry zone or wet zone and topography, crop type and the specific agriculture sector. This is why site specific Environmental Management Planning plays a key role. However, careful and minimal use of chemical fertilizer and pesticides/weedicides through good practices such as Integrated Pest Management and Integrated Plant nutrition Management etc that facilitate sustainable agricultural development should be essentially promoted. At the same time careful soil management needs to be taken care of to prevent soil erosion and top soil degradation.

Among other best practices would be organic cultivation. Although in commercial agriculture it may seem an uneconomical task it would certainly be an initiative and be a new avenue for small to medium farmers.

Sector specific environmental guidelines for further reading

Central Environmental Authority. (1997) Environmental Guidelines for Agriculture Sector Projects in Sri Lanka

1.2 Agro Processing

1.2.1 Rice Mills

Description of the industry

The staple diet in the South Asian region consists of rice and preparations from rice flour. From paddy cultivation to harvesting and all other operations pertaining to paddy cultivation takes place in all regions in Sri Lanka. In the milling process, the hard husk of the rice grain is removed mechanically to obtain the edible seed of rice. Most milling of paddy for commercial purposes are done in registered mills in a large scale while small scale operations also takes place for individual or personal consumption. Most rice mills of commercial operation are private sector owned and operated by the rice traders. Generally they purchase harvested paddy from growers and milled and sold as rice to the market maintaining adequate stocks of rice in the market and paddy in the stores.

Thus real value addition takes place at this milling operation. Rice mills whether they operate the dry process or wet process, need to obtain EPL for their operation.

Production process

Depending on the type of rice required, paddy is par-boiled prior to milling or milled without par-boiling. These two operations are known as wet and dry process respectively.

In the milling process, be it wet or dry a pre-cleaning takes place where the impurities are removed in the first instance. If paddy is milled using the dry method, paddy is dried before milling. Then is subjected to the de-husking process and thereafter rice is polished using vertical cone polishers.

In contrary, in the wet process, paddy is first cleaned to remove any impurities. Then it is soaked in water, drained and boiled. Once boiling is done, paddy is dried and dehusked. Finally it is polished to obtain the final product.

Polluting process: (point sources)

In rice milling industry the main polluting sources are

- (1) Pre-cleaning process
- (2) Soaking process & draining
- (3) Boiling process
- (4) De-husking

Summary of key environmental issues:

According to the level of pollution, rice mills have been categorized under the E2 in terms of pollution level of the ERMF.

Solid Waste - In the pre-cleaning process any remnants of straw or dried plant debris may be removed as solid waste. It is estimated that nearly 200Kg of husk is generated for a ton of paddy milled. Along with the husk, rice bran is also removed and is discarded as dust. Husk is the main solid waste that is generated in the paddy mills. Particulate matter and dust is generated in the process.

Husk is used as a source of fuel for furnaces in the mill. Partially it is used as poultry feed as it contains rice bran and also used to produce bricks. Unutilized husk is burnt in open which causes air pollution. Fly ash causes a nuisance if not disposed of properly. Mostly the unused excess husk is burnt in heaps. At times these heaps are dumped in open ground which takes years to decompose. Thus land becomes non-arable. At the same time if it gets into a water body, it becomes polluted and silted leading to eutrophication.

Wastewater - Water used for soaking paddy is discarded as waste water. As this wastewater contains high levels of BOD, discharging to the vicinity is quite detrimental to the environment. Nutrients in the wastewater may promote algal growth leading to eutrophication in the water body where the waste is discharged. If hot water is discharged, it can bring about adverse effects to the fauna and flora in soil or the water body.

Air Pollution – In the milling process, although Air Pollution is not a significant element, in-door air pollution can be associated with particulate matter and dust in the air. This will cause allergic reactions in workers.

Recommended pollution prevention methods Solid waste

General solid waste disposal methods include composting if the matter is of organic origin, sanitary land fill, or incineration. In the case of solid waste generated from the paddy mills, it can be considered to be of organic origin. Hence this can be composted in site or at a different location. Discarding paddy husk is a raw material for making bricks where it is used extensively by the brick makers and is used as a fuel for furnaces in the mill itself or for other industries. Any excess paddy

husk that needs to be discarded should be burnt in a properly constructed incinerator and fly ash should be disposed of in a proper manner ensuring no solid waste gets into any water body.

Waste water

Disposal of wastewater needs to comply with the industrial wastewater discharging standards gazetted by the Central Environmental Authority.

After a pre-treatment of screening, the wastewater can be anaerobically treated in an anaerobic digester followed by aerobic treatment in an oxidation ditch or aerated pond or activated sludge system depending on the BOD level that needs to be reduced. Treated clarified effluent is then channelled through a sand bed to remove any suspended particles.

Air Pollution

Particulate matter and dust that is generated needs to be taken care of. The wet scrubbers, cyclonic particle collectors or even exhausts with dust bags can be installed to prevent any particulate matter being sent out of premises. These dust traps need to be cleaned or replaced periodically for efficiency. (Refer Chapter 4, section 4.2).

1.2.2 Grinding Mills

Description of the industry

Commercial grinding mills came into operation with the open economy and changes in lifestyle where more and more females being employed and seeking convenience in preparation of food. Life has made convenient by having access to easy- to-prepare food formulations such as *Dosa* mixtures, sting-hopper mixtures, hopper mixtures and spices & condiments etc.

All grinding mills need to obtain EPL for their operation.

Production process

In the production process, whatever the item being ground, is first washed and destoned. Raw materials are dried to reduce the moisture content to the level where it can be ground mechanically and sieved to remove any hard solid particles. Finally they are mixed with other ingredients if formulations or mixtures are to be prepared or packed mechanically.

Adequate care should be taken in all steps to avoid contamination from chemical and biological substances as food products can be vehicles for food borne diseases. Maintenance of hygienic conditions is top priority in handling food preparations.

Polluting process – (point sources)

- (1) Washing and de-stoning process
- (2) Drying and roasting process
- (3) Grinding process
- (4) Packing

Summary of key environmental issues

Grinding mills have been categorized into E2 in terms of pollution level of the ERMF as per its level of pollution.

Solid waste - It is quite unlikely that any of the raw materials will become waste matter except in an unlikely event where the raw materials are of poor quality and become inedible. In the grinding process certain solid matter may remain to be disposed of. Fine particulate matter can become air borne causing an occupation health hazard.

Wastewater – During washing of raw material certain particulate matter or debris may be washed away. This washing may be high in BOD and COD content and may include suspended solid particles.

Air emissions - As far as air emissions are concerned, particulate matter if becomes air borne may cause an occupational hazard and perhaps be a pollutant. Dust particles are generated in the grinding process and at the packing process. Certain condiments when grinding may emit aromatic compounds which are not affecting the environment or health. Certain respiratory issues can create an impact to the workforce if proper and adequate preventive measures are not taken.

In commercial scale operations, drying is done using steam and hence boilers can generate air emissions due to the use of fuel.

Noise/ vibration – As grinding operation is done mechanically, the noise and vibration are generated. This becomes an annoyance in long term operations causing sever distress to the workers and may even cause impairment to hearing. Measures need to be taken to prevent any such damage from occurring.

Recommended pollution prevention and control technologies Solid waste

Dust and particulate matter are the main concerns in the grinding mill operation in terms of solid waste and is discussed under air pollution.

To prevent occupational health hazards, workers should be given face masks.

Wastewater

Wastewater generated during the washing process may contain a high BOD and COD levels. The washings are of organic origin and hence after initial screening to remove any suspended solids, it can be treated anaerobically to reduce the BOD and COD levels followed by aerobic treatment. However, in highly urbanised areas, as the limiting factor is land, a chemical treatment method may be employed to settle the suspended and dissolved solids followed by a clarification process. (Refer Chapter 4, section 4.1 for waste water effluent discharge standards).

Air pollution

Wet scrubbing methods can be used to trap the aromatic organic pollutants while dust traps/ bags or cyclonic separators are employed to collect air borne particulate matter. (Refer Chapter 4, section 4.2).

Noise/vibration

As most of the small scale operating mills is located amongst commercial buildings or homes noise and vibration can be an annoyance to the inhabitants. In larger scale commercial operations, the factories can adopt proper enclosure with sound proof insulation material or isolate the machines that generate noise. (Refer Chapter 4, section 4.3 for Noise standards).

But in the ones that are located in urban areas can employ simpler technologies such as use of insulation material to the walls. Proper servicing of machinery, lubrication of moving parts and replacement of worn out parts will minimise noise and vibration.

Improper mounting of equipment tend to give out vibration much more than those that are properly mounted. Adequate care must be taken to install equipment in the first place. (Refer Chapter 4, section 4.4).

Waste type	Migratory/ Abatement Measure
Solid Waste	
Polythene	Recycle; no open burning
Cardboard/ paper	Recycle; no open burning
Paddy hull/ husk	Use as a raw material for brick making or as animal feed or incinerate
Fly ash	Bury
Liquid Waste	
Suspended solids	Use screening mesh(Pre-treatment)
Clarified liquid waste	Anaerobic treatment followed by Aerobic treatment. Clarification in a sand bed.
Gaseous Waste	
Suspended particulate matter	Use dust traps
Air emissions from stove/ boiler rooms	Minimum chimney stack height to be 30 feet
Noise/Vibration	
Machines in operation	Enclose in a room
Vibration	Proper mounting of machinery

Regulatory obligations

Description	EPL Category
Rice mills having wet process and having a production capacity of 5,000 kg or more per day	A
Rice mills having wet process with a production capacity of more than 1,000 kg per day	B
Rice mills having a dry process	C
Grinding mills having production capacity of more than 1,000 kg per month	B
Grinding mills having production capacity of less than 1,000 kg per month	C

Sector specific environmental guidelines for further reading

1. Environmental Resources Management Lanka (Pvt.) Ltd. (2001). *Pollution Control Guideline No. 1- Paddy Mills*, Central Environmental Authority.
2. Environmental Resources Management Lanka (Pvt.) Ltd. (2001). *Pollution Control Guideline No. 7- Grinding Mills*, Central Environmental Authority.

1.2.3 Sugar Mills

Description of the industry

Sugar production in Sri Lanka is not a widely developed industry. The first factory was established as a Government Corporation in the early 70's and eventually sought private sector investment and entrepreneurship for economic viability. Subsequently several other factories also came into being in the dry zone of the island. The sugar cane plantation also began to provide the raw material for the industry. Sugar cane plantation encounters several natural environmental problems such as drought and fire, mainly being in the dry zone and also constantly being attacked by wild elephants.

Production process

Sugar cane, once ready to harvest are cut and cleared of all vegetative parts and manually cleaned before being fed into the mechanical crushers, into the process called milling. Milling takes place in several continual stages; cane juice is extracted and collected in each stage. The crushed cane is removed as bagasse and is a dry mass of solid vegetative material. The extracted juice is then strained to remove any particulate matter. Lime and soluble phosphate are added to the raw cane juice and heated to form a thick precipitate of insoluble particulate matter which is later separated out from the sugar syrup. Lime is added to neutralize the organic acids in the extract. The precipitate is then separated in the clarifier and is called "mud". The mud is filtered and filter cake is disposed of.

The clarified sugar syrup called molasses is heated and subjected to an evaporation process in several stages where a concentrated syrup is obtained. This is clarified by adding lime, phosphoric

acid and a polymer flocculent and crystalline sugar is obtained. In a more sophisticated process vacuum pans are used. The crystallization commences with the addition of a “seeding” solution consists of liquor and crystals known as massequite. The process takes place in several stages and finally the massequite is centrifuged to separate the molasses from the crystallized brown sugar.

The refining process takes place with a washing process called affinitation with warm and saturated syrup to loosen the molasses film. This is then followed by separation of crystals from the syrup in a centrifugal and washing of separated crystals with jets of hot water. Having carried out the cleaning process, the syrup is then sent to a clarifier followed by decolourisation and deodorization processes respectively. The final product is thus obtained as refined sugar.

Polluting process – (point sources)

In the sugar processing industry, the key polluting sources are:

- (1) Initial cleaning
- (2) Crushing
- (3) Clarification process
- (4) Afflination process
- (5) Decolourisation and deodorisation

Summary of key environmental issues

In the ERMF sugar mills have been categorised under E2 according to the pollution level.

Solid waste - Solid waste is generated at three stages in the sugar manufacturing industry. At the initial stage where the parts of the dried leaf matter is separated from the trunks. These vegetative parts are not a major issue as they are biodegradable and not detrimental to the environment. Similarly, the bagasse which is obtained after crushing and extraction of sugar, is mostly used the industry itself to fire the boilers.

The filter cake produced after the clarification process is may contain be mostly of mud and other suspended solids found in the syrup. This may also contain a high nutrient level hence needs to be disposed of in a method that is not harmful to the environment; especially it should not contaminate any water body. Similarly, in sugar manufacture, there are several clarification processes takes place hence all the sludge produced should be disposed of in an environment friendly manner.

Wastewater – Sugar industry produces liquid waste in stages but the liquid waste thus generated is reused in the production process; hence the actual wastage is generally minimal. However, possible generating points are at the crushing process, clarification process, afflination process, decolourisation and deodorisation processes. Molasses at different grades are reused in the production process and it is also sold as a raw material for ethanol industry. In case of a spillage, proper care should be taken.

Generally, the wastewater may contain a high BOD and COD values; therefore it needs to be treated before being discharged.

Air emissions – Possible air pollutants in the sugar industry generates in all the processes. Among the pollutants are particulate matters arising from cleaning process are generally harmless. Other potentially harmful substances are the volatile organic compounds, nitrogen oxides, carbon dioxide, carbon monoxide and sulphur oxides generating in the combustion process.

Odour becomes a problem only within the factory premises.

Noise/ vibration - In the crushing process generate noise and vibration. A part from this, in other operations noise may generate which is generally an in-house matter. Adequate measures may be necessary to prevent annoyance.

Recommended pollution prevention and control technologies Solid waste

Solid waste generated in sugar industry is generally of organic origin. Hence, it can be composted. The bagasse is used as fuel to the fire the boilers or as a raw material for industries such as paper and pulp industry, ethanol production or as fuel for any industry that may use it. Any excess solid waste needs to be buried or composted. However, composting may take a long time as it contains cellulose and fibrous substances that is not easily degraded. In the event all such methods are not feasible they should be incinerated.

The filter cake needs to be buried and prevent from getting into any water body.

Wastewater

Wastewater generated in the industry may contain high BOD and COD contents. This needs to be treated prior to disposal. (Refer Chapter 4, section 4.1 for waste water effluent discharge standards).

After initial screening process waste should be treated with alum to flocculate any suspended solids followed by aerobic treatment such as oxidation ditch or aerated pond which would reduce the BOD levels to accepted levels. Final clarification and tertiary treatment method can be employed prior to final disposal.

Air Emissions

As for air emissions in sugar industry, the dust particles may be collected by cloth dust collectors and should prevent from harming the workers. In the case of nitrogen oxides, sulphur dioxides and volatile organic compounds wet scrubbers can be used. Mostly, the plants are equipped with cyclonic air collectors and this can be released to higher atmosphere. The boiler chimney stack height should be maintained to prevent any indoor or our door air pollution. (Refer Chapter 4, section 4.2 for Ambient Air Quality Standards).

Noise/ vibration

The noise levels can be maintained if the respective machines are enclosed in a room. However, the workers be given adequate protection from being subjected to in-house noise pollution. (Refer Chapter 4, sections 4.3 and 4.4 for Noise standards and proposed Vibration standards).

Waste type	Migratory/ Abatement Measure
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Solid Waste	
Vegetative parts	Compost and burial
Bagasse	Use as fuel or as a raw material for ethanol industry or paper and pulp industry
Polythene	Recycle; no open burning
Cardboard/ paper	Recycle; no open burning
	Use as a raw material for brick making or as animal feed or incinerate
Fly ash	Bury
Liquid Waste	
Suspended solids	Use screening mesh(Pre-treatment)
Clarified liquid waste	Initial screening followed by Aerobic treatment. Clarification and tertiary treatment method.
Gaseous Waste	
Suspended particulate matter	Use dust traps
Air emissions from stove/ boiler rooms	Use of wet scrubbers and installation of cyclonic air collectors. Minimum chimney stack height to be 30 feet
Noise/ Vibration	
Machines in operation	Enclose in a room
Vibration	Proper mounting of machinery

Regulatory obligations

Description	EPL Category
Sugar manufacturing industries or sugar refineries	A
Sugar cane based industries excluding sugar factories or sugar refineries	B

Sector specific environmental guidelines for further reading

1. IFC. (2007). *Environmental, Health, And Safety Guidelines, Sugar Manufacturing*. April 30, 2007. International Finance Corporation.

Annex 7-B Intro to the World Bank Groups Environmental, Health, and Safety (EHS) Guidelines Relevant to the Agriculture Sector

The World Bank Groups Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry specific examples of Good International Industry Practice (GIIP). EHS Guidelines are applied as required by their respective policies and standards. These industry sector EHS guidelines are designed to be used together with the General EHS Guidelines document, which provides guidance to users on common EHS issues potentially applicable to all industry sectors.

The EHS Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs. Application of the EHS Guidelines to existing facilities may involve the establishment of site-specific targets, with an appropriate timetable for achieving them. The applicability of the EHS Guidelines should be tailored to the hazards and risks established for each project on the basis of the results of an environmental assessment in which site-specific variables, such as host country context, assimilative capacity of the Defined as the exercise of professional skill, diligence, prudence and foresight that would be reasonably expected from skilled and experienced professionals engaged in the same type of undertaking under the same or similar circumstances globally. The circumstances that skilled and experienced professionals may find when evaluating the range of pollution prevention and control techniques available to a project may include, but are not limited to, varying levels of environmental degradation and environmental assimilative capacity as well as varying levels of financial and technical feasibility. Environment, and other project factors, are taken into account. The applicability of specific technical recommendations should be based on the professional opinion of qualified and experienced persons. When host country regulations differ from the levels and measures presented in the EHS Guidelines, projects are expected to achieve whichever is more stringent. If less stringent levels or measures than those provided in these EHS Guidelines are appropriate, in view of specific project circumstances, a full and detailed justification for any proposed alternatives is needed as part of the site-specific environmental assessment. This justification should demonstrate that the choice for any alternate performance levels is protective of human health and the environment.

When host country regulations differ from the levels and measures presented in the EHS Guidelines, projects will be required to achieve whichever is more stringent. As the EHS guidelines are more stringent to the measures present in Country, the EHS guidelines should be followed where applicable

Sectoral Guidelines Applicable to the Project

Perennial Crop Production

These guidelines includes information relevant to large-scale plantation crops and out grower systems and focuses on the primary production and harvesting through farming and plantation forestry of major multi-year food, fiber, energy, ornamental, and pharmaceutical crops, located in both temperate and tropical regions. It includes tree crops (such as olives, citrus, coffee, rubber, eucalypts, and cacao) as well as banana, sugarcane, and palm oil. It does not include the processing of raw materials into semi-finished and finished products.

Annual Crop production

These guidelines includes information relevant to large-scale production, harvesting, post harvesting processing and storage of major annual crops, including cereals, pulses, roots and tubers, oil-bearing crops, fiber crops, vegetables, and fodder crops, located in both temperate and tropical regions. It does not include the processing of raw materials into semi-finished and finished products.

Food and Beverage Processing

These guidelines cover the processing of vegetable, and fruit raw materials into value-added food and beverages products for human consumption.

All guidelines highlighted above may be downloaded via the following link:

http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/ifc+sustainability/our+approach/risk+management/ehsguidelines

Annex 8: Suggested Format for the Environmental Screening Form for Subprojects Under Component 2

Title of sub-project:

No	Item	Details			
INTRODUCTION					
1	Name of the Site				
2	Province				
3	District				
4	Divisional Secretary Division (s)				
5	Local Authority				
6	Grama Niladari Division (s)				
7	Brief description of the project (Be as brief as possible, confining to main elements only, provide a 1:10,000 scaled site map inclusive of area within 500m radius from the project site)				
8	Does the site /project require any;	Yes	No	If yes give the extent (in ha)	
	Reclamation of land, wetlands				
	Clearing of forest				
	Felling of trees				
9	Distance from Coast line				
10	Minimum land area required for the proposed development (based on urban guidelines) (ha)				
11	Available total land area within the identified location (ha)				
12	Expected construction period				
13	Responsible contact person with contact Information				
14	Present Land Ownership	State	Private	Other (specify)	
15	Total Cost of the Project				
16	Anticipated Date of Completion				
DESCRIPTION OF THE ENVIRONMENT					
PHYSICAL					
17	Topography & Landforms (map)	Attach an extract from relevant 1: 50,000 topographic sheet/ if detailed maps are available provide them			
18	Relief (difference in elevation)	Low <20m	Medium 20-40m	High 40-60	>60m
19	Slope	Low <30%	Medium 30-40 %	High 40-60 %	Very High > 60%
20	Position on Slope	Bottom	Mid-slope	Upper-slope	
21	Soil type				
22	Depth of top soil	Shallow	Moderate	Deep	

		< 20cm	20 – 100 cm	>100cm			
23	Soil Erosion	Low	Medium	High			
24	Climate	Wet Zone	Intermediate Zone	Dry Zone/ Semi Arid Zone			
25	Annual dry period						
26	Source of fresh Surface Water	Spring/canal	Tank/Reservoir	Perennial Stream	Seasonal Stream	N o n e	
28	Surface Water Use	Domestic	Washing/Bathing	Irrigation		Animal use	
29	Surface Water Quality	Poor	Moderate	Good			
30	Ground Water Availability	Dug Well	Tube Well	Other (specify)			
31	Ground Water Use	Domestic	Washing/Bathing	Irrigation	Animal use		
32	Ground Water Quality	Poor	Moderate	Good			
33	Incidence of Natural Disasters	Floods	Prolonged droughts	Cyclones/tidal waves	Other		
34	Geological Hazards	Landslides	Rock falls	Subsidence	Other		
ECOLOGICAL							
35	Habitat Types in the Project Site (indicate the % of each habitat type)	Natural forest	Degraded forest	Natural scrubland	Degraded scrubland	Riverine forest	
		Grassland	Abandoned agricultural land	Marsh	Lagoon	Estuary	
		Coastal scrub	Mangrove	Salt marsh	Home-gardens	Other (list)	
36	Habitat types within 500m radius from the site periphery (indicate the % of each habitat type)	Natural forest	Degraded forest	Natural scrubland	Degraded scrubland	Riverine forest	
		Grassland	Abandoned agricultural land	Marsh	Lagoon	Estuary	
		Coastal scrub	Mangrove	Salt marsh	Home-gardens	Other (list)	
37	Are there any environmentally and culturally sensitive areas within 250m?	Protected Areas	Migratory pathways of animals	Archeological sites	Wetlands	Mangroves strands	
38	Screening Questions	Yes	No	Scale of Impact			Remarks
				H	M	L	

A	Siting of the activity						
f.	Are there any environmentally and culturally sensitive areas within the project site and 500 meters from the project boundary?						
g.	Protected Areas / Forest Reserve						
h.	Migratory pathways of animals						
i.	Archeological sites						
j.	Wetlands						
k.	Mangroves strands						
l.	Estuarine						
n	Bufferzone of PAs/FRs						
n	Special area for protecting biodiversity						
o	Are there any plants (endemic and threatened species) of conservation importance within the project site and 500 meters from the project boundary?						
p	Are there any animals (endemic and threatened species) of conservation importance within the project site and 500 meters from the project boundary?						
B	Potential Environmental Impacts						
	Will the activity / sub-project cause						
•	Land disturbance or site clearance?						
•	Negative effects on rare (vulnerable), threatened or endangered species of flora or fauna or their habitat?						
•	Negative effects on designated wetlands?						
•	Spread of invasive plants or animals?						
•	Negative effects on wildlife habitat, populations, corridors or movement?						
•	Destruction of trees and vegetation?						
•	Impact on fish migration and navigation?						

•	Obstruction of natural connection between river and wetlands inside project area or natural drainage system?						
•	Water logging due to inadequate drainage?						
•	Insufficient drainage leading to salinity intrusion?						
•	Negative effects on surface water quality, quantities or flow?						
•	Negative effects on groundwater quality, quantity or movement?						
•	Increased demand of water requirements leading to reduction of water supply for competing uses?						
•	Increase probability of spread of diseases and parasites?						
•	Significant sedimentation or soil erosion or shoreline or riverbank erosion on or off site?						
•	Noss of existing buildings, property, economic livelihood?						
•	Negative impact on soil stability and compactness?						
•	Impacts on sustainability of associated construction waste disposal?						
•	Changes to the land due to material extraction?						
•	Traffic disturbances due to construction material transport and wastes?						
•	Increased noise due to transportation of equipment and construction materials?						
•	Increased noise due to day-to-day construction activities?						
•	Increased wind-blown dust from material (e.g. fine aggregate) storage areas?						
•	Degradation or disturbance of historical or culturally important sites?						
•	Health and safety issues?						
	Will the activity / sub-project require						
•	Setting up of ancillary production facilities?						

• Significant demands on utilities and services?						
• accommodation or service amenities to support the workforce during construction						

Note: Please add any other screening questions relevant to the proposed activity / sub-project. Also provide additional explanation of the responses and/or positive impacts in the remarks column.

CONTACT DETAILS OF OFFICIALS AND RECOMMENDATIONS

39	Name of the officer completed the form (From the Developer)	
40	Designation and contact Information	
41	List of team members	
42	Overall observation and recommendation	
43	Signature and date	

FINAL OBSERVATIONS & RECOMMENDATIONS

(a)	Does this site require an Initial Environmental Examination/Environmental Impact Assessment (IEE/EIA) or any other Environmental Assessments (EA) under the national regulations and please state the reasons?	
(b)	Although national regulations may not require IEE/EIA at this Site, are there environmental issues which need to be addressed through further environmental investigations and/or EA based on the guidance provided in EAMF? If the answer is “Yes” briefly describe the issues and type of investigations that need to be undertaken.	
(c)	Will this site be abandoned based on the current observations? If yes, please state the reasons.	
(d)	Does the proposed site meet the national urban planning requirements (only applicable for activities outside PAs)? If the answer is “No”, what needs to be done to meet these requirements; if the answer is “Yes”, has the project site obtained the necessary approvals?	
(e)	In addition to the above issues, please indicate any additional observations, recommendations if any	

Name and Contact Information of the officer who made the final observations and recommendations (PMU)

Signature and Date

Annex 9: Dam Safety Screening and Next Steps for Irrigation Subprojects

Form: Verification of the Status of Dam Safety of Up-Stream Hydrologic Connections

The following exercise will require collaboration with field offices (Provincial or District) belonging to the Irrigation Department/Mahaweli Authority.

Verification and Documentation Form		
1	Name of Subproject	
2	Name of Irrigation Scheme/Tank	
3	Description of Irrigation Scheme/Tank (For tanks, provide the bund height and capacity for schemes indicate the length and size of the scheme and command area)	
4	The irrigation structure/scheme is connected to/downstream of a medium-large scale dam	
	Yes	No
5	If Yes, provide the name of the dam and bund height	
	Has the dam mentioned in question 5 undergone any form of rehabilitation	
	Yes (Indicate the date of the last rehabilitation exercise)	No
6	Is the dam covered under the Dam Safety and Water Resources Planning Project (DSWRPP) or any other project	
	Yes	No
7	If Yes please indicate when the rehabilitation work was completed/ will be completed under the said project	
8	If No, a site verification of the dam should be conducted, in collaboration with the Irrigation/Mahaweli officers, the exiting conditions of the dam in terms of operations and safety need to be recorded and shared with the World Bank's environmental specialist for technical recommendations on further actions using the procedures mentioned below.	

As per the above screening, in the presence of such upstream hydrologically connected dams, which have not been rehabilitated or strengthened and thus have Dam Safety implications, the following steps need to be taken:

- (a) an inspection and evaluation of the safety status of the existing dam, its appurtenances, and its performance history;
- (b) a review and evaluation of the mandated dam owners operation and maintenance procedures, and
- (c) preparation of a written report of findings and recommendations for any remedial work or safety-related measures necessary to upgrade the existing dam to an acceptable standard of safety.

Necessary additional dam safety measures or remedial work may be financed under the proposed project. When substantial remedial work is needed, these will be undertaken using the following procedures.

- (a) A competent professional will be hired to design and supervise the work which can be conducted as per generic dam safety measures designed by qualified engineers.

Name and Contact Information of the officer from the Irrigation Department/Mahaweli Authority Consulted. (Please provide the Name of the field office)
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Signature and Date

Name and Contact Information of the officer who made the final observations and recommendations (PMU)

Signature and Date

Annex 10: Guidelines for Health and Safety of Workers, Communities and Visitors

Health and safety of workers and the public should be designed into constructions, before and during and after the building phase. It is cheaper and easier to control risks in construction to workers as well as the public before work starts on site by proper planning, training, site induction, worker consultation and incorporating strict safety procedures in construction plans. The proposed project interventions will mostly involve small to medium scale construction sites. As such, extreme dangers posed by working in environments such as great heights, deep water and involving dangerous chemicals and radioactive material will not be present. Potential dangers associated with ESCAMP sites will include falling from moderate heights, vehicle accidents, falling into trenches, drowning, breathing dust and other air pollutants, back aches caused by handling heavy material, wildlife attacks, etc. and can be mitigated with following safety guidelines.

EA/EMP for each site should mandatorily include a risk assessment as to what are the hazards involved in the work site, who might be harmed and how seriously, how likely this harm might happen and what actions are required to eliminate or reduce the risk and incorporate such measures in the EMP and clearly set out in the tender documents. All sub-projects must observe health and safety regulations, hence during implementation it is important to check if these control measures are put in place and are meeting the legal requirement.

Further guidance can be found in the World Bank Group General EHS Guidelines. The following measures have been developed to fit the country context based on the General EHS Guidelines.

Training

- Ensure constructors carry out suitable training programs on occupational health and safety for workers prior to commencement of construction, especially with regard to working in wild territory.
- Ensure only experienced and well trained workers are used for the handling of machinery, equipment and material processing plants
- Ensure all persons, including managers, are trained and able to carry out their work without risk to the safety or health of themselves, other workers or the public

Personal Protective Equipment

- Ensure appropriate safety equipment, tools and protective clothing are provided to workers and that safe working methods are applied. A safety inspection checklist should be prepared taking into consideration what the workers are supposed to be wearing and monitored.
 - Any person who works or operates in an area where there is a risk of flying objects, such as splinters, should wear safety goggles at all time. These should be securely fitted to the face. Welders should protect the entire face from hot sparks and bright rays by using a welding mask.
 - Any person exposed to high levels of dust or hazardous gases (when working in tunnels) should wear respiratory protection in the form of disposal masks or respiratory masks which fit more snugly around the nose and mouth.
 - Any person working in an area where there is the risk of being struck on the head by a falling or flying object should wear a hard hat at all times. These should be well maintained in order to be fully effective, and any helmets or hard hats that are damaged or cracked should immediately be replaced.

- All workers will be required to wear shoes or strong boots to prevent sharp objects from penetrating or crushing the foot. Those working in muddy conditions and in canals with polluted water should avoid hand/foot contact with water and should never wear slippers.
- Road workers should wear reflective vests to avoid being hit by moving vehicular traffic.

Site Delineation and Warning Signs

- Ensure delineation devices such as cones, lights, tubular markers, orange and white strips and barricades are erected to inform about work zones.
- Ensure all digging and installing work items that are not accomplished are isolated and warned of by signposts and flash lamps in nighttime (for those sites outside PAs).
- Ensure dangerous warning signs are raised to inform public of particular dangers and to keep the public away from such hazards, such as warning for bathing when working on river sites and irrigation works.
- Ensure rehabilitation of trenches progressively once work is completed.
- The safety inspection checklist must look to see that the delineation devices are used, whether they are appropriately positioned, if they are easily identifiable and whether they are reflective.

Equipment safety

- Work zone workers use tools, equipment and machinery that could be dangerous if used incorrectly or if the equipment malfunctions. Inspections must be carried out to test the equipment before it is used, so that worker safety can be secured. Inspections should look for evidence of wear and tear, frays, missing parts and mechanical or electrical problems.

Material management

- Ensure easily flammable materials are not be stored in construction site and that they are transported out of project site

Emergency Procedures

- Ensure an emergency aid service is in place in the work zone.
- Ensure all site staff is properly briefed as to what to do in the event of an emergency, such as who to notify and where to assemble for a head count. This information must be conveyed to employees by the site manager on the first occasion a worker visits the site.

Construction camps

- Ensure installation of adequate construction camps and sanitation facilities for construction workers to control of transmission of infectious diseases.
- Ensure that adequate warning is provided on issues of poaching and wildlife attacks

Information management

- Develop and establish contractor's own procedure for receiving, documenting and addressing complaints that is easily accessible, culturally appropriate and understandable to affected communities.
- Provide advance notice to local communities by way of information boards about the schedule of construction activities.

Worker consultation

- Consulting the workforce on health and safety measures is not only a legal requirement, it is an effective way to ensure that workers are committed to health and safety procedures and improvements. Employees should be consulted on health and safety measures and before the introduction of new technology or products.

Annex 11: Generic EMPs and Environmental Codes for some of the proposed investments**Environmental Conditions to be Included in Contracts for Gravel Road Rehabilitation**

The following environmental conditions should be followed, by the contractor, during rehabilitation of gravel roads within agricultural areas.

1. Material Sourcing

- a. Construction material such as sand, aggregates and other quarry material should only be sourced from licensed sources.
- b. All burrow and/or quarry material may only be sourced from sources that hold a valid mining license from the GSMB.
- c. The contractor is required to maintain updated copies of all necessary licenses and environmental clearances for all burrow and quarry material they are sourcing.
- d. Sourcing of any material from within any Protected Areas/Sanctuaries, tank beds and/or designated natural areas are strictly prohibited.
- e. The will need to maintain the numbers and relevant details, including dates licenses were issued and expiration dates, of all relevant licenses and report of their status accordingly.

2. Transport of Construction Material

- a. All material should be transported in fully covered trucks. Overloading of vehicles with materials should be controlled and done in a manner to suit the trucks capacity.

3. Onsite and Offsite Storage of construction materials

- a. Sites for storage of construction materials should be identified, without affecting the local communities, traffic and other common utilities that will lead to access issues.
- b. All construction material should be stored in a site approved by the engineer.
- c. All earth material, sand and/or metal should be stored in a contained manner at all times to avoid dust and runoff due to rain.
- d. Plastic sheeting (of about 6 mm minimum thickness) can be used and held in place with weights, such as old tires or cinder blocks, with the edges of the sheeting buried, or by the use of other anchoring systems.

4. Management of Dust

- a. All construction material should be stored and transported as per the recommendations provided above (Point 3), where the measures stipulated will ensure dust levels are mitigated.
- b. Water sprinkling should be carried out in the work and fill areas and the access road if dust stir is observed. Water sprinkling should be done more frequently on days that are dry and windy (at least four times a day) as the levels of dust can be elevated during dry periods.
- c. Dust masks should be provided to the laborers for the use at required times.

5. Control of Spread of Invasive Species

- a. There is a possibility of introducing / spreading of invasive species during material transportation and disposing cleared vegetation from one site to another, thus the following measures are to be undertaken.
- b. Close monitoring of transportation, storage of borrowing material for the spread of any invasive species must be done.
- c. Vehicles should be covered during transportation of cleared vegetation to and from the construction site.
- d. Borrow material to be brought from properly identified borrow pits and quarry sites, the sites should be inspected in order to ensure that no invasive plant species are being carried with the borrow material.
- e. Washing the vehicles should be conducted periodically to prevent carrying any invasive species
- f. The construction site should be inspected periodically to ensure that no invasive species are establishing themselves at the site.

6. Water for work purposes and dust management

- a. The contractor should arrange adequate supply of water for the project purpose throughout the construction period from a source agreed upon with the engineer.
- b. Water may not be obtained for project purposes, including for labor camps, from public or community water supply schemes without a prior approval from the relevant authority.
- c. Extraction of water from ground water or surface water bodies without the permission from Engineer and the relevant authority
- d. Permission for the extraction of water should be obtained prior to the commencement of the project, from the relevant authority.

General Mitigation Measures to be Included in the Environmental Management Plan for All Construction Projects

Pre-Construction Impact Mitigation

Utility Relocation

- ❖ Identify the common utilities to be affected such as: telephone cables, electric cables, electric poles, water pipelines, public water taps, etc.
- ❖ Affected utilities shall be relocated with prior approval of the concerned agencies before construction starts.
- ❖ Ensure community consensus and minimum impact to common utilities like telephone cable, electric cables, electric poles, water taps and etc., Proper clearance to be obtained from the concerned authorities and sent to the PMU before commencement of works.

Tree Removal

- ❖ Attempt to save the trees by changing the alignment of the designs
- ❖ Provide adequate protection to the trees to be retained with tree guards (e.g. Masonry tree guards, Low level RCC tree guards, Circular Iron Tree Guard with Bars) as required.
- ❖ Identify the number of trees that will be affected with girth size & species type
- ❖ Trees shall be removed from the construction sites before commencement of construction with prior permission from the concerned department.
- ❖ Compensatory plantation by way of Re-plantation of at least twice the number of trees cut should be carried out in the project area. (Please Refer Tree Protection/ Tree Re-Planting Procedures outlined in Section X)

Construction of labor camps

- ❖ The location, layout and basic facility provision of labor camp must be submitted to Engineer prior to their construction.
- ❖ The construction will commence only upon the written approval of the Engineer.
- ❖ The contractor shall maintain necessary living accommodation and ancillary facilities in functional and hygienic manner and as approved by the Engineer.
- ❖ All temporary accommodation must be constructed and maintained in such a fashion that uncontaminated water is available for drinking, cooking and washing. The sewage system for the camp must be planned and implemented with concurrence from the Local Public Health Officer (PHI)
- ❖ Adequate health care is to be provided for the work force. The layout of the construction camp and details of the facilities provided should be prepared and shall be approved by the engineer.
- ❖ Labor camp sites after use should be cleared and the site should be reinstated to previous condition at the close of the construction work.

Planning of temporary Traffic arrangements

- ❖ Temporary diversion will be provided with the approval of the engineer. Detailed traffic control plans will be prepared and submitted to the engineers for approval, one week prior to commencement of works.
- ❖ The traffic control plans shall contain details of temporary diversion, details of arrangements for construction under traffic, details of traffic arrangement after cessation of work each day, Signage, safety measures for transport of hazardous materials and arrangement of flagmen.

Site Management and Mitigation of Impacts during Construction Phase

Information Disclosure among Stakeholders

- ❖ Discussions should be conducted with the residents who reside around the immediate vicinity of the construction site; provide them with information on the project activities must their views for possible impact mitigation as this will also ensure a good rapport and less complains. This should be done immediately once the contractor is mobilized.
- ❖ A copy of the EMP should be available at all times at the project supervision office on site.

Material Sourcing

- ❖ Significant impact on geological resources is anticipated at quarry sites and borrow areas the PIA shall ask contractors to ensure that sand, aggregates and other quarry material is sourced from licensed sources.
- ❖ It is recommended that all burrow and/or quarry material should be sourced from licensed sources.
- ❖ The contractor is required to maintain the necessary licenses and environmental clearances for all burrow and quarry material they are sourcing to obtain soil , fine aggregate and coarse aggregate.
- ❖ Sourcing of any material from any protected areas and/or designated natural areas are strictly prohibited.
- ❖ The Project Supervision Engineer will require maintaining the numbers and relevant details of all necessary licenses etc. and report of their status accordingly.

Transport and Storage of construction materials

- ❖ Sites for storage of construction materials should be identified, without affecting the traffic and other common utilities that will lead to access issues as the compound is operational.
- ❖ All material should be transported in fully covered trucks. Overloading of vehicles with materials should be controlled and done in a manner to suit the trucks capacity.
- ❖ Construction material such as cement, sand and metal should be stored in closed structures or in a contained manner.

Dust

- ❖ All construction materials such as sand, metal, lime, bricks etc. should be transported under cover to the site and stored under cover at the sight. Plastic sheeting (of about 6 mm minimum thickness) can be used and held in place with weights, such as old tires or cinder blocks, with the edges of the sheeting buried, or by the use of other anchoring systems. This will minimize the levels of airborne

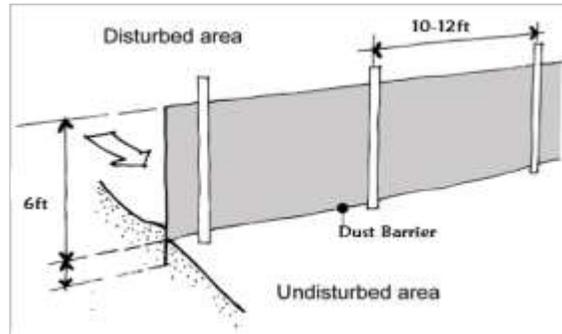


dust.

- ❖ Mud patches caused by material transporting vehicles in the access road should be immediately cleaned

- ❖ Continual water sprinkling should be carried out in the work and fill areas and the access road if dust stir is observed. Water sprinkling should be done more frequently on days that are dry and windy (at least four times a day) as the levels of dust can be elevated during dry periods.
- ❖ Dust barriers should be used during all construction activities, especially in areas along roads with heavy traffic, commercial and residential areas.

- ❖ The maximum height of barriers should be 6ft at minimum. Material such as Amano roofing sheets, fine mesh geo textiles are recommended materials to be used for setting up dust barriers.



- ❖ Dust masks should be provided to the laborers for the use at required times.

Noise

- ❖ Noise generating work should be limited to day time (6:00AM to 6:00PM). Other type of construction work which will not disturb the environment by noise or vibration could be carried out during the night time. No work that generates excessive noise should be carried out during night hours (from 6:00PM to 6:00AM on the following day).
- ❖ Even during day time use of the access road should be minimized during departure times (7:00AM to 8:30AM), school time (1:00PM-2:00PM) and arrival times (After 4:30PM -6:00PM). This will not only reduce noise levels but also help mitigate congestion issues in the area due to the construction activities.
- ❖ All equipment and machinery should be operated at noise levels that do not exceed the permissible level of 75 dB (during construction) for the day time. For all construction activities undertaken during the night time, it is necessary to maintain the noise level at below 50 dB as per the Central Environmental Authority (CEA) noise control regulations
- ❖ All equipment should be in good serviced condition. Regular maintenance of all construction vehicles and machinery to meet noise control regulations stipulated by the CEA in 1996 (Gazette Extra Ordinary, No 924/12) must be conducted for vehicles/machinery that will be used in construction on site and for transport.
- ❖ Ideally noise generating work should not be carried out during public holidays and religious days. Special care should be taken as there is a temple nearby.

- ❖ Labor gangs should be warned to work with minimum noise. Strict labor supervision should be undertaken in this respect. Number of night time resident laborers should be minimized.
- ❖ Temporary sound barriers also should be erected around buildings or premises as appropriate to shield residents if there are complaints from them.

Vehicular noise pollution at residential / sensitive receptors

- ❖ Idling of temporary trucks or other equipment should not be permitted during periods of loading / unloading or when they are not in active use. The practice must be ensured especially near residential / commercial / sensitive areas.
- ❖ Stationary construction equipment will be kept at least 500m away from sensitive receptors, where possible. These include hospitals, schools, places of worship and households.
- ❖ All possible and practical measures to control noise emissions during drilling shall be employed.

Noise from vehicles, machinery and equipment

- ❖ Contractor shall submit the list of high noise/vibration generating machinery & equipment to the PIA for approval.
- ❖ Servicing of all construction vehicles and machinery must be done regularly and during routine servicing operations, the effectiveness of exhaust silencers will be checked and if found defective will be replaced.
- ❖ Maintenance of vehicles, equipment and machinery shall be regular and up to the satisfaction of the Engineer to keep noise levels at the minimum.

Removal and Disposal of construction debris and excavated materials

- ❖ During site clearance activities, demolition and debris removal must be carried out swiftly and in well-planned manner. Possibly debris removal can be carried out during non-peak hours to avoid traffic at the site.
- ❖ The contractor shall identify the sites for debris disposal and should be finalized prior to start of the earthworks; Spoil and other disposal materials should only be dumped at sites for which prior approval from relevant authorities such as the LA have been obtained. Taking into account the following
 - The dumping does not impact natural drainage courses
 - No endangered / rare flora is impacted by such dumping
 - Should be located in nonresidential areas located in the downwind side
 - Located at least 100m from the designated forest land.
 - Avoid disposal on productive land.
 - should be located with the consensus of the local community , in consultation with the engineer and shall be approved by the highways department
 - Minimize the construction debris by balancing the cut and fill requirements.
- ❖ The contractor should avoid any spillage of spoil when transporting such materials to the approved material dumping sites.

Protection of top soil

- ❖ The top soil to be protected and compacted after completion of pipe laying activities.
- ❖ The contractor should attempt to reuse the cut material from earthworks for project activities where possible

Pollution from Fuel and Lubricants

- ❖ The contractor shall ensure that all construction vehicle parking location, fuel/lubricants storage sites, vehicle, machinery and equipment maintenance and refueling sites shall be located away from rivers and irrigation canal/ponds.
- ❖ Contractor shall ensure that all vehicle/machinery and equipment operation, maintenance and refueling will be carried out in such a fashion that spillage of fuels and lubricants does not contaminate the ground.
- ❖ Contractor shall arrange for collection, storing and disposal of oily wastes to the pre-identified disposal sites (list to be submitted to Engineer) and approved by the Engineer. All spills and collected petroleum products will be disposed off in accordance with standards set by the CEA/MoE.
- ❖ Engineer will certify that all arrangements comply with the guidelines of CEA/MoE or any other relevant laws.

Public and Worker Safety

- ❖ The construction site should be barricaded at all time in a day with adequate marking, safety tape, flags, reflectors etc. for safety of individuals using the compound on a daily basis. (Items such as parking cones, lights, tubular markers, orange and white strips and barricades of a luminous nature for night visibility)
- ❖ The construction site should be clearly demarcated by the above means and restriction of access to public to the site will help the safety of public.
- ❖ Safety signboards should be displayed at all necessary locations.



- ❖ The contractor should obtain a Third party insurance to compensate any damages, injuries caused to the public or laborers during the construction period.
- ❖ All construction vehicles should be operated by experienced and trained operators under supervision.
- ❖ Basic onsite safety training should be conducted for all laborers during the EMP training prior to the start of the construction activities.
- ❖ All digging and installation work should be completed in one go, if this task is not accomplished the area should be isolated using luminous safety tape and barricading structures surrounding the whole area.
- ❖ Trenches should be progressively rehabilitated once work is completed.
- ❖ Material loading and unloading should be done in an area, well away from traffic and barricaded
- ❖ Construction wastes should be removed within 24 hours from the site to ensure public safety.

Safety Gear for Labors

- ❖ Protective footwear and protective goggles should be provided to all workers employed on mixing of materials like cement, concrete etc.
- ❖ Welder's protective eye-shields shall be provided to workers who are engaged in welding works.
- ❖ Earplugs shall be provided to workers exposed to loud noise, and workers working in crushing, compaction, or concrete mixing operation.
- ❖ The contractor shall supply all necessary safety appliances such as safety goggles, helmets, safety belts, ear plugs, mask etc. to workers and staffs.
- ❖ In addition, the contractor shall maintained in stock at the site office, gloves, ear muffs, goggles, dust masks, safety harness and any other equipment considered necessary.
- ❖ A safety inspection checklist should be prepared taking into consideration what the workers are supposed to be wearing and monitored on a monthly basis and recorded.



Prevention of accidents

- ❖ Prevention of accidents involving human beings, animals or vehicles falling or accidents due to open trenches/manholes during construction period. This needs to be ensured with proper barricading, signage boards and lighting etc.
- ❖ A readily available first aid unit including an adequate supply of sterilized dressing materials and appliances should be available at the site office at all times
- ❖ Availability of suitable transport at all times to take injured or sick person(s) to the nearest hospital should also be insured.
- ❖ Names and contact information for emergency services such as Ambulance services, hospitals, police and the fire brigade should be prepared as a sign board and displayed at the work site.



Presence of Outside Labor in a Residential Area

- ❖ Strict labor supervision should be undertaken. There should be labor awareness programs to educate the laborers about their general behavior while at work as well as their own safety.

Operation of labor camps

- ❖ The Contractor shall construct and maintain all labor accommodation in such a fashion that uncontaminated water is available for drinking, cooking and washing.
- ❖ Supply of sufficient quantity of potable water (as per IS) in every workplace/labor camp site at suitable and easily accessible places and regular maintenance of such facilities.
- ❖ The sewage system for the camp are designed, built and operated in such a fashion that no health hazards occurs and no pollution to the air, ground water or adjacent water courses take place. Ensure adequate water supply is to be provided in all toilets and urinals.
- ❖ The contractor shall provide garbage bins in the camps and ensure that these are regularly emptied and disposed of in a hygienic manner

Surface Drainage and Possible Water Stagnation

- ❖ Provide storm water drain system in the premises which will discharge water to the improved roadside storm water drain.
- ❖ Carry out overall storm water management in the premises during construction using temporary ditches, sand bag barriers etc.
- ❖ Temporary flooding due to excavation.
- ❖ Proper drainage arrangements to be made, to avoid the overflowing of existing drains due to excavation during the laying of pipes, cutting activities.

Tree Protection during Construction Phase

- ❖ Giving due protection to the trees that fall in the shoulders /corridor of impact shall be the prime focus during Construction/post construction

- ❖ Masonry tree guards, Low level RCC tree guards, Circular Iron Tree Guard with Bars, use of plate compactors near trees may also be considered where necessary

Tree Re-Planting

- ❖ Re-plantation of at least twice (1:2) the number of trees cut should be carried out along the project road. Since the major portion of the project road may pass through open lands, planting of trees along the entire stretch of the road is recommended as an enhancement measure.
- ❖ Growth and survival of trees planted shall be ensured and monitoring done at least for a period of 3 years. Survival status shall be reported on monthly basis to Engineer in charge.

Clearing/Closure of Construction Site/Labor Camps

- ❖ Contractor to prepare site restoration plans for approval by the engineer. The plan is to be implemented by the contractor prior to demobilization.
- ❖ On completion of the works, all temporary structures will be cleared away, all rubbish cleared, excreta or other disposal pits or trenches filled in and effectively sealed off and the site left clean and tidy, at the contractor's expenses, to the entire satisfaction of the engineer.

Procedures for Dealing with Chance Finds

Flora and Chance found Fauna

- ❖ The contractor will take reasonable precaution to prevent workmen or any other persons from removing and damaging any flora (plant/vegetation) and fauna (animal) including fishing in any water body and hunting of any animal.
- ❖ If any wild animal is found near the construction site at any point of time, the contractor will immediately upon discovery thereof acquaint the Engineer and carry out the Engineer's instructions for dealing with the same.
- ❖ The Engineer will report to the nearby Forest Department /Department of Wild Life Conservation (range office or divisional office) and will take appropriate steps/ measures, if required in consultation with the forest officials.

Chance Found Archaeological Property

- ❖ All fossils, coins, articles of value of antiquity, structures and other remains or things of geological or archaeological interest discovered on the site shall be the property of the Government and shall be dealt with as per provisions of the relevant legislation.
- ❖ The contractor will take reasonable precautions to prevent his workmen or any other persons from removing and damaging any such article or thing. He will, immediately upon discovery thereof and before removal acquaint the Engineer of such discovery and carry out the instructions for dealing with the same, waiting which all work shall be stopped.
- ❖ The Engineer will seek direction from the Archaeological Department of Sri Lanka and inform the project EO to follow the Chance Find Procedures set forth.

Generic Environmental Management Plan (EMP) for Rehabilitation of C Grade Roads

	Activities and Associated Impacted	Protection and preventive measures	Mitigation cost	Responsibility	
				Implementation	Monitoring
PRE-CONSTRUCTION AND SITE PREPERATION					
1.	Tree Removal	<ul style="list-style-type: none"> ❖ The contractor shall make every effort to avoid removal and/or destruction of trees, including those of religious, cultural and aesthetic significance. ❖ If such action is unavoidable the Engineer shall be informed in advance to verify and report on the technical justification for the trees that will be required to be removed. ❖ The following steps are to be followed if trees are identified for removal during the rehabilitation of the road. <ul style="list-style-type: none"> ○ Identify and document the number of trees that will be affected with girth size & species type ○ Trees shall be removed from the construction sites before commencement of construction with prior permission from the concerned department (LA). ○ Compensatory plantation by way of Re-plantation of at least twice the number of trees cut should be carried out in the project area. ○ The contractor shall adhere to the guidelines and recommendations made by the Central Environmental Authority, if any with regard to felling of trees and removal of vegetation. ○ Removed trees of economic value must be handed over to the Timber Corporation. 	Engineering Cost	Contractor	PMU/MoA
2.	Labor and Labor Camps	<ul style="list-style-type: none"> ❖ The contractor should give priority to hiring labor from the surrounding areas to avoid the need for labor camps. ❖ The location, layout and basic facility provision of the labor camp must be submitted to Engineer of the relevant managing department prior to their construction. ❖ The construction will commence only upon the written approval of the Engineer. ❖ The contractor shall maintain necessary living accommodation and ancillary facilities in a functional and hygienic manner and as approved by the Engineer. ❖ All temporary accommodation must be constructed and maintained in such a fashion that uncontaminated water is available for drinking, cooking and washing. 	Engineering Cost	Contractor	PMU/MoA

		<ul style="list-style-type: none"> ❖ The sewage system for the camp must be planned and implemented with concurrence from the Local Public Health Officer (PHI) ❖ Adequate health care is to be provided for the work force. ❖ Labor camp sites after use should be cleared and the site should be reinstated to previous condition at the close of the construction work. 			
3.	Material Sourcing	<ul style="list-style-type: none"> ❖ The contractor is required to ensure that sand, aggregates and other quarry material is sourced from licensed sources. ❖ The contractor is required to maintain the necessary licenses and environmental clearances for all burrow and quarry material they are sourcing –including soil , fine aggregate and coarse aggregate. ❖ Sourcing of any material from protected areas and/or designated natural areas, including tank beds, are strictly prohibited. ❖ If the contractor uses a non-commercial burrow/quarry sites, the sites should be remediated accordingly once material sourcing has been completed. ❖ The contractor should submit in writing all the relevant numbers and relevant details of all pre-requisite licenses etc. and report of their status accordingly. 	Engineering Cost	Contractor	PMU/MoA
4.	Water for Construction activities	<ul style="list-style-type: none"> ❖ The contractor should arrange adequate supply of water for the project purpose throughout the construction period from a source agreed upon with the engineer. ❖ Water may not be obtained for project purposes, including for labor camps, from public or community water supply schemes without a prior approval from the relevant authority. ❖ Extraction of water from ground water or surface water bodies without the permission from Engineer and the relevant authority ❖ Permission for the extraction of water should be obtained prior to the commencement of the project, from the relevant authority. 			PMU/MoA
5.	Work Site for construction materials	<ul style="list-style-type: none"> ❖ The contractor should identify an area to store construction materials and equipment at a site which should be approved by the engineer. ❖ Storage yards cannot be located in community areas, such as playgrounds, close to water ways, cause access issues to locals or forested areas that require clearing. ❖ Parking, repairing vehicles, machinery and equipment shall be done stationed only at the work site and/or in any other designated areas by the engineer. ❖ The contractor should provide instruction and advice should be given to drivers and operators (both company owned and hired) to park vehicles and store equipment at the work site or designated areas by the engineer. 			PMU/MoA

6.	Information Disclosure among Stakeholders	<ul style="list-style-type: none"> ❖ Discussions should be conducted with the residents who reside along the corridor of the road; <ul style="list-style-type: none"> ○ Residents have to be briefed of the project, purpose and design and outcomes via a documented community consultation session ○ This should be done immediately once the contractor is mobilized. ○ The contractor should take note of all impacts, especially access issues and safety hazards that will be of concern to the residents and take necessary measures as stipulated in the EMP to mitigate them. ❖ The contractor will maintain a log of any grievances/complains and actions taken to resolve them. ❖ A copy of the EMP should be available at all times at the project supervision office on site. 	Engineering Cost	Contractor/ PIA	PMU/MoA
CONSTRUCTION PHASE					
7.	Clearing of road shoulders and Removal and Disposal of construction debris and excavated materials	<ul style="list-style-type: none"> ❖ During site clearance activities, removal of vegetation and debris must be carried out swiftly and in well-planned manner. ❖ The contractor shall identify the sites for disposal of material cleared. ❖ Plants, shrubs and other vegetation cleared should not be burned on site. ❖ Spoil and other disposal materials should only be dumped at sites for which prior approval from relevant authorities such as the LA have been obtained. Taking into account the following <ul style="list-style-type: none"> ○ The dumping does not impact natural drainage courses ○ No endangered / rare flora is impacted by such dumping ○ Should be located in nonresidential areas located in the downwind side ○ Located at least 100m from the designated forest land. ○ Avoid disposal on productive land. ○ should be located with the consensus of the local community , in consultation with the engineer and shall be approved by the highways department ○ Minimize the construction debris by balancing the cut and fill requirements. ❖ The contractor should avoid any spillage of spoil when transporting such materials to the approved material dumping sites. 	Engineering Cost	Contractor	PMU/MoA
8.	Protection of top soil	<ul style="list-style-type: none"> ❖ Top soil of the agricultural areas and any other productive areas where it has to be removed for the purpose of this project shall be stripped to a specified depth 	Engineering Cost	Contractor	PMU/MoA

		<p>of 150mm and stored in stockpiles of height not exceeding 2m, as directed by the engineer.</p> <ul style="list-style-type: none"> ❖ If the contractor is in any doubt on whether to conserve the topsoil or not for any given area he shall obtain the direction from the engineer in writing ❖ Removed top soil could be used as a productive soil when replanting trees and during turfing. ❖ Stockpiled topsoil must be returned to cover the areas where the topsoil has been removed due to project activities. Residual topsoil must be distributed on adjoining/proximate barren areas as identified by the engineer in a layer of thickness of 75mm – 150mm. ❖ Topsoil thus stockpiled for reuse shall not be surcharged or overburdened. ❖ As far as possible multiple handling of topsoil stockpiles should be kept to a minimum. 			
9.	Protection of Ground Cover and Vegetation	<ul style="list-style-type: none"> ❖ Construction vehicle, machinery and equipment shall be used and stationed only in the areas of work and in any other area designated/ approved by the engineer. ❖ Entry and exit of construction vehicles and machinery should be restricted to particular points as directed by the engineer ❖ Contractor should provide necessary instructions to drivers, operators and other construction workers not to destroy ground vegetation cover unnecessarily. 	Engineering Cost	Contractor	PMU/MoA
10.	Transport and Storage of construction materials	<ul style="list-style-type: none"> ❖ All material should be transported in fully covered trucks. Overloading of vehicles with materials should be controlled and done in a manner to suit the trucks capacity. ❖ Construction material such as cement, sand and metal should be stored in closed structures or in a contained manner as per those specified under mitigatory measures to ❖ All construction materials such as sand, metal, lime, bricks etc. should be transported under cover to the site and stored under cover at the sight. Plastic sheeting (of about 6 mm minimum thickness) can be used and held in place with weights, such as old tires or cinder blocks, with the edges of the sheeting buried, or by the use of other anchoring systems. 	Engineering Cost	Contractor	PMU/MoA
11.	Emission of Dust	<ul style="list-style-type: none"> ❖ In order to minimize the levels of airborne dust all construction material/debris should be stored as per the instructions provided above. ❖ Mud patches caused by material transporting vehicles in the access road should be immediately cleaned ❖ Continual water sprinkling should be carried out in the work and fill areas and the access road if dust stir is observed. Water sprinkling should be done more frequently on days that are dry and windy (at least four time’s day) as the levels of dust can be elevated during dry periods. ❖ Dust masks should be provided to the laborers for the use at required times. 	Engineering Cost	Contractor	PMU/MoA

10	Burrowing of Earth and Management of Self Operated Burrow Sites	<ul style="list-style-type: none"> ❖ In the event the contractor will use a self-operated burrow site <ul style="list-style-type: none"> ○ Contractor shall comply with the environmental requirements/guidelines issued by the CEA and the respective local authorities with respect of locating burrow areas and with regard to all operations related to excavation and transportation of earth from such sites. ○ Contractor can also find suitable soil materials from currently operated licensed burrow pits in the surrounding area, subject to approval of the engineer ○ No burrow-sites be used (current approved) or newly established within areas protected under FFPO and FO ○ Burrow areas shall not be opened without having a valid mining license from the GSMB. The location, depth of excavation and the extent of the pit or open cut area shall be as approved by the engineer. ○ All burrow pits/areas should be rehabilitated at the end of their use by the contractor in accordance with the requirements/guidelines issued by the CEA and the respective local authority. ○ Establishment of burrow pits/areas and its operational activities shall not cause any adverse impact to the near-by properties. Also shall not be a danger of health hazard to the people. ○ Contractor shall take all steps necessary to ensure the stability of slopes including those related to temporary works and burrow pits. 	Engineering Cost	Contractor	PMU/MoA
11.	Quarry Operations and Management of Self Operated Quarry Sites	<ul style="list-style-type: none"> ❖ In the event the contractor manages a self-owned existing quarry sites available in the project area ❖ The should be approved by GSMB with valid EPL and Industrial Mining Licenses; ❖ Prior approval should be obtained from GSMB, CEA and local authorities such as Pradeshiya Sabha. ❖ Selected quarry sites should have proper safety measures such as warnings, safety nets etc., and third party insurance cover to protect external parties that may be affected due to blasting. ❖ Quarry sites should not be established within protected sites identified under the FFPO and FO ❖ It is recommended not to seek material from quarries that have ongoing disputes with community. ❖ The maintenance and rehabilitation of the access roads in the event of damage by the contractors operations shall be a responsibility of the contractor. ❖ Copies of all relevant licenses should be maintained by the contractor for review and documentation by the engineer 	Engineering Cost	Contractor	PMU/MoA
12.	Control of Sedimentation and Soil Erosion	<ul style="list-style-type: none"> ❖ Debris material shall be disposed in such a manner that existing drainage paths are not blocked. ❖ Drainage paths associated with irrigation structures should be improved / erected to drain rain water properly. ❖ Silt traps will be constructed to avoid siltation into the water ways. where necessary along the road corridor. 	Engineering Cost	Contractor	PMU/MoA

		<ul style="list-style-type: none"> ❖ To avoid siltation, drainage paths should not be directed to waterways and irrigation canals and they should be separated from such water bodies ❖ In Hilly terrain and areas with slopes <ul style="list-style-type: none"> ○ Embankment slopes, slopes of cuts, etc. shall not be unduly exposed to erosive forces. ○ These exposed slopes shall be graded and covered by grass or other suitable materials per the specifications. ○ During the rainy season open cuts/slopes should be covered with fixed polythene sheeting to avoid excessive erosion. ❖ All fills, back fills and slopes should be compacted immediately to reach the specified degree of compaction and establishment of proper mulch. ❖ Work that lead to heavy erosion shall be avoided during the raining season. If such activities need to be continued during rainy season prior approval must be obtained from the Engineer by submitting a proposal on actions that will be undertaken by the contractor to prevent erosion. ❖ The work, permanent or temporary shall consist of measures as per design or as directed by the engineer to control soil erosion, sedimentation and water pollution to the satisfaction of the engineer. <ul style="list-style-type: none"> ○ Typical measures include the use of berms, dikes sediment basins, fiber mats, mulches, grasses, slope drains and other devices. ○ All sedimentation and pollution control works and maintenance thereof are deemed, as incidental to the earthwork or other items of work and no separate payment will be made for their implementation. 			
12.	Noise from vehicles, machinery and equipment	<ul style="list-style-type: none"> ❖ Noise generating work should be limited to day time (6:00AM to 6:00PM). No work that generates excessive noise should be carried out during night hours where in close proximity to sensitive receptors (temples, schools, hospitals) and residential areas (from 6:00PM to 6:00AM on the following day). ❖ All equipment and machinery should be operated at noise levels that do not exceed the permissible level of 75 dB (during construction) for the day time. For all construction activities undertaken during the night time, it is necessary to maintain the noise level at below 50 dB as per the Central Environmental Authority (CEA) noise control regulations ❖ All equipment should be in good serviced condition. Regular maintenance of all construction vehicles and machinery to meet noise control regulations stipulated by the CEA in 1996 (Gazette Extra Ordinary, No 924/12) must be conducted for vehicles/machinery that will be used in construction on site and for transport. ❖ Ideally noise generating work should not be carried out during public holidays and religious days. Special care should be taken as there is a temple nearby. ❖ Labor gangs should be warned to work with minimum noise. Strict labor supervision should be undertaken in this respect. Number of night time resident laborers should be minimized. 	Engineering Cost	Contractor	PMU/MoA
13.	Vehicular noise pollution at residential / sensitive receptors	<ul style="list-style-type: none"> ❖ Idling of temporary trucks or other equipment should not be permitted during periods of loading / unloading or when they are not in active use. ❖ The practice must be ensured especially near residential / commercial / sensitive areas. 	Engineering Cost	Contractor	PMU/MoA

		<ul style="list-style-type: none"> ❖ Stationary construction equipment will be kept at least 500m away from sensitive receptors, where possible. These include places of worship and households. ❖ All possible and practical measures to control noise emissions during drilling shall be employed. ❖ Contractor shall submit the list of high noise/vibration generating machinery & equipment to the engineer for approval. ❖ Servicing of all construction vehicles and machinery must be done regularly and during routine servicing operations, the effectiveness of exhaust silencers will be checked and if found defective will be replaced. ❖ Maintenance of vehicles, equipment and machinery shall be regular and up to the satisfaction of the Engineer to keep noise levels at the minimum. 			
14.	Pollution of Soil and Water via Fuel and Lubricants	<ul style="list-style-type: none"> ❖ The contractor shall ensure that all construction vehicle parking locations, fuel/lubricants storage sites, vehicle, machinery and equipment maintenance and refueling sites shall be located away from rivers, at least 200m away, and irrigation canal/ponds. ❖ Contractor shall ensure that all vehicle/machinery and equipment operation, maintenance and refueling will be carried out in such a fashion that spillage of fuels and lubricants does not contaminate the ground. ❖ Contractor shall arrange for collection, storing and disposal of oily wastes to the pre-identified disposal sites (list to be submitted to Engineer) and approved by the Engineer. All spills and collected petroleum products will be disposed of in accordance with standards set by the CEA/MoE. ❖ Engineer will certify that all arrangements comply with the guidelines of CEA/MoE or any other relevant laws. 	Engineering Cost	Contractor	PMU/MoA
15.	Public Safety	<ul style="list-style-type: none"> ❖ At all times, the Contractor shall provide safe and convenient passage for vehicles, pedestrians and livestock. ❖ Work that affects the use of existing accesses shall not be undertaken without providing adequate provisions to the prior satisfaction of the Engineer. ❖ The construction corridor should be barricaded at all time in a day with adequate marking, safety tape, flags, reflectors etc. for safety of individuals using the site daily basis. (Items such as parking cones, lights, tubular markers, orange and white strips and barricades of a luminous nature for night visibility shall be procured where deemed necessary) ❖ Safety signboards should be displayed at all necessary locations. ❖ The contractor should obtain a Third party insurance to compensate any damages, injuries caused to the public or laborers during the construction period. ❖ All construction vehicles should be operated by experienced and trained operators under supervision. ❖ Basic onsite safety training should be conducted for all laborers during the EMP training prior to the start of the construction activities. ❖ All digging and installation work should be completed in one go, if this task is not accomplished the area should be isolated using luminous safety tape and barricading structures surrounding the whole area. ❖ Trenches should be progressively rehabilitated once work is completed. 	Engineering Cost	Contractor	PMU/MoA

		<ul style="list-style-type: none"> ❖ Material loading and unloading should be done in an area, well away from traffic and barricaded ❖ Construction wastes should be removed within 24 hours from the site to ensure public safety. 			
16.	Safety of Workers	<ul style="list-style-type: none"> ❖ Contractor shall comply with the requirements for safety of the workers as per the ILO Convention No. 62 and Safety & Health Regulations of the Factory Ordinance of Sri Lanka to the extent that those are applicable to this contract. ❖ The contractor shall supply all necessary safety measures at site. ❖ Protective footwear and protective goggles should be provided to all workers employed on mixing of materials like cement, concrete etc. ❖ Welder's protective eye-shields shall be provided to workers who are engaged in welding works. ❖ Earplugs shall be provided to workers exposed to loud noise, and workers working in crushing, compaction, or concrete mixing operation. ❖ The contractor shall supply all necessary safety appliances such as safety goggles, helmets, safety belts, ear plugs, mask etc. to workers and staffs. ❖ In addition, the contractor shall maintained in stock at the site office, gloves, ear muffs, goggles, dust masks, safety harness and any other equipment considered necessary. ❖ A safety inspection checklist should be prepared taking into consideration what the workers are supposed to be wearing and monitored on a monthly basis and recorded. 	Engineering Cost	Contractor	PMU/MoA
17.	Prevention of accidents	<ul style="list-style-type: none"> ❖ Prevention of accidents involving human beings, animals or vehicles falling or accidents due to open trenches/manholes during construction period. This needs to be ensured with proper barricading, signage boards and lighting etc. ❖ A readily available first aid unit including an adequate supply of sterilized dressing materials and appliances should be available at the site office at all times ❖ Availability of suitable transport at all times to take injured or sick person(s) to the nearest hospital should also be insured. ❖ Names and contact information for emergency services such as Ambulance services, hospitals, police and the fire brigade should be prepared as a sign board and displayed at the work site. 	Engineering Cost	Contractor	PMU/MoA
18.	Operation of labor camps	<ul style="list-style-type: none"> ❖ The Contractor shall construct and maintain all labor accommodation in such a fashion that uncontaminated water is available for drinking, cooking and washing. ❖ Supply of sufficient quantity of potable water (as per IS) in every workplace/labor camp site at suitable and easily accessible places and regular maintenance of such facilities. ❖ The sewage system for the camp are designed, built and operated in such a fashion that no health hazards occurs and no pollution to the air, ground water or adjacent water courses take place. Ensure adequate water supply is to be provided in all toilets and urinals. 	Engineering Cost	Contractor	PMU/MoA

		<ul style="list-style-type: none"> ❖ The contractor shall provide garbage bins in the camps and ensure that these are regularly emptied and disposed of in a hygienic manner 			
19.	Traffic Management	<ul style="list-style-type: none"> ❖ Contractor shall develop a traffic management plan to minimize inconvenience to road users as well as prevent road accidents and implement it. ❖ Road signs and trained flagmen should be used to divert traffic as per the required traffic management measures. ❖ Clear instructions should be given if detours are used. ❖ Also any pits should be enclosed to prevent pedestrians or vehicles falling into them ❖ Improvement of the road surface and width will result in an increase of both the number of vehicles and the vehicle operating speeds. ❖ Therefore, after the construction is completed the contractor should erect relevant road signs and road markings to guide the drivers to ensure the safety of the vehicles and pedestrians 			PMU/MoA
20.	Loss of Access due to construction	<ul style="list-style-type: none"> ❖ Temporary access will be provided when permanent access is blocked for construction. ❖ When construction work is in progress in one side, the other side will be opened for traffic & properly ❖ At the end of each day, debris that blocked access path will be cleared away under the supervision of a supervisor. 			PMU/MoA
21.	Loss, Damage and disruption to Flora	<ul style="list-style-type: none"> ❖ All works shall be carried out in a manner that the destruction to the flora and their habitats is minimized. ❖ Trees and vegetation shall be felled / removed only if that impinges directly on the permanent works or necessary temporary works. In all such cases contractor shall take prior approval from the Engineer. ❖ Contractor shall make every effort to avoid removal and/or destruction of trees of religious, cultural and aesthetic significance. ❖ If such action is unavoidable the Engineer shall be informed in advance and carry out public consultation and report on the same should be submitted to the Engineer. ❖ Contractor shall adhere to the guidelines and recommendations made by the CEA, if any with regard to felling of trees and removal of vegetation. ❖ Removed trees of significant value must be handed over to the Timber Corporation. Documentation on the process should be shared with the engineer and maintained by the contractor. ❖ The contractor shall plant over 5 year old root-balled native trees suitable for the location as identified by the Engineer. ❖ The planting should take place in public land suitable for the purpose ❖ The contractor shall build hardy structures around the trees for protection. ❖ The contractor shall be responsible for ensuring the well-being of the trees/plants until the end of the contract 	Engineering Cost	Contractor	PMU/MoA

22.	Loss, Damage and disruption to Fauna	<ul style="list-style-type: none"> ❖ All works shall be carried out in such a manner that the destruction or disruption to the fauna and their habitats is minimum. ❖ Construction workers shall be instructed to protect fauna including wild animals and aquatic life as well as their habitats. Hunting, poaching and unauthorized fishing by project workers is not allowed. ❖ No solid or liquid waste should be dumped into natural habitats. 	Engineering Cost	Contractor	PMU/MoA
23.	Chance find procedures for PCRs and Archeological Property	<ul style="list-style-type: none"> ❖ Presented in Annex 11 			PMU/MoA
24.	Surface Drainage and Possible Water Stagnation	<ul style="list-style-type: none"> ❖ Provide storm water drain system in the premises which will discharge water to existing storm water drainage networks ❖ Carry out overall storm water management in the premises during construction using temporary ditches, sand bag barriers etc. ❖ Proper drainage arrangements to be made, to avoid the overflowing of existing drains due to cutting, excavation and other activities 	Engineering Cost	Contractor	PMU/MoA
POST CONSTRUCTION					
25.	Clearing/Closure of Construction Site/Labor Camps	<ul style="list-style-type: none"> ❖ Contractor to prepare site restoration plans for approval by the engineer. The plan is to be implemented by the contractor prior to demobilization. This includes burrow sites and storage yards as well ❖ On completion of the works, all temporary structures will be cleared away, all rubbish cleared, excreta or other disposal pits or trenches filled in and effectively sealed off and the site left clean and tidy, at the contractor's expenses, to the entire satisfaction of the engineer. 	Engineering Cost	Contractor	PMU/MoA
26.	Environmental Enhancement/ Landscaping	<ul style="list-style-type: none"> ❖ Landscape plantation, including turfing of shoulders, slopes, edge treatment of water bodies shall be taken up as per either detailed design or typical design guidelines given as part of the Bid Documents. ❖ The contractor also shall remove all debris, piles of unwanted earth, spoil material, away from the dam site and from other work places and disposed at locations designated or acceptable to the Engineer or as per the stipulated waste management criteria of this EMP. 	Engineering Cost	Contractor	PMU/MoA

Annex 12. Chance find procedure for Physical Cultural Resources

Contracts for civil works involving earth moving and excavation activities, especially in areas known to be sites of old civilizations and now returned to forest, should normally incorporate procedures for dealing with situations in which buried PCRs are unexpectedly exposed.

Recognition of unknown PCRs – This is the most difficult aspect to cover, especially if the contractor is not full-time accompanied by a specialist. **Upon discovery of such material** during project implementation work, the following should be carried out;

- Immediately stop construction activities.
- With the approval of the resident engineer delineate the discovered site area.
- Secure the site to prevent any damage or loss of removable objects. In case of removable antiquities or sensitive remains, a night guard should be present until the responsible authority takes over.
- Through the Resident Engineer, notify the responsible authorities, the Department of Archaeology and local authorities within 24 hours.
- Submit a brief chance find report, within a specified time period, with date and time of discovery, location of discovery, description of finding, estimated weight and dimension of PCR and temporary protection implemented.
- Responsible authorities would be in charge of protecting and preserving the site before deciding on the proper procedures to be carried out.
- An evaluation of the finding will be performed by the Department of Archaeology who may decide to either remove the PCR deemed to be of significance, further excavate within a specified distance of the discovery point and conserve on-site, and/or extend/reduce the areas demarcated by the contractor etc. This should ideally take place within about 7 days.
- Construction work could resume only when permission is given from the Department of Archaeology after the decision concerning the safeguard of the heritage is fully executed.

Annex 13: Environmental Conditions for the Construction of Dug Wells

Since dug wells take water from the highest water table, they are extremely susceptible to those activities that take place in the immediate vicinity of the well. Hence, selection of the proper location is an important aspect in dug well construction, especially if the water in the well will be used for drinking purposes.

Some basic rules to keep in mind before selecting a location for constructing a drinking water well.

- Survey of any existing DW in the area should be made to find out water availability and quality in the general area (if geo-tech investigations are not done). Any unused DW should be noted and causes found out.
- Well site must be above the flood level of rivers, tanks or other low lying areas that are prone to flood during rain
- Drinking water well should not be built in paddy fields (pollution by agro-chemicals)
- Areas of peaty soil should be avoided for DW as these cause the water to have an unpleasant taste and smell.
- Distance to the nearest possible source of pollution must not be less than at least 15 meters in the direction of the ground water flow. Sources of pollution can be latrine pits, cattle sheds, drains, burial grounds, garbage disposal dumps, roads etc.

Some tips for hand dug well-construction

- Select technology suited for the ground condition of the area
- Do not embark on well construction during or immediately after a rainy season
- The first 2.5m of wall in ing below ground level should compulsorily be water sealed to avert surface water intrusion. The well should be protected with a head wall and an apron around it.
- The required depth of the dug well will depend on the soil and water table conditions. It is better to construct dug well in the dry season, with the objective of achieving about two meters of water in the DW upon completion. This procedure will ensure a sufficient depth of water to remain serviceable year-round.
- DW should be covered to protect it from outside contamination ensuring proper ventilation and sunlight. A wire mesh with a suitable mesh size to protect the water quality to be placed on the headwall is ideal. If a concrete cover is placed, then adequate measures should be taken to ensure aeration.

Water Quality

- Water quality in the new dug well should be tested prior to it being used. The first sample should be taken after the well has been cleaned after construction which will take a few days.
- Water should be tested for bacteriological and chemical properties (the National Water Supply and Drainage Board has a standard test for drinking water sources and can be tested in any of the NWSDB laboratories). The local PHI should be contacted in this regard.
- Chlorination should be carried out if presence of fecal coliform bacteria is determined.
- It is important not to over-chlorinate. Hence, this should be done by or under the supervision of the PHI.
- Ideally, the water quality of the well should be tested twice a year to ensure no contamination is taking place.

Environmental Best Practices for Minor Tank Rehabilitation

Desilting

- There are many aspects which need to be taken care of during desilting of canals and ponds.
- It will be highly critical and important to instruct the labour that, they should take care of the canal sides and the banks, so that they are not damaged. During desilting and disposal this should be supervised by the departmental entity to ensure intactness of structures.
- The protection of existing canal outlets needs to be ensured, so that its blockage is avoided. The water through outlets reaches the fields as usual however otherwise there may be serious resentment among the water users which may leads to law and order problem.
- Although the current activities are proposed to serve the farming community, still there will be certain short-term problems for the natives of that area, such as – blocking of the access and hindrances in villagers movement. Desilting activities in sensitive areas should be done manually as much as possible and concern should be made on ensuring uninterrupted access to village communities.

Disposal of desilted matter

- The disposal of desilted matter is a critical exercise, which if not done properly and as per disposal plan may lead to many environmental and socio-political problems. So the contractor has to ensure strict compliance in this regard. The departmental field officers need to prepare a Silt Disposal Plan which should be made available to contractor's representative well in advance. Such a plan should clearly spell the disposal sites with quantum of desilted matter to be disposed.
- Prior to preparation of Silt Disposal Plan, the consent of villagers for disposal of desilted matter onto their land is mandatory, so that there is no room for any confusion and conflict in this regard.
- There is another key aspect i.e. quality of desilted matter from minors It needs to be ensured whether it is fit for the farms or not. For this, the desilted matter needs to be tested and analyzed by the Mobile and Base Laboratories of the consultant.
- Various plants, bushes, shrubs etc. are likely to be damaged during transportation of desilted matter. Even the machinery/vehicles may also trample the floral species available on the canal banks. In addition to this, the labour movement may also damage the flora.
- The unplanned deposition of desilted matter on the canal banks lead to choking and destruction of flora present over there, thereby leading to temporary termination of their growth and if the desilted matter is not immediately disposed off to pre-decided disposal sites, it would cause killing of floral varieties buried under the desilted matter.
- The water-bodies (which are located in the vicinity of canal systems) such as – ponds, lakes, wetlands are prone to sedimentation, pollution and overall destruction due to ill-planned Silt Disposal or inadequate adherence to a comprehensive plan. Water-bodies are lifeline for the villagers. These water-bodies are used by cattle for bathing and drinking etc. Such bodies also cater to a wide range of domestic needs of villagers and especially during lean period these water-bodies are vital for their survival.

- A provision to grow a vegetative cover on the disposal site after disposal is complete can be very helpful in further curbing adverse impacts of desilted matter in the vicinity. Such an activity has to be executed by the contractor under the supervision of the departmental field functionary.
- The silt from the canals mainly in branches and head reaches of distributaries contains pure sand. Such a desilted matter may reduce the fertility of the native soil and in addition to this, it may also change the current chemical composition of soil thereby leading to other problems related to compatibility, inhibited growth and reduced yield.
- If due care is not taken during disposal of the desilted matter placed on the banks after excavation, the banks and slopes would get damaged. This may also lead to weakening of banks. The awareness of labour in this regard will be quite critical in this regard.
- The contractor should carefully undertake this exercise and the departmental field functionary should supervise such activities, so that any damage to bunds and slopes can be avoided.

Borrow Area Rehabilitation

- The executing entities (contractor) borrow the area for soil digging for the purpose of construction or strengthening of structures/banks of the canals. It has been often found that, these entities rarely take environmental protection measures. Listed below are certain issues, which requires due consideration –
- In an event when the borrowed area is not compensated from environment viewpoint, it may causes soil degradation and removal of all floral and faunal species of that area, if any.
- Proper disposal of left over material after construction/other-maintenance-related-activity has to be ensured, the patch of area borrowed should be appropriately compensated from environment point of view. Surplus excavated material should be used for construction in fill, or be disposed off at suitable places. These places of dumping should be provided with a vegetative cover
- Loss of vegetation may also leads to
- Soil erosion
- Stagnation of water leading to vector proliferation and thereby causing diseases related to mosquitoes or other biting flees etc.
 - The loss of vegetation is another issue which needs to be dealt with, so that impact can be minimized in this aspect. The executing entities can be directed to ensure growth of vegetation in certain patch as a return for the destruction it has done to some other area in the name of “Borrow Area”.
 - At this juncture, one needs to understand the significance of the ‘vegetative – cover’. The vegetative cover allows the native floral and faunal species to grow and propagate. It also hampers removal of top layer of earth i.e. soil (which is generally productive in nature) either by wind or rainfall/run-off water.
- Removal of vegetation and cutting of trees should be done judiciously and limited to minimum possible extent. It is advised that cutting of any such tree (if highly essential) should be done in consultation with the forest authorities.

Drains

Under the rehabilitation work numbers of drainage systems are also to be rehabilitated including the earthwork.

- Silt cleared from the bed of a drain should be used to fill up holes and ruts on the inspection bank. This silt should not be thrown up in heaps in such a way as to interfere with the ingress of drainage.
- The silt should not be disposed off on the inner slopes of the drain to safeguard its re-entrance into the drains during rains, as this may potentially lead to choking or disruption of usual path of drain.
- Trees which grow on the inner slopes of drains should not be felled without taking required permission from the competent authority in the Forest Department. The compensatory plantation/afforestation should be ensured. The dead branches and rubbish that may have accumulated in the drains should also be cleared.
- Bunds should not be permitted in drains, as this may damage the drain and should be removed if found.
- All vegetative growth on distributaries and minors should be cleared from toe to toe of the outer slopes of the banks. Shrubs, large grass should be dug out by the roots. Stumps of trees that have been standing should be cut down to atleast below the ground. Ant hills shall be dug out and leveled off.
- All vegetative growth on escapes and drains should be cleared from the outer edge of the riding bank to the inner edge of the opposite bank.
- Grass and jungle should never be allowed to grow on masonry works; it should be dug out by the roots and the masonry then plastered. Grass against masonry works should be scrapped off, as the masonry may get damaged in the process.
- No trees, jungle of any kind and tall grass should be allowed to grow within 10 meters of a masonry work. No big trees such as should be allowed within 25 meters of an important masonry works, as the roots of these trees may extend up to the joints and damage the masonry.
- When a tree is to be felled, a hollow should be dug around the base and the trunk cut through as low down as possible, the hollow should then be filled-up to cover the root.
- No grass or similar bushy plants be allowed at the internal section of canals and drains as they will severely hamper the pace of water flow.
- Shade-line trees should not be felled without special approval from concerned authorities.
- Pruning of trees if at all is necessary should not be carried out with axe. The branch should first be sawn about half through on the underside and then completely through from the top, so that the bank may not be torn off.

Water quality

- Irrigation works must be planned to be carried out during times of lowest flow
- Silt traps using sand bags should be used when desilting and bank and other structural maintenance work is carried out in order to protect downstream users

1. Introduction to the project

To be filled

2. The Need for Environmental Assessment

All Matching Grant Scheme (MGS) proposals and sub-projects financed under the Agriculture Sector Modernization Project (ASMP) are required to comply with World Bank Operational and Safeguard Policies triggered, in addition to conformity with the environmental legislation of GOSL. Thus all sub-projects are required to conform to:

- a) the Environmental Assessment and Management Framework (EAMF) adopted by GOSL and accepted by the World Bank, and
- b) the terms of the Central Environmental Authority (CEA) as mandated by the National Environmental Act (NEA) of Sri Lanka, **where it is applicable**.

According to the EAMF, each sub-projects needs to be subjected to an environmental screening using the recommended template. Based on the screening information and concerns of the public the need to pursue further stand-alone assessments and if so the type of assessment is determined. All screening forms are filled by environmental officers supporting the Project implementation agencies and reviewed and cleared by the respective Project Management Units (PMU). For a sample proposals/ sub-projects with impacts are deemed as significant a prior review of the screening is carried out by the World Bank. When standalone assessments and management plans are considered necessary, the project proponent is responsible for carrying them out while the PMU reviews and clears them.

According to CEA procedures, all sub-project requiring NEA approval need to fill in a Basic Environmental Information Questionnaire (BEIQ). Upon reviewing the BEIQ, the CEA will determine whether no further environmental analysis is required or whether the proponent is required to prepare an Initial Environmental Examination (IEE) or an Environmental Impact Assessment (EIA).

3. Objectives

The primary objective of this assignment is for the Consultant to carry out an environmental audit for ASMP. The consultant will review the application of the EAMF to the ASMP. In particular, the consultant will review a sample of (i) the screening forms prepared by each PMU (ii) standalone environmental assessments/management plans (iii) application of the NEA and its clearance procedures followed by the project, as the case be, and based on site visits ensure conformity with conditions, guidelines and comments stipulated in these and other related documents. The Consultant is expected to be familiar with the EAMF, the applicable safeguard policies of the WB, NEA and the approval procedure of the CEA.

4. Tasks of the Consultant

- Obtain the required information from the sub-project proponent, PMUs, on the sub-project under implementation as well as under preparation under the ASMP. This may include, but not be limited to, relevant plans, drawings, screening reports, social analysis, standalone EA/EMP (if it has been necessary), comments of the World Bank.
- Review the above documents, discuss with the sub-project proponent as well as the surrounding community and visit the location and environs of the sub-project.
- Check for conformity of the sub-project in relation to the guidelines, conditions and comments stipulated in the item above.
- Examine monitoring reports and whether standards, procedures and controls are in place to respond to safeguards requirements stipulated in EAMF.
- Examine significant new risks and propose remedial actions
- Highlight any deviations from the guidelines, conditions and comments stipulated in the aforesaid documents and assist the sub-project proponent to improve the safeguard documents incorporating the necessary mitigatory measures.
- Document any adverse environmental impacts that were not anticipated in the screening and follow up assessments that may have occurred during project construction and implementation.
- Examine procedures of corrective action if monitoring parameters are out of monitoring limits and if such incidents are actually reported, investigated and followed up

Document and submit the environmental audit report which should include (i) an Executive

Summary, (ii) Overall audit opinion on the level of compliance, (iii) for each sub-project reviewed (a) a description of the sub-project, (b) the list of documents reviewed and persons interviewed, (c) observations made at the site, (d) conformity and/or deviations to guidelines (CEA and EAMF), clearance conditions (World Bank and GOSL) and plans, (e) status of progress reporting and actions taken to address issues (f) actions need to be taken to respond to negative deviations, (g) new risks and recommendations to address the risks (mitigation actions), (h) any other relevant information to support the findings.

5. Application Procedure

Qualified consultants may apply for the assignment listed above. Applications should be submitted using the format below:

- Title of assignment
- Name and address of the consultant/firm
- Name, designation and telephone number of contact person
- Brief consultant/company profile
- Key staff members of the firm (giving priority to assignment-specific staff; for each staff member provide name, position in the team, number of years in the firm, relevant qualifications and assignment-specific experience and proficiency in languages – read, write and speak)

- Relevant experience of the consultant/firm (Details of assignment-specific tasks undertaken during the past 10 years with client references)

Expressions of interest should focus on aspects relevant to the particular assignment, and reach the PMU by [Date].

Annex 16: Climate and Environmental Characteristics of the key Rice Growing and Agricultural Areas in Sri Lanka growing regions in Sri Lanka

Despite its relatively small aerial extent, Sri Lanka exemplifies a variety of climatic conditions depending on the geographical settings of respective locations. The average annual rainfall of the island varies from about 900 mm (Maha Lewaya, Hambantota) to over 5,500 mm (Kenilworth Estate, Ginigathena). Being located in the low latitudes between 6 and 10 N and surrounded by the Indian Ocean, Sri Lanka shows very typical maritime-tropical temperature conditions. These conditions are characterized by greater daily than annual temperature ranges and moderate average temperatures in comparison with the more continental tropics. Temperature conditions in Sri Lanka are also characterized by a significant temperature decrease in the central highlands according to the vertical atmospheric lapse rate.

Sri Lanka has traditionally been generalized in to three climatic zones in terms of Wet Zone in the southwestern region including central hill country, and Dry Zone covering predominantly, northern and eastern part of the country, being separated by an Intermediate zone, skirting the central hills except in the south and the west (Map 1). In differentiating aforesaid three climatic zones, rainfall, contribution of southwest monsoon rains, soils, land use and vegetation have been widely used. The Wet zone receives relatively high mean annual rainfall over 2,500 mm without pronounced dry periods. The Dry zone receives a mean annual rainfall of less than 1,750 mm with a distinct dry season from May to September. The Intermediate zone receives a mean annual rainfall between 1,750 to 2,500 mm with a short and less prominent dry season.

As low temperature is an important climatic factor affecting plant growth in the Wet and Intermediate zones of Sri Lanka, a sub-division based on the altitude takes into account the temperature limitations in these two climatic regions. In this delineation, the Low-country is demarcated as the land below 300 m in elevation and the Mid-country with elevation between 300 - 900 m while the Up-country is the land above 900 m elevation (Map 2). Both Wet and Intermediate zones spread across all three categories of elevation while the Dry zone is confined to the Low-country resulting seven agro-climatic zones covering the entire island (Map 3). These seven agro-climatic zones have further sub-divided into Agro-Ecological Regions (AER) with a total of 46 AERs covering the entire island (Map 4).

The delineation of AER boundaries of Sri Lanka has been based on the rainfall regime, terrain characteristics, predominant soil type, land use and vegetation so that each AER represents an uniform agro-climate, soils and terrain conditions and as such would support a particular farming system where certain range of crops and farming practices find their best expression.

Detailed studies on climatology of Sri Lanka has identified that "climatic year" or "hydrological year" of the island begins in March and not in January so that seasonal weather rhythm or more specifically the rainfall seasons ranges from March to February. It is generally accepted that there are four rainfall seasons in Sri Lanka:

March	-	April	--	First	Inter	Monsoon	(FIM)	rains
May	-	September	--	South	West	Monsoon	(SWM)	rains
October	-	November	--	Second	Inter	Monsoon	(SIM)	rains

November - February -- North East Monsoon (NEM) rains

These rainfall seasons do not bring homogeneous rainfall regimes over the whole island and it is the main cause to exhibit such a high agro-ecological diversity of the country despite its relatively small aerial extent. Out of these four rainfall seasons, two consecutive rainy seasons make up the major growing seasons of Sri Lanka, namely Yala and Maha seasons. Generally Yala season is the combination of FIM and SWM rains. However, since SWM rains are not effective over the Dry zone it is only the FIM rains that fall during the Yala season in the Dry zone from mid March to early May. Being effective only for two months, the Yala season is considered as the minor growing season of the Dry zone. The major growing season of the whole country, Maha begins with arrival of SIM rains in Mid September/October and continues up to late January/February with the NEM rains.

Rice is grown under more diverse environmental conditions than any other major food crop in the world and the situation remains as the same in Sri Lanka too. Except in almost all AERs in the Up country Wet and Intermediate zones where minimum temperature at nighttime is limiting, paddy is the most common land use in valley bottoms in the all other AERs of the country. Solar radiation is not a limiting factor for rice growth in almost all rice growing regions of Sri Lanka. However, when all other conditions such as water, nutrients and temperature are non-limiting, the intensity of sunlight may determine the yield level depending on the location and season. For example, in the Wet zone, solar radiation may limit the rice yield during Yala season due to high cloud cover arising from the southwest monsoonal circulation whereas a similar situation could expect in the Dry zone during Maha season due to overcast conditions that may result due to weather systems formed in the Bay of Bengal and northeast monsoonal circulation.

Climate of the Low Country Wet Zone

This agro-climatic region has been sub-divided in to five AERs (Map 4) where rice is the main land use in inland valleys and flood plains. The expected annual rainfall at the 75% probability level in this region ranges from 1,700 to 3,200 mm depending on the agro-ecological region (Table 1). Its average maximum temperature ranges from 32 to 35 0C. The highest values are being recorded during the period of late February to early May. The average minimum temperature is ranged from 22 to 24 0C where the lowest values are generally observed during the period of December to February, the winter months of the island. The day time relative humidity is generally ranged from 60 to 75 percent where as nighttime values may reach even up to 90 per cent at anytime of the year.

Table 1. Agro-ecological regions of Low Country Wet Zone

Agro-ecological Region	Expected annual rainfall-mm	Major land use
WL1a	> 3,200	Tea, Rubber, MHG, Paddy, EAC
WL1b	> 2,800	Rubber, MHG, Paddy
WL2a	> 2,400	Rubber, Tea, Coconut, MHG, Paddy, EAC

WL2b	> 2,200	Rubber, Coconut, MHG, Paddy
WL3	> 1,700	Coconut, Fruits, MHG, Paddy

MHG: Mixed Home Gardens, EAC: Export Agricultural Crops

Climate of the Mid Country Wet Zone

Even though this agro-climatic region has been sub-divided in to six AERs (Map 4), rice is predominantly found only in four AERs (Table 2). The two AERs located in higher elevations, namely WM1a and WM1b are not suitable for rice as cool injuries are likely to occur. The expected annual rainfall at the 75% probability level in this region ranges from 1,400 to 3,300 mm depending on the agro-ecological region. Its average maximum temperature ranges from 27 to 33 0C. The highest values are being recorded during the period of late February to early May. The average minimum temperature is ranged from 18 to 22 0C where the lowest values are generally observed during the period of December to February, the winter months of the island. The further low values of night temperature are likely to experience in higher elevations of the region (i.e., WM1a and WM1b regions). The day time relative humidity is generally ranged from 55 to 80 percent where as nighttime values may range from 75 to 85 per cent.

Table 2. Agro-ecological regions of Mid Country Wet Zone

Agro-ecological Region	Expected annual rainfall - mm	Major land use
WM1a	> 3,300	Tea, Natural forests
WM1b	> 2,900	Tea, Natural forests MHG,
WM2a	> 2,200	Tea, MHG, EAC, Natural forest, Paddy
WM2b	> 1,800	MHG, Paddy, EAC, Tea
WM3a	> 1,600	MHG, Paddy, EAC, Tea
WM3b	> 1,400	MHG, EAC, Tea, Paddy, Rubber

MHG: Mixed Home Gardens, EAC: Export Agricultural Crops

Climate of the Up Country Wet Zone

This agro-climatic region has been sub-divided in to four AERs (Map 4) and rice is hardly found in this region. As the elevation of this agro-climatic region is well above the 900 m, low temperature has become a limiting factor for growth of rice plants.

Table 3. Agro-ecological regions of Up Country Wet Zone

Agro-ecological Region	Expected annual rainfall - mm	Major land use
WU1	> 3,100	Tea, Forest plantations, Natural forests
WU2a	> 2,400	Tea, Forest plantations,
WU2b	> 2,200	Tea, Forest plantations, Vegetables
WU3	> 1,800	Tea, Vegetables, MHG, Forest plantations

Climate of the Low Country Intermediate Zone

This agro-climatic region has been sub-divided in to five AERs (Map 4) where rice is the predominant land use in valley bottoms and terraced upland slopes in some areas. The expected annual rainfall at the 75% probability level in this region ranges from 1,100 to 1,600 mm depending on the agro-ecological region. Its average maximum temperature ranges from 29 to 35 0C. The highest values are being recorded during the period of late February to early May. The average minimum temperature is ranged from 20 to 26 0C where the lowest values are generally observed during the period of December to February, a common phenomenon for the entire island. The day time relative humidity is generally ranged from 55 to 75 percent where as nighttime values may reach even up to 90 per cent especially during winter months of the year.

Table 4. Agro-ecological regions of Low Country Intermediate Zone

Agro-ecological Region	Expected annual rainfall - mm	Major land use
IL1a	> 1,400	Coconut, MHG, EAC, Paddy, Rubber
IL1b	> 1,100	Coconut, Paddy, MHG, EAC
IL1c	> 1,300	MHG, Rubber, Paddy, Sugarcane
IL2	> 1,600	MHG, Paddy, RUC, Scrub, Sugarcane, Citrus
IL3	> 1,100	Coconut, Paddy, MHG,

MHG: Mixed Home Gardens, RUC: Rainfed Upland Crops, EAC: Export Agricultural Crops

Climate of the Mid Country Intermediate Zone

Although this agro-climatic region has been sub-divided in to eight AERs (Map 4), rice is being cultivated only in five AERs (Table 5). In these AERs rice is the major land use in valley bottoms and terraced slopes at least in one season out of two seasons in a year. In the other season, farmers may switch in to vegetable cultivation depending on the land suitability. The expected annual rainfall at the 75% probability level in this region ranges from 1,100 to 2,000 mm depending on the agro-ecological region. Its average maximum temperature ranges from 28 to 330C. The highest values are being recorded during the period of late March to early May. The average minimum temperature is ranged from 18 to 23 0C where the lowest values are generally observed during the period of December to February. The day time relative humidity is generally ranged from 55 to 75 percent where as nighttime values are generally around 75 to 85 per cent.

Table 5. Agro-ecological regions of Mid Country Intermediate Zone

Agro-ecological Region	Expected annual rainfall - mm	Major land use
IM1a	> 2,000	Tea, Vegetables, MHG, Paddy, Forest plantations

IM1b	> 2,000	Natural forests, MHG, Paddy, Grasslands
IM1c	> 1,300	Natural Forests, Vegetables
IM2a	> 1,800	EAC, MHG, Tea, Vegetables
IM2b	> 1,600	Natural forests, MHG, Paddy, Tea, Vegetables
IM3a	> 1,400	MHG, EAC, Paddy
IM3b	> 1,200	MHG, EAC, Rubber, Vegetables, Paddy
IM3c	> 1,100	Vegetables, Tea, MHG, EAC

MHG: Mixed Home Gardens, EAC: Export Agricultural Crops

Climate of the Up Country Intermediate Zone

Although this agro-climatic region has been sub-divided in to seven AERs, rice is being cultivated only in two AERs due to limitation of the temperature regime in the rest of AERs owing to their relatively higher elevations. In those two AERs rice may be the major land use in valley bottoms during minor rainy season (Yala). In the other season (Maha), farmers may switch in to high value temperate vegetable crops, especially for potato to harness the potential of low temperature regime prevailing in these regions. The expected annual rainfall at the 75% probability level in those two regions ranges from 1,400 to 1,600. Its average maximum temperature ranges from 22 to 29°C. The highest values are being recorded during the period of late March to September. During the said period, high winds that blow from the southwest direction is a common weather phenomenon to experience in this region. The average minimum temperature is ranged from 13 to 18 °C where the lowest values are generally observed during the period of December to March. Hence, low temperature injuries in rice plants could be a recurrent problem if rice is grown in those regions during the major rainy season, Maha season. Relative humidity during day time in this agro-climatic region is generally ranged from 60 to 82 percent where as nighttime values may reach even up to 90 per cent especially during winter months of the year.

Table 6. Agro-ecological regions of Up Country Intermediate Zone

Agro-ecological Region	Expected annual rainfall - mm	Major land use
IU1	> 2,400	Tea, EAC, Natural forests, Forest plantations
IU2	> 2,100	Tea, Vegetables, MHG, Natural forests, MHG, Forest plantations
IU3a	> 1,900	Tea, Forest Plantations,
IU3b	> 1,700	Tea, Natural forests, Forest plantations
IU3c	> 1,600	Tea, Vegetables, Paddy
IU3d	> 1,300	Tea, Vegetables, Forest plantations, Natural forests
IU3e	> 1,400	Tea, Vegetables, Paddy, MHG

MHG: Mixed Home Gardens, MHG: Mixed Home Gardens

Climate of the Low Country Dry Zone

This agro-climatic region is the countrys driest part and it has been sub-divided in to 11 AERs. Even though water is a limiting factor in this part of the country for year round crop production, trans-basin diversion of some rivers of Wet and Intermediate zones and large number of tanks that were built during ancient times have made it possible to cultivate lowlands in to rice or rice based cropping systems. Out of 11 AERs in this region, rice is the predominant agricultural land use in 10 AERs except in DL3 AER (Table 7), the Oxisol belt which spreads from northwestern coastal region to northern peninsular (Map 4). The expected annual rainfall at the 75% probability level in this region ranges from 650 to 1,100 mm depending on the agro-ecological region. In some AERs monthly rainfall distribution depicts a bi-modal pattern where as AERs found in the northeastern and eastern parts of the Dry zone shows a uni-modal monthly rainfall distribution. Hence, unless irrigation water is supplied, cultivation of rice in lowland in those regions is possible only during the major rainy season (Maha season).

When the Wet zone of Sri Lanka experiences Southwest monsoon rains, the same monsoonal wind blows over the Dry zone as a warm and dry wind, a Fhn like wind locally known as Yal Hulang, Wesak hulang or Kachchan. Hence, crop water requirement during this period, May to September (Yala season) is very much higher than that of the other times of the year (Maha season). The general wind speed of the Dry zone is 3 5 km/hr. However, during said period, it may reach even 12 15 km/hr. The average maximum temperature in the Dry zone ranges from 29 to 38 0C depending on the AER. The highest values are being recorded during the period of late February to late September irrespective of the location. Thus, high temperature injuries are being experienced in rice grown during Yala season in the Dry zone, commonly known as the Ehela Pussa. Continuous weather observations have shown that it is becoming a more and more common feature in rice cultivation during recent times and it could be a repercussion of global warming. The average minimum temperature is ranged from 20 to 26 0C where the lowest values are generally observed during the period of December to February, a common phenomenon for the entire island. However, further low nighttime temperatures are experienced during winter months in the northern peninsular of the island due to the influence of the huge land mass of the Indian sub-continent making it possible to grow potato. However, rice is hardly grown in this region due to some other edaphic limitations. The day time relative humidity in the Dry zone is generally ranged from 50 to 75 percent where as nighttime values may reach even up to 90 per cent, especially during winter months of the year.

Table 7. Agro-ecological regions of Low Country Dry Zone

Agro-ecological Region	Expected annual rainfall - mm	Major land use
DL1a	> 1,100	MHG, Paddy, Forest plantations, Scrub, Sugarcane, Natural forests,
DL1b	> 900	Rainfed Upland Crops, Paddy, Scrub, MHG, Forest plantations
DL1c	> 900	RUC, Paddy, Scrub, Natural forests, Forest Plantations, Sugarcane
DL1d	> 900	RUC, Paddy
DL1e	> 900	RUC, Paddy, Scrub
DL1f	> 800	RUC, Paddy, Scrub, Natural forests

DL2a	> 1,300	RUC, Paddy, Natural forests, Sugarcane, Scrub
DL2b	> 1,100	Paddy, RUC
DL3	> 800	Cashew, Coconut, Condiments, Scrub, Natural forests
DL4	> 750	Scrub, Paddy, RUC
DL5	> 650	Scrub, Natural forests, RUC, Paddy

MHG: Mixed Home Gardens, MHG: Mixed Home Gardens, RUC: Rainfed Upland Crops