REPUBLIC OF TURKEY

MINISTRY OF AGRICULTURE AND FORESTRY

DIRECTORATE GENERAL OF EUROPEAN UNION AND FOREIGN RELATIONS

TURKEY CLIMATE SMART AND COMPETITIVE AGRICULTURAL GROWTH PROJECT

ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK

November 2021

Table of Contents

List of Tables

List of Figures

List of Annexes

List of Abbreviations

ABDGM : Directorate General of European Union and Foreign Relations
BMP : Biodiversity Management Plan
BÜGEM : Directorate General of Plant Production
C-ESMP : Contractor's Environmental and Social Management Plan
CHMP : Cultural Heritage Management Plan
CO : Carbon monoxide
CO_2 : Carbon dioxide
CoC : Code of Conduct
DDT : Dichloro-diphenyl-trichloroethane
E&S : Environmental and Social
EHSGs : World Bank Group Environmental, Health and Safety Guidelines
EIA : Environmental Impact Assessment
ESA : Environmental and Social Assessment
ESCP : Environmental and Social Commitment Plan
ESF : Environmental and Social Framework
ESIA : Environmental and Social Impact Assessment
ESMF : Environmental and Social Management Framework
ESMP : Environmental and Social Management Plan
ESSs : Environmental and Social Standards
GBV : Gender-based violence
GD : General Directorate
GDP : Per capita gross domestic product
GSFI : Global Food Security Index
DGFC : Directorate General of Food and Control
DGIT : Directorate General of Information Technologies
GHG : Greenhouse Gas
GIIP : Good International Industry Practice
GM : Grievance Mechanism
GMOs : Genetically Modified Organisms
GN : Guidance Note
GPN : Good Practice Note
GRS : Grievance Redress Service
GT : Government of Turkey
HAYGEM : Directorate General of Livestock
HAZID : Hazard Identification
HAZOP : Hazard and Operability
IFC : International Finance Corporation
IPM : Integrated Pest Management
IVM : Integrated Vector Management
MoAF : Ministry of Agriculture and Forestry
MoEUCC : Ministry of Environment, Urbanization and Climate Change

OHS	:	Occupational Health and Safety
OP	:	Operation Policy
PCBs	:	Poly Chlorinated Biphenyls
PCU	:	Project Coordination Unit
PIU		Project Implementation Unit
PM	:	Particulate matter
PMP	:	Pest Management Plan
PSM	:	Process Safety Management
QRA	:	Quantitative Risk Analysis
RP	:	Resettlement Plan
RF	:	Resettlement Framework
RHA	:	Risk Hazard Assessment
RU	:	Regional Unit
SEA	:	Sexual Exploitation and Abuse
SEP	:	Stakeholder Engagement Plan
SH	:	Sexual Harassment
STD	:	Sexually Transmitted Disease
TAGEM	:	Directorate General of Agricultural Research and Policies
tCO2e	:	tons of carbon dioxide equivalent
TORs	:	Terms of Reference
TRGM	:	Directorate General of Agricultural Reform

Glossary

Adaptive management refers to the practice in which the implementation of mitigation and management measures are responsive to changing conditions and the results of project monitoring.

Air pollution refers to the release of air pollutants (often associated with the combustion of fossil fuels), such as nitrogen oxides (NOx), sulfur dioxide (SO2), carbon monoxide (CO), particulate matter (PM), as well as other contaminants including GHGs.

Associated Facilities refers to facilities or activities that are not funded as part of the project and are: (a) directly and significantly related to the project; and (b) carried out, or planned to be carried out, contemporaneously with the project; and (c) necessary for the project to be viable and would not have been constructed, expanded or conducted if the project did not exist. For facilities or activities to be Associated Facilities, they must meet all three criteria.

Biodiversity is the variability among living organisms from all sources including, inter alia, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species, and of ecosystems.

Borrower refers to the recipient of Investment Project Financing (IPF) and any other entity involved in the implementation of a project financed by IPF

Chance Find Procedure A chance find is archaeological material encountered unexpectedly during project construction or operation. A chance find procedure is a procedure which will be followed if previously unknown cultural heritage is encountered during project activities. The chance finds procedure will set out how chance finds associated with the project will be managed.

Community representatives refer to village heads, community, local government representatives, civil society representatives, politicians or teachers.

Consultant refers to a variety of private entities, joint ventures, or individuals that provide services of an advisory or professional nature.

Consulting services cover a range of services that are of an advisory or professional nature and are provided by Consultants. These Services typically involve providing expert or strategic advice.

Core functions of a project constitute those production and/or service processes essential for a specific project activity without which the project cannot continue.

Critical habitat is defined as areas with high biodiversity importance or value, including: (a) habitat of significant importance to Critically Endangered or Endangered species, as listed on the International Union for the Conservation of Nature (IUCN) Red List of threatened species or equivalent national approaches; (b) habitat of significant importance to endemic or restricted-range species; (c) habitat supporting globally or nationally significant concentrations of migratory or congregatory species; (d) highly threatened or unique system; and (e) ecological functions or characteristics that are needed to maintaining the viability of the biodiversity values described above in (a) to (d).

Cultural heritage is defined as resources with which people identify as a reflection and expression of their constantly evolving values, beliefs, knowledge and traditions.

Cumulative impact refers to the incremental impact of the project when added to impacts from other relevant past, present and reasonably foreseeable developments as well as unplanned but predictable activities enabled by the project that may occur later or at a different location.

Cumulative impacts can result from individually minor but collectively significant activities taking place over a period of time.

Cumulative Impact Assessment refers to an instrument to consider cumulative impacts of the project in combination with impacts from other relevant past, present and reasonably foreseeable developments, as well as unplanned but predictable activities enabled by the project that may occur later or at a different location.

Direct impact refers to an impact which is caused by the project, and occurs contemporaneously in the location of the project.

Disadvantaged or vulnerable refers to those who may be more likely to be adversely affected by the project impacts and/or more limited than others in their ability to take advantage of a project's benefits. Such an individual/group is also more likely to be excluded from/unable to participate fully in the mainstream consultation process and as such may require specific measures and/or assistance to do so. This will take into account considerations relating to age, including the elderly and minors, and including in circumstances where they may be separated from their family, the community or other individuals upon which they depend.

Ecosystem services are the benefits that people derive from ecosystems. Ecosystem services are organized into four types: (i) provisioning services, which are the products people obtain from ecosystems and which may include food, freshwater, timbers, fibers, medicinal plants; (ii) regulating services, which are the benefits people obtain from the regulation of ecosystem processes and which may include surface water purification, carbon storage and sequestration, climate regulation, protection from natural hazards; (iii) cultural services, which are the nonmaterial benefits people obtain from ecosystems and which may include natural areas that are sacred sites and areas of importance for recreations and aesthetic enjoyment; and (iv) supporting services, which are the natural processes that maintain the other services and which may include soil formation, nutrient cycling and primary production.

Environmental, Health, and Safety Guidelines (EHSGs) are technical reference documents with general and industry-specific statements of Good International Industry Practice. The EHSGs contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable cost.

Emergency event refers to an unanticipated incident, arising from both natural and man-made hazards, typically in the form of fire, explosions, leaks or spills, which may occur for a variety of different reasons, including failure to implement operating procedures that are designed to prevent their occurrence, extreme weather or lack of early warning.

Environmental and Social Assessment (ESA) refers to a process of analysis and planning to ensure the environmental and social impacts and risks of a project are identified, avoided, minimized, reduced or mitigated throughout the project life-cycle.

Environmental and Social Commitment Plan (ESCP) refers to a summary document setting out the material measures and actions that are required for the project to achieve compliance with the Environmental and Social Standards over a specified timeframe in a manner satisfactory to the Bank. The ESCP forms part of the Legal Agreement.

Environmental and Social Framework (ESF) comprises: a Vision for Sustainable Development, which sets out the Bank's aspirations regarding environmental and social sustainability; the World Bank Environmental and Social Policy for Investment Project Financing, which sets out the mandatory

requirements that apply to the Bank; and the Environmental and Social Standards, together with their Annexes, which set out the mandatory requirements that apply to the Borrower and projects.

Environmental and Social Impact Assessment (ESIA) refers to an instrument to identify and assess the potential environmental and social impacts of a proposed project, evaluate alternatives, and design appropriate mitigation, management, and monitoring measures.

Environmental and Social Management Framework (ESMF) refers to an instrument that examines the risks and impacts when a project consists of a program and/or series of sub-projects, and those risks and impacts cannot be determined until the program or sub-project details have been identified. The ESMF sets out the principles, rules, guidelines and procedures to assess the environmental and social risks and impacts.

Environmental and Social Management Plan (ESMP) refers to an instrument that details (a) the measures to be taken during the implementation and operation of a project to eliminate or offset adverse environmental and social impacts, or to reduce them to acceptable levels; and (b) the actions needed to implement these measures.

Forced eviction is defined as the permanent or temporary removal against the will of individuals, families, and/or communities from the homes and/or land which they occupy without the provision of, and access to, appropriate forms of legal and other protection, including all applicable procedures and principles in ESS5. The exercise of eminent domain, compulsory acquisition or similar powers by a Borrower will not be considered to be forced eviction providing it complies with the requirements of national law and the provisions of ESS5, and is conducted in a manner consistent with basic principles of due process (including provision of adequate advance notice, meaningful opportunities to lodge grievances and appeals, and avoidance of the use of unnecessary, disproportionate or excessive force).

Good International Industry Practice (GIIP) is defined as the exercise of professional skill, diligence, prudence, and foresight that would reasonably be expected from skilled and experienced professionals engaged in the same type of undertaking under the same or similar circumstances globally or regionally. The outcome of such exercise should be that the project employs the most appropriate technologies in the project-specific circumstances.

Habitat is defined as a terrestrial, freshwater, or marine geographical unit or airway that supports assemblages of living organisms and their interactions with the non-living environment. Habitats vary in their sensitivity to impacts and in the various values society attributes to them.

Harvesting of living natural resources, such as fish and all other types of aquatic and terrestrial organisms and timber, refers to productive activities that include extraction of these resources from natural and modified ecosystems and habitats.

Hazard or risk assessment is defined as an instrument for identifying, analyzing, and controlling hazards associated with the presence of dangerous materials and conditions at a project site. World Bank requires a hazard or risk assessment for projects involving certain inflammable, explosive, reactive, and toxic materials when they are present in quantities above a specified threshold level.

Historical pollution is defined as pollution from past activities affecting land and water resources for which no party has assumed or been assigned responsibility to address and carry out the required remediation.

Indirect impact is defined as an impact which is caused by the project and is later in time or farther removed in distance than a direct impact, but is still reasonably foreseeable, and will not include induced impacts.

Induced impacts are indirect economic impacts that may be generated by a project, both positive and negative, that are not associated with the physical footprint of the project, and not a direct result of the project's physical impact/activities.

Intangible cultural heritage includes practices, representations, expressions, knowledge, skills - as well as the instruments, objects, artefacts and cultural spaces associated therewith – that communities and groups recognize as part of their cultural heritage, as transmitted from generation to generation and constantly recreated by them in response to their environment, their interaction with nature and their history.

Involuntary Resettlement. Project-related land acquisition or restrictions on land use may cause physical displacement (relocation, loss of residential land or loss of shelter), economic displacement (loss of land, assets or access to assets, including those that lead to loss of income sources or other means of livelihood), or both. The term "involuntary resettlement" refers to these impacts. Resettlement is considered involuntary when affected persons or communities do not have the right to refuse land acquisition or restrictions on land use that result in displacement.

Land acquisition refers to all methods of obtaining land for project purposes, which may include outright purchase, expropriation of property and acquisition of access rights, such as easements or rights of way. Land acquisition may also include: (a) acquisition of unoccupied or unutilized land whether or not the landholder relies upon such land for income or livelihood purposes; (b) repossession of public land that is used or occupied by individuals or households; and (c) project impacts that result in land being submerged or otherwise rendered unusable or inaccessible. "Land" includes anything growing on or permanently affixed to land, such as crops, buildings and other improvements, and appurtenant water bodies.

Legal Agreement. The legal agreement entered into between the Bank and the Borrower to provide Bank financing for the Borrower's investment project.

Like-for-like or better. The principle of "like-for-like or better" means that in most cases biodiversity offsets should be designed to conserve the same biodiversity values that are being affected by the project (an "in kind" offset). In certain situations, however, areas of biodiversity to be affected by the project may be neither a national nor a local priority, and there may be other areas of biodiversity with like values that are a higher priority for conservation and sustainable use and under imminent threat or in need of protection or effective management.

Livelihood refers to the full range of means that individuals, families, and communities utilize to make a living, such as wage-based income, agriculture, fishing, foraging, other natural resource-based livelihoods, petty trade, and bartering.

Meaningful consultation refers to a two-way process, that: (a) Begins early in the project planning process to gather initial views on the project proposal and inform project design; (b) Encourages stakeholder feedback, particularly as a way of informing project design and engagement by stakeholders in the identification and mitigation of environmental and social risks and impacts; (c) Continues on an ongoing basis, as risks and impacts arise; (d) Is based on the prior disclosure and dissemination of relevant, transparent, objective, meaningful and easily accessible information in a timeframe that enables meaningful consultations with stakeholders in a culturally appropriate

format, in relevant local language(s) and is understandable to stakeholders; (e) Considers and responds to feedback; (f) Supports active and inclusive engagement with project-affected parties; (g) Is free of external manipulation, interference, coercion, discrimination, and intimidation; and (h) Is documented and disclosed by the Borrower.

Migrant workers are defined as workers who have migrated from one country to another or from one part of the country to another for purposes of employment.

Mitigation hierarchy is defined as a systematic and phased approach to addressing the risks and impacts of a project.

Modified habitats are areas that may contain a large proportion of plant and/or animal species of nonnative origin, and/or where human activity has substantially modified an area's primary ecological functions and species composition. Modified habitats may include, for example, areas managed for agriculture, forest plantations, reclaimed coastal zones, and reclaimed wetlands.

Movable cultural heritage refers to such objects as: historic or rare books and manuscripts; paintings, drawings, sculptures, statuettes and carvings; modern or historic religious items; historic costumes, jewelry and textiles; fragments of monuments or historic buildings; archaeological material; and natural history collections such as shells, flora, or minerals.

Natural features with cultural significance refer to features imbued with cultural heritage significance. Examples include sacred hills, mountains, landscapes, streams, rivers, waterfalls, caves and rocks; sacred trees or plants, groves and forests; carvings or paintings on exposed rock faces or in caves; and paleontological deposits of early human, animal or fossilized remains. The significance of such heritage may be localized in small community groups or minority populations.

Natural habitats are areas composed of viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified an area's primary ecological functions and species composition.

Net gains are defined as additional conservation outcomes that can be achieved for the biodiversity values for which the natural or critical habitat was designated.

No net loss is defined as the point at which project-related biodiversity losses are balanced by gains resulting from measures taken to avoid and minimize these impacts, to undertake on-site restoration and finally to offset significant residual impacts, if any, on an appropriate geographic scale.

Pollution refers to both hazardous and non-hazardous chemical pollutants in the solid, liquid, or gaseous phases, and includes other components such as thermal discharge to water, emissions of short- and long-lived climate pollutants, nuisance odors, noise, vibration, radiation, electromagnetic energy, and the creation of potential visual impacts including light.

Pollution management is defined as measures designed to avoid or minimize emissions of pollutants, including short- and long-lived climate pollutants, given that measures which tend to encourage reduction in energy and raw material use, as well as emissions of local pollutants, also generally result in encouraging a reduction of emissions of short- and long-lived climate pollutants.

Primary production of living natural resources is defined as the cultivation or rearing of plants or animals, including annual and perennial crop farming, animal husbandry (including livestock), aquaculture, and plantation forestry.

Primary suppliers are those suppliers who, on an ongoing basis, provide directly to the project goods or materials essential for the core functions of the project. Core functions of a project constitute those production and/or service processes essential for a specific project activity without which the project cannot continue.

Procurement documents refer to all Procurement Documents issued by the Borrower. It includes: General Procurement Notice (GPN), Specific Procurement Notice (SPN), Expression of Interest (EOI), Request for Expressions of Interest (REOI), prequalification document, initial selection document, request for bids document, request for proposal documents, forms of contracts and any addenda.

Project: Refers to Turkey Climate Smart and Competitive Agricultural Growth Project

Project Worker refers to: (a) people employed or engaged directly by the Borrower (including the project proponent and the project implementing agencies) to work specifically in relation to the project (direct workers); (b) people employed or engaged through third parties to perform work related to core functions of the project, regardless of the location (contracted workers); (c) people employed or engaged by the Borrower's primary suppliers (primary supply workers); and (d) people employed or engaged in providing community labor (community workers). This includes full-time, part-time, temporary, seasonal and migrant workers.

Replacement cost is defined as a method of valuation yielding compensation sufficient to replace assets, plus necessary transaction costs associated with asset replacement. Where functioning markets exist, replacement cost is the market value as established through independent and competent real estate valuation, plus transaction costs. Where functioning markets do not exist, replacement cost may be determined through alternative means, such as calculation of output value for land or productive assets, or the undepreciated value of replacement material and labor for construction of structures or other fixed assets, plus transaction costs. In all instances where physical displacement results in loss of shelter, replacement cost must at least be sufficient to enable purchase or construction of housing that meets acceptable minimum community standards of quality and safety. The valuation method for determining replacement cost should be documented and included in relevant resettlement planning documents. Transaction costs include administrative charges, registration or title fees, reasonable moving expenses, and any similar costs imposed on affected persons. To ensure compensation at replacement cost, planned compensation rates may require updating in project areas where inflation is high or the period of time between calculation of compensation rates and delivery of compensation is extensive.

Restrictions on land use refers to limitations or prohibitions on the use of agricultural, residential, commercial or other land that are directly introduced and put into effect as part of the project. These may include restrictions on access to legally designated parks and protected areas, restrictions on access to other common property resources, restrictions on land use within utility easements or safety zones.

Security of tenure refers to that resettled individuals or communities are resettled to a site that they can legally occupy, where they are protected from the risk of eviction and where the tenure rights provided to them are socially and culturally appropriate.

Stakeholder refers to individuals or groups who: (a) are affected or likely to be affected by the project (project-affected parties); and (b) may have an interest in the project (other interested parties). The stakeholders of a project will vary depending on the details of the project. They may include local communities, national and local authorities, neighboring projects, and nongovernmental organizations.

Standard Procurement Documents (SPDs). Procurement documents issued by the Bank to be used by Borrowers for IPF-financed projects.

Tangible cultural heritage refers to movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Tangible cultural heritage may be located in urban or rural settings, and may be above or below land or under the water.

Technical feasibility is based on whether proposed measures and actions can be implemented with commercially available skills, equipment, and materials, taking into consideration prevailing local factors such as climate, geography, demography, infrastructure, security, governance, capacity, and operational reliability.

Universal access refers to unimpeded access for people of all ages and abilities in different situations and under various circumstances.

Executive Summary

Development Objective. The development objective of the "Turkey Climate Smart and Competitive Agricultural Growth Project" is to enhance capacity for sustainable and competitive agricultural growth and promote the use of climate-smart approaches in the agricultural sector in Turkey.

Project Scope and Approach. The project will support the agri-food sector in transitioning toward a more climate-smart, inclusive orientation by supporting innovation and the use of smart farming/climate-smart technologies and practices by farmers and agricultural enterprises and by enhancing capacity for sustainable and competitive growth in a range of areas, including: information generation and dissemination to support sustainable soil and land-use planning/management; agricultural data collection and analysis; and animal health aspects. The Project investments are expected to contribute to increased agricultural productivity; increased input and resource-use efficiency; and increased overall agricultural productivity resilience, and sustainability. Project activities will largely focus on the production stages, although a subset of activities (particularly in fruit and vegetable value chains) will promote opportunities for enhancing efficiencies beyond the farm gate.

Project Components. The project will be implemented through four components:

- Component 1: Institutional Capacity Strengthening for Climate Smart Agri-food Policy, Planning, and Investments. Activities under this component will support the strengthening of an environment for sectoral planning, with a particular focus on narrowing information gaps in relation to Turkey's soils and land natural capital, to enhance its sustainable planning and management. They will also enhance MoAF's digital blueprint for data collection and information management to support smart policy monitoring and programming. Component funds will mainly support non-consulting and specialized consulting services; acquisition of software/hardware/equipment required and training. Activities under this component will be implemented through two subcomponents.
    - Subcomponent 1.1: Narrowing information gaps to enhance soil health and land-use planning/management. (TRGM will implement with support from TAGEM)
    - Subcomponent 1.2: MoAF digital blueprint for sectoral information collection and management. (DGIT will implement)
- Component 2: Enhancing animal health capacity for effective disease surveillance and control: This component aims at enhancing animal disease surveillance and control capacity in Turkey and will invest in services to support feasibility assessments, works, laboratory equipment, training, and information systems. It will be implemented by DGFC. The component will support two main activities:
    - Subcomponent 2.1: Strengthening the capacity of animal health institutes
    - Subcomponent 2.2: Strengthening and improving veterinary medical product control
- Component 3: Investments for Enhanced Productivity, Resource-Efficiency, and Climate Resilience. This component will support the dissemination, validation and adoption of CSA technologies and practices, as well as research and development efforts aimed at enhancing agriculture performance by improving productivity, reducing costs, promoting more efficient resource use (fertilizers, pesticides, energy, water), and improving climate resilience. Investments under this component are also expected to generate key agricultural data to be support decision making by farmers and enterprises and to inform policy design. The encourage the uptake and effective use of innovative/disruptive climate smart technologies by closing knowledge and skill gaps and by providing financial support and technical assistance to producers and enterprises. The investments supported through grants and

technical assistance and knowledge sharing are expected to contribute to livelihood opportunities (creating jobs and generating income) and to reduce the overall environmental footprint of the agri-food sector, particularly as related to growing pollution from ineffective input/resource use and GHG emissions. Activities supported under Component 3 will be implemented through four subcomponents.

- Subcomponent 3.1: Strengthening climate resilience, productivity, and resource-use efficiency in vegetable value chains. (BUGEM will implement)
  - Subcomponent 3.1a. Modernization of small-scale greenhouse production.
  - Subcomponent 3.1b. Pilot model for clustering greenhouse production around an efficient energy source (geothermal energy).
- Subcomponent 3.2: Promoting the adoption of CSA technologies/practices across relevant crops. (TRGM will implement with support from TAGEM)
  - Subcomponent 3.2a. Digital CSA technologies.
  - Subcomponent 3.2b. Solar energy as an alternative power source for pump irrigation systems.
- Subcomponent 3.3: Enhancing the productivity and greening profile of cattle production in Turkey.
  - Subcomponent 3.3a. Piloting of a Precision Livestock Farming (PLF) program. (HAYGEM will implement)
  - Subcomponent 3.3b. Reducing cattle production pressures on water pollution and GHG emissions. (TRGM will implement)
- Subcomponent 3.4: Research and innovations to support CSA (TAGEM will implement)

- Component 4: Project Management, Monitoring, and Evaluation. Activities under this component will support all project management functions. It will include support for a Project Coordination Unit (PCU) under ABDGM, and Project Implementation Units (PIUs) under TRGM, DGIT, BUGEM, TAGEM, HAYGEM and DGFC, for (i) strengthening capacity for day-to-day project management of technical, fiduciary, Monitoring and Evaluation (M&E), E&S issues; (ii) E&S risk management, including preparation of site-specific E&S instruments required; (iii) grievance redress, citizen engagement, and communications; and (iv) M&E of project activities, including impact assessments, beneficiary satisfaction surveys, and development of an integrated system for project management and monitoring of project outputs and outcomes. It will be implemented by ABDGM.

Project location. The project will be implemented country wide while Component 3 will be mainly in Aegean, Southern and Central Anatolian regions of Turkey.

Environmental and social standards relevant to the project and national regulatory framework. All Environmental and Social Standards (ESSs) (including: ESS1 Assessment and Management of Environmental and Social Risks and Impacts; ESS2 Labor and Working Conditions; ESS3 Resource Efficiency and Pollution Prevention and Management; ESS4 Community Health and Safety; ESS5 Land Acquisition, Restrictions on Land Use and Involuntary Resettlement; ESS6 Biodiversity Conservation and Sustainable Management of Living Natural Resources; ESS8 Cultural Heritage; and ESS10 Stakeholder Engagement and Information Disclosure), but ESS 7 and 9 are relevant to the project: the country doesn't have any recognized indigenous or traditional underserved local communities and the project is not going to apply financial intermediary bodies. Furthermore, the proposed project doesn't trigger (a) the WB Operational Policy 7.60 on Disputed Territories as it will be not implemented in such areas; as well as (b) OP 7.50 on International Waterways as the proposed activities will not generate any impacts on such waterways.

The ESMF provides an assessment of the national ESA framework and World Bank ESSs identifying the existing gaps between the national legislation and World Bank ESSs and relevant measures to close the gaps have been specified and will be followed during the project implementation.

Scope of Environmental and Social Management Framework. To address identified risks and impacts the MoAF, prepared an Environmental and Social Management Framework (ESMF) which is based on national laws and regulations, the WB's ESSs, WB Group's Environmental Health and Safety (WBG's EHS) General and sector-specific (if applicable) Guidelines, and Good International Industry Practices (GIIP). The ESMF includes: (a) baseline analysis of the country and of the regions where most of proposed activities will be implemented; (b) regulatory framework for Environmental and Social Assessment (ESA), including provisions of the national laws and regulations as well as main requirements of the WB ESA guiding documents and Environmental and Social Standards; (c) proposed project activities and investments; (d) eligibility and screening criteria (along with distinct exclusion criteria), for proposed activities; (e) assessments of the potential E&S risks and impacts and generic mitigation measures, including mitigation and management procedures; (f) guidelines and procedures for conducting Environmental and Social Impact Assessment (ESIA); (g) requirements for preparing water balance, as some of the greenhouse sub-projects might significant consumers of water, providing clear criteria for when this would be required; (h) outlines of sub-project ESMP and ESMP Checklists (for activities related to modernizing existing greenhouses and other small scale construction and rehabilitation activities); (j) requirements on pesticides and fertilizers purchase, transportation, storage, use, handling and disposal during greenhouses' operation, (i) requirements in terms of pest Management and a template for an Integrated Pest Management Plan; (k) requirements for subprojects monitoring plans; (l) responsibilities for implementing site-specific ESMPs and ESMP Checklists; (m) outline of a specialized program for information dissemination and capacity building activities on several key issues (water and energy efficiency in greenhouse operations, pest control and safety; OHS issues; manure management; etc.); and, (n) ESMF implementing arrangements, and capacity building activities for the PMU, PIUs and other involved parties. Moreover, the ESMF includes necessary actions to address Covid-19 risks, in line with the national guidelines and WB Note on "Covid-19 considerations in construction/civil works projects." The site-specific E&S instruments (ESIA; ESMPs; RAPs) will be prepared based on the initial E&S assessments once the investments and their location details are finalized, completed and disclosed before the completion of bidding document packages.

The ESMF specifies sub-project specific ESIA/ESMPs will be part of the bidding documents and construction contracts. The contractors will be responsible for the implementation of the ESIA and ESMPs and MoAF (through the PCU and PIUs) will be responsible for the review and approval of all documents and the quality of each ESIA/ESMP. MoAF will also be responsible for monitoring the implementation of the E&S documents and report the status of implementation to the Bank.

The ESMF also identified relevant social risks, the legal and institutional background in key social areas relevant to the project with a focus on gaps between national law and the ESF, and outlines mitigation measures, roles and responsibilities for their implementation proportionate to the level of risk. In this regard, the ESMF provides an overview of risks, legislation and practices relevant to: labor rights and safety (consistent with ESS2), land acquisition, restrictions on land use and involuntary resettlement (consistent with ESS5), community health and safety (consistent with ESS4), environmental and social commitments of financial intermediaries (consistent with ESS9), and stakeholder engagement (consistent with ESS10). The ESMF also identifies disadvantaged and vulnerable groups as relevant to this project and outline differentiated measures that will be undertaken by the project to ensure no disproportionate harm, and their equal access to project benefits.

Resettlement Framework, SEP and LMP. Considering the potential social risks and impacts of the Project and its proposed components, a Stakeholder Engagement Plan (SEP), Resettlement Framework (RF) and Labor Management Procedures (LMP) has been prepared in line with the relevant ESSs (ESS1, ESS2, ESS5 and ESS10) which are an integral part of this ESMF. The SEP identifies stakeholders to be affected and/or interested in the Project as well as the stakeholder consultation and engagement methods, timing and other arrangements to be adopted by PIUs and PCU under the MoAF. The RF sets out the policies and legal framework, principles and procedures, and institutional arrangements that will administer the land acquisition and resettlement process as well as defining the eligibility criteria for identification of PAPs and entitlements. LMP defines potential risks and impacts pertaining to labor and working conditions and describes the mitigation measures and strategies to ensure compliance with WB ESS2 as well as implementation arrangements, monitoring and reporting instruments, indicators and grievance mechanism for workers.

Institutional Arrangement for Implementation. The overall responsibility for project implementing, including management and coordination will lie with the Ministry of Agriculture and Forestry (MoAF), through the Project Implementation Units (PIUs). A Project Coordinating Unit (PCU) responsible for overall project coordination will be established. The location of the PCU will be at the GD of EU and Foreign Relations (ABDGM). PCU's functions will be overseen by the leading Vice-Minister. MoAF will manage the Project Designated Account in the Central Bank and be responsible for overall project reporting to the World Bank, through the PCU. Project implementation Units (PIUs) will be established under each leading GD responsible for specific subcomponents; TRGM for subcomponents 1.1., 3.2 and 3.3b, DGIT for subcomponent 1.2, DGFC for component 2, BUGEM for subcomponent 3.1, HAYGEM for subcomponent 3.3a, and TAGEM for subcomponent 3.4. If more than one department under the relevant GD is responsible for the implementation of project subcomponents, focal points will be appointed in each department, these focal points will report directly to the Deputy General Director and will coordinate implementation closely with the PIU coordinator. The personnel designated as the focal point will also be responsible for following up the activities related to the subcomponent and accepted as the PIU staff. Responsibility for day-to-day project management, coordination and supervision will be assigned to a PCU and line Directorate-specific Project Implementation Units (PIUs).

A Project Steering Committee (PSC) will be established to ensure effective coordination at a higher level and provide strategic advice. The PSC will have participation of senior leadership of the General Directorates (GDs) leading implementation of the subcomponents, including Deputy General Directors from the relevant GDs (TRGM, BUGEM, HAYGEM, DGFC, TAGEM, DGIT and ABDGM), as well as representatives of the Strategy and Budget Office of the Presidency (SBO) and the Ministry of Treasury and Finance (MoTF). The PSC will be chaired by the line Vice Minister of the MoAF (to which TRGM, BUGEM, DGFC and HAYGEM report to), with the PCU acting as the Secretariat**.**

Technical Coordinating Committee (TCM) will be established to ensure close project coordination on a regular basis, and led by the PCU Director, with participation of focal points assigned for each subcomponent and relevant staff at the PIUs level. Committee members will meet periodically to review project progress based on monitoring and evaluation (M&E) results and will revise technical and administrative issues related to implementation. Ad hoc Technical Committees will be established for specific topics where strong alignment among MoAF's departments is required, including participation of departments that have not direct responsibility in the implementation of the project but that are direct beneficiaries of some of the activities or information generated by the project. These ad hoc technical committees can be established for a specific period of time, as

required, and will operate under a flexible framework. A M&E technical working group will be established permanently, to further refine the overall M&E strategy for the project and for coordinating its monitoring, including measurement approaches and strategies for data capture, reporting and evaluation. Each General Directorate will assign a focal point (internal or hired externally) responsible of monitoring and evaluation aspects, which will be assigned to this working group.

Activities under each subcomponent will be implemented in close coordination with Provincial Directorates (PD), Field Officers (FO) or Research Institutes/Regional Laboratories (for TAGEM and DGFC activities) linked to the respective General Directorates at MoAF headquarters.

MoAF will implement the project based on a POM approved by the Bank. A Project Annual Workplan and Budget (AWPB) will be prepared, consolidated, and finalized by the PCU every year in close coordination with the General Directorates responsible for implementing project components and subcomponents and reviewed during annual project meetings. An advanced draft will be sent to the World Bank and the PSC for comments and information. Once approved, MoAF will then include its respective AWPB in its Annual Investment Program with SBO and the procurement plan of the project. The detailed process for preparing, reviewing, and approving the AWPB will be further specified in the POM.

The World Bank will support project implementation in line with its procedures, standards, and requirements. The Bank team will conduct technical due diligence, including reviewing specific investments and feasibility studies and/or planning reports, engineering design, tender packages, and E&S instruments. It is expected that implementation support by the Bank team will be more intense during the first two years of operation. Project Reports will be reviewed periodically by the World Bank as part of project implementation support missions to be carried out at least twice a year.

Grievance mechanism. Along with the existing GMs at national level (CIMER and TIMER), the project will have its own, project specific grievance mechanisms, designed separately for Project workers and external stakeholders to enable them to communicate their suggestions and grievances to the PIU and the approach of the PIU to receive, evaluate, respond and decide on these suggestions and grievances.

1. Introduction

1.1. Country Context

Turkey is a large, upper-middle-income country with a strong record of inclusive growth, but recent shocks threaten the economic and social gains made since the early 2000s. During the last two decades, Turkey urbanized dramatically, opened to foreign trade and finance, maintained strong macroeconomic and fiscal policy frameworks, and harmonized many laws and regulations with European Union (EU) standards. The decrease in poverty has been remarkable, and other indicators of wellbeing (life expectancy, adult literacy, school enrollment, and access to public services such as water and sanitation) have also improved. Turkey's exemplary response to the influx of approximately 3.6 million Syrian refugees over the past decade serves as a model for other countries. In the last years, however, rapid growth has been accompanied by stagnating productivity, a rising current account deficit, and a growing stock of foreign exchange–denominated debt. Policies to stimulate the economy after the failed coup led to economic overheating in 2016, double-digit inflation, and a large current account deficit. The cumulative effects of these and other economic vulnerabilities came to a head in mid-2018, with the tightening of global economic conditions combined with tense international relations. These events triggered a collapse in the Turkish lira and a downturn in the Turkish economy. Spending fell, inflation spiked, and the corporate sector struggled under an elevated debt burden. Close to one million jobs were lost as unemployment rose from 10% in January 2018 to 13.8% in January 2020. Per capita gross domestic product (GDP) fell from a high of US$12,500 in 2013 to US$9,000 in 2018 and progress in poverty reduction stalled.

The COVID-19 crisis precipitated another economic shock, undermining the economic recovery that started in late 2019. The national economy went through significant adjustments from late 2018 through 2019 as banks and corporations reduced their exposure to foreign currency debt, private sector credit growth resumed, and demand started to recover. Nonetheless, the economic rebound experienced in the 4th quarter of 2019 was shortly lived as the COVID-19 pandemic took hold in early 2020. The economic outlook for 2020 soon deteriorated as real growth dropped sharply to -5 %. The government responded swiftly to COVID-19 with a large economic stimulus program focused on opening credit channels and loosening monetary policy and other regulatory measures to promote credit expansion. The stimulus generated a significant increase in economic activity in late 2020 that more than offset the decline recorded earlier in the year. Real economic activity over the full year was 1.8% higher than in 2019, Turkey exhibited the fastest growth of all G20 countries aside from China. Reopening after the first wave of the pandemic also played a role in Turkey's economic recovery. However, the policy frameworks that ensured a strong economic rebound during the pandemic also heightened macroeconomic risks, including rising price inflation, currency depreciation, a large current account deficit, and a depletion of external reserves.

The strong economic rebound and positive projections in coming years is overshadowed by the widening economic and social disparities caused by the 2018 economic crisis and COVID-19 outbreak. Annual growth for 2021 is projected to grow at 5.8%[1] from an exceptionally low growth basis achieved in early 2020. Economic growth is projected to continue at 3.2% in 2022 as investment and consumption return to more stable growth. These encouraging prospects are shadowed by the widening economic and social disparities provoked by the 2018 economic crisis and COVID-19 outbreak, slashing nearly 3.4 million jobs from the Turkish economy, mostly jobs held by unskilled informal, young, and female workers. The pandemic alone accounts for three-quarters of the job

[1] Growth projections for 2021 and 2022, from World Economic Outlook, International Monetary Fund (IMF), July 2021.

losses since 2018 (2.6 million jobs or 9.2% of employment). The overall recovery of the labor market at the end of 2020 was good but asymmetric, bypassing large numbers of lower-skilled, informal, young, and female workers. This asymmetric recovery exacerbates disparities in the labor market, where unemployment was already much higher among youth, and female labor force participation was far lower than expected given Turkey's levels of income and human capital. The pandemic also increased the poverty rate from 10.2% in 2019 to an estimated 12.2% in 2020.

Turkey's economic growth prospects must also be considered in light of the country's longer-term challenge to increase productivity sustainably and vulnerability to climate risks. Productivity growth has contributed less to overall growth in recent years. As a result, potential output—what the economy can produce when factor inputs are fully utilized—has flattened. Unless Turkey can produce more and better output with its available inputs, the return on those inputs, including labor, will stagnate. The economy is also contending with growing sustainability gaps as rapid demographic growth, urbanization, and industrialization exert heavy pressure on natural resources and the environment. The effects of climate change, including rising annual mean temperatures and changes in precipitation patterns, have expanded Turkey's exposure to natural disasters. The country now experiences more frequent and severe rainfall, floods, heatwaves, and droughts. With its diminishing surface water supply, Turkey is already considered a water-stressed country. In less than a decade—by 2030—it is likely to be a water-scarce country.

The country has an opportunity to move rapidly onto a more resilient, sustainable, and inclusive growth path as its economy recovers from COVID-19. The pandemic has generated a profound awareness of the links between climate change, fragile ecosystems, economic growth, and human health. As pressures intensify to support post-pandemic economic growth, recovery, and jobs, Turkey has an opportunity to build back better, relying on strategies that can reduce its vulnerability to climate disasters, avoid the depletion of its natural resources and weaken its economic growth prospects. By incentivizing a green recovery and initiating a green transformation, Turkey can retain a competitive advantage as global markets—including the EU, Turkey's main trading partner—move to decarbonize. The agri-food sector will have a pivotal role in a green recovery strategy fostering a climate-smart, competitive, and resilient growth.

1.2. Sectoral and Institutional Context

Turkey has taken advantage of its natural capital to build a large agriculture and food sector that contributes importantly to the economy. In 2014, natural capital represented more than one-quarter of Turkey's national wealth, with the share of cropland and pastures of this natural capital reaching 90%. On average, the use of this land generates significantly more wealth for Turkey than for other peer countries. Turkey ranks among the top 10 global agri-food producers, and is a major global producer of wheat, cotton, hazelnuts and other high value crops. Turkey exports around 1,800 agricultural products to more than 190 countries.[2] The agri-food sector contributed 6.6% of GDP in 2020 and employs about 18% of Turkey's labor force.

Growing demand—domestic and external—has propelled the expansion of Turkey's agri-food sector. During 2010–19, real agricultural GDP grew at an annual rate of 2.7%, below the overall economy (5.38%) but represented a significant improvement over the languishing 2000–09 growth of 1.9%. More recently, it has grown faster (2.5%) than overall GDP (1.8%), which contracted significantly in late 2018 due to the recession. Recent estimates suggest that in 2020 the sector grew at an even

[2] Switzerland Global Enterprise. 2018. *https://www.s-ge.com/en/article/global-opportunities/20211-c5-food-turkey-market-overview*

higher rate (4.8%) than the overall economy (1.8%).[3] The sector's expansion has been fueled by growing domestic demand for agri-food products and changes in consumption patterns to favor more protein- and nutrient-rich foods such as fruits, vegetables, fish, and animal products (dairy, poultry, and red meat), as well as some less nutritious foods. Growing external demand has also driven the sector's expansion. Exports of agri-food products rose from US$3.6 billion in 2000 to about US$20.7 billion in 2020 and accounted for 10–11% of national exports. Through its participation in a customs union with EU countries and free-trade agreements with 27 countries, Turkey has become the lead exporter of a substantial set of agri-food products (largely fruits, vegetables, and nuts), to a wide range of destinations worldwide.

Agricultural performance has been quite mixed across Turkey's macro-regions. Between 2004 and 2019, agricultural growth in Central, Southeast, and Eastern Anatolia Regions was very dynamic surpassing 4%. This is important, considering that provinces in the Southeast and Eastern Anatolia Regions have the lowest poverty rates in Turkey. Agricultural growth was modest in the Aegean (2.77%) and Black Sea Regions (2.2%) while in the Marmara and Mediterranean Regions growth was below 2%. These modest rates are worrisome, as these regions combined provide nearly 65% of national agricultural employment (Aegean Region provides 16.2%, Black Sea Region 22%, Marmara 14%, and the Mediterranean 13%) and are important export poles.

One reason for this mixed performance is that for some time the agri-food sector has been constrained by low productivity. At an aggregated level, the sector has grown by 2.48% per year on average over the last two decades, but this growth has been very cyclical and for the most part lower than growth in the wider economy. Data on total factor productivity (TFP) show that growth in TFP has not only slowed but turned negative from 2012 to 2016 (–0.4%) as the input use index (land, labor, machinery, and so on) grew faster (1.3%) than the output index (0.9%). Growth in agricultural output has been driven primarily by input intensification and far less by improvements in resource-use efficiency and technological adoption. An analysis by OECD[4] suggests that growth in the primary factors of production (labor, land, livestock, and machinery) and in the use of intermediate inputs (fertilizers, pesticides, and so on) was responsible for 75% of the growth in output in Turkey between 2007 and 2016. This indicates that only 25% of that growth was attributed to TFP. The sector faces significant input costs, including energy use (eroding farm profitability), while the misuse of inputs is compounding costs and implicitly reducing productivity and bringing important environmental challenges. Gains in output per hectare (yields) have been particularly strong in cereal, fruit, and beef production, but they are offset by falling yields of key crops/activities such as tree nuts, pulses, and dairy. Yields also tend to be volatile rather than steady, often experiencing boom-bust cycles (particularly in vegetables). This cyclical nature of output generates a high uncertainty on returns to farmers, which discourages investments in technology to stabilize production and improve productivity.

Low agricultural productivity can partially explain the persistent inflation and volatility of food prices in Turkey. High food price inflation and volatility have serious welfare implications, especially for poor households, in which food accounts for 29% of spending. Unprocessed foods, particularly fresh vegetables and fruits, drive food price inflation (although more recently beef has become a major driver), which has been exacerbated recently due to COVID-19 pandemic. Food price inflation has increased, and prices have become more volatile over time. A recent analysis of food price inflation

[3] TurkStat Report No. 37180 01, March 2021.
[4] Based on the TFP database of the U.S. Department of Agriculture.

in Turkey by the World Bank[5] highlights the strong link between land productivity and food price inflation; food price inflation was lower in provinces where growth in land productivity was higher. The analysis also concludes that low levels of market integration are one of the drivers of food price inflation in Turkey, as reflected by the intertemporal volatility and spatial dispersion of prices.

Agriculture's vulnerability to climate change can exacerbate food price pressures and overall food security concerns in Turkey. Decades of data from the Turkish State Meteorological Service (TSMS) confirm the increase in extreme climate events, mostly windstorms and heavy rain; such events are projected to occur more often as the climate changes.[6] Climate change is also projected to reduce the availability of surface water, increase the frequency and severity of floods, and prolong dry seasons and droughts. An analysis of water requirements for 35 crops in 81 regions suggests that the economic effects of climate change will be mild until the mid-2030s and then become more severe. The Global Food Security Index (GFSI) ranks Turkey 47th among 113 countries with respect to the overall food security environment. A granular look at the index categories shows that the major risks for Turkey are exposure to droughts and severity of storms. In terms of the availability of water for agriculture, Turkey ranks at the bottom of its peer countries (and 77th in the overall GSFI ranking) due to its high level of drought stress and variability in renewable water supply. Strategies for enhancing the climate resilient of the agriculture sector need to improve both access and efficient water use, along with seizing opportunities for influencing crop patterns, towards low-water demand crops in regions facing high water scarcity and promoting water and soil conservation practices in crop production.

Climate change has a major impact on soils/land, accelerating desertification, erosion, causing fertility loses, etc., and vice versa, changes in land use and soils can either accelerate or slow down climate change, as soils are important carbon sinks. Protecting soil health and sustainable land management are emerging globally as priority climate change mitigation strategies. Furthermore, healthy soils are the foundation of improved productivity. Conservation and proper utilization of soils and land has emerged as a key priority in Turkey, with important regulatory actions taken to address issues of soil and land degradation, continued fragmentation of agricultural land, growing patterns of land abandonment and conversion of fertile agricultural land to non-agricultural uses.

In conjunction with climate change, the expansion and intensification of agriculture and related manufacturing activities are also creating significant environmental pressures. The agri-food sector is a large (and inefficient) user of land, water, and energy, as well as a large emitter of greenhouse gases (GHGs). Achieving efficiencies in the sector can bring important environmental benefits and mitigation opportunities. Key agri-food sector environmental issues identified are:

a. Turkey's agriculture sector is relatively carbon intensive compared with the rest of the economy, with the sector's share of emissions doubling its share in GDP. Turkey's total GHG emissions from agriculture were estimated at 68 million tons of carbon dioxide equivalent (tCO2e) in 2019 representing 13.4% of total country GHG emissions.[7] The annual volume of GHG emissions in the Turkish agricultural sector has continuously increased over the years by

[5] World Bank (2021), Drivers of Food Price Inflation in Turkey (unpublished report).
[6] Demircan et al. (2017). Climate Change Projections for Turkey: Three Models and Two Scenarios. January 2017. Turkish Journal of Water Science and Management 1(1):22-43.
[7] Greenhouse Gas Emission Statistics 1990-2019. https://data.tuik.gov.tr/Bulten/Index?p=37196&dil=2.

47.7 % with reference to 1990. The largest sources of GHG emissions in the agricultural sector are digestive processes and manure from livestock, mainly from cattle.[8]

b. Livestock production has also driven land degradation, given the high intensity of production in Turkey. For instance, the intensity of sheep production was 387 head/km^2 in 2016, compared to 232 on average for OECD countries.
c. Agriculture is the sector that uses most of the freshwater abstracted in Turkey (almost 90%). Irrigation schemes are mostly open channels and inefficient on farm irrigation practices methods are used.[9]
d. Fertilizer and pesticide use is growing fast.[10] Their overuse combine with land mismanagement is creating agricultural pollution problems and, increasingly, market access challenges due to food safety rejections/notifications by major markets such as the European Union (EU), particularly linked to inappropriate pesticide use/residues.
e. Supply chain inefficiencies translate into high levels of food waste and loss.

Against this background of increasing climate and environmental risks—which threatens to destabilize gains in agricultural productivity, rural incomes and employment, and the resilience of the natural resource base—Turkey has a unique opportunity to pursue the green transformation of its agri-food system, backing up policies with stronger public sectoral investments. On the policy front, Turkey has made important progress on prioritizing agriculture climate action as part of the national climate change plans and strategies and aligning national development plans and sectoral programs, around such climate change objectives. However, there are opportunities to repurpose public investment support towards advancing actions highlighted in such policies. Agriculture support in Turkey is still highly focusing on price support (which accounts for two-thirds of the estimated support to producers) and variable input subsidies. Such subsidies are the most distortive types. Support to more estimate of generalized service support (public services) averaged 17% of all agricultural spending during the period 2017-2019, the bulk of this (75%) supported irrigation investments, while public expenditure on the agricultural knowledge and innovation system averages only 5%, in clear contrast with the EU, where half of the estimated support to general services go to R&I and 92% in Brazil. Public support for post-pandemic recovery could be used to transform the agri-food system and build back better, with an emphasis on new technologies and practices that deliver multiple wins in terms of productivity, climate resilience and protection of the natural capital of the sector. Innovations in climate-smart agriculture (CSA) offer tremendous prospects for improving productivity, achieving resource efficiencies, and reducing the climate vulnerability of agriculture, with potential to generate quality jobs.

Climate-smart agriculture technologies and practices can accelerate the sustainable and competitive transformation of the agri-food sector in Turkey. The mainstreaming of technologies and innovations lies at the core of the transformation of Turkey's agri-food system towards higher levels of competitiveness, sustainability, and climate resilience. Recent broad estimates by the International Finance Corporation (IFC) suggest that the adoption of CSA technologies/approaches in emerging markets in Europe (Russia, Turkey, Ukraine and Serbia) could represent an investment opportunity of US$79.4 billion, and a powerful tool for job creation and GHG emission reduction.[11] These CSA

[8] Turkish Greenhouse Gas Inventory 1990–2018. Inventory Report for submission under the United Nations Framework Convention on Climate Change." Available at: https://unfccc.int/documents/223580.
[9] Based on information from the Turkey Modernization Project (P158418).
[10] OECD (2019), "OECD Environmental Performance Reviews: Turkey 2019." OECD Publishing, Paris. Available at: https://doi.org/10.1787/9789264309753-en.
[11] Ctrl-Alt-Delete: A Green Reboot for Emerging Markets. Key Sectors for Post-Covid Sustainable Growth. International Finance Corporation (IFC), January 2021.

technologies include traditional conservation practices and nature-based solutions (e.g. conservation tillage, crop rotation) to more modern technologies such as smart and precision agriculture, energy efficient and waste recycling technologies, etc.

Climate smart agriculture (CSA) can contribute to address gender disparities, attract rural youth to farming and strengthen the economic recovery from the pandemic by spurring job creation. Women are an integral part of Turkey's agricultural labor force, especially in rural areas, but they face a range of barriers to their entrepreneurship and employment opportunities. In 2020, it is estimated that about 40% (down from 44% in 2019) of those employed in agriculture are women; the sector is the largest employer of women with a share of 23% of total female labor, however, a large proportion of women agricultural labor is unpaid. The modernization of agriculture is providing improved labor opportunities for women; an example is the expansion of greenhouse infrastructure, which employs largely female workers, and provides durable and relatively well-paid jobs. The same can be said around the growing demands for healthy and organic products, with anecdotal information suggesting that a growing number of women in Turkey run successful organic farms. By recognizing that climate change affects women and men differently, CSA practices and technologies can be developed and promoted in a way that addresses the gender gap and ensures that men and women can equally benefit from any intervention in the agricultural sector to reduce risks linked to climate change. A recent analysis by the World Bank and others on the opportunities for digital agriculture suggests that efforts based on mobile approaches and data analytics are the most likely to bring high-impact solutions to the Turkish agricultural sector. Mobile applications, in particular, can facilitate women participation, as use or mobile phones is almost universal across gender and age groups in Turkey, while the gender gap in internet usage was estimated at 16%. Youth unemployment is also a serious and increasing problem in Turkey. The Turkish Statistical Institute recently estimated that nearly 25% of individuals ages 15–24 is unemployed; the actual unemployment rate for this age group is believed to be much higher, because official statistics exclude people who have given up searching for employment. Furthermore, while cities are getting crowded of young unemployed people, in the rural areas of Turkey and everywhere else in the world, the farming population is growing older. Experiences of technology-based agriculture programs in EU and the USA, have demonstrated the potential of digital technologies to support a new generation of young new farmers.

While the range of digital and smart agricultural technologies available in Turkey has been growing rapidly each year, uptake has remained limited. Lack of knowledge and trust in new technologies and financial constraints limits farmers' willingness to invest in them. Support to farmers—especially young and women farmers—through investments to disseminate knowledge and build skills are critical to support adoption. Pilots, demonstration plots, public awareness campaigns, and skill development can enable farmers to learn about and use the latest available digital innovations, solutions, and opportunities. Supportive national policy, public-sector investment, and private-sector engagement in innovation and monetization are needed.

Spurring Turkey's agri-food green transformation could preserve and enhance trade opportunities, while enhancing sectoral competitiveness. The EU, Turkey's biggest agri-food trade partner, is promoting climate action through its recently launched Green Deal, which highlights the EU's commitment to tackling climate and environmental challenges and achieving carbon neutrality by 2050. Within the framework of the Green Deal, the EU has adopted a Farm-to-Fork strategy, a Biodiversity strategy, a proposal for a Climate Law, as well as a new action plan for the Circular Economy, all of which address issues relevant to agri-food systems. In August 2021, the Government of Turkey (GT) released the "Green Deal Action Plan" aimed at contributing to Turkey's transition to a

sustainable and resource efficient economy and to respond to the comprehensive changes envisaged by the EU Green Deal. The Plan identifies 81 actions and 32 targets around nine specific thematic areas. For sustainable Agriculture, the Plan highlights actions in eight thematic areas to be implemented between 2021-2023, regarding reduction of inputs use (pesticide, antibiotics, chemical fertilizers), reduction on food loses and waste, mainstreaming the use of biofertilizers, and promoting organic production. These actions represent a timely opportunity for Turkey to further modernize the agri-food system, enhance its competitiveness, and strengthen public-private partnerships and multi-stakeholder alliances as vehicles to pilot approaches and promote innovations. Moving toward a green transformation might increase costs in the short term, but in the long term, climate-smart policies and practices will ensure the commercial viability of Turkey's agri-food sector—whereas business-as-usual will undermine the natural capital on which the sector depends.

Turkey has made good and continued progress on the fight against animal diseases; however, climate change and other pressures are exacerbating risks of outbreaks. The natural location of Turkey allows many infections with zoonotic characteristics to emerged or re-emerged. Furthermore, Turkey has borders with countries where many economically important infectious diseases are endemic which puts it at higher risk threatening its livestock sector. According to OIE, a total of 107 zoonotic infections originating from Turkey have been reported thus far. Turkey has experienced recent outbreaks including on Pest des Petitis Ruminants (PPR, 997 from 1999 to 2018) and lumpy skin disease (LSD) (180 outbreaks in 2019 and 5 in 2020).[12] The prevalence of other animal diseases in the country includes brucellosis at an estimated at around 1.43% in the animal population, tuberculosis and Foot-and-Mouth Disease (FMD). These diseases are causing significant economic losses in Turkish livestock sector[13] and could represent important risks to human health. These diseases have become endemic and are controlled through mass vaccination programs which has contributed to a decline in outbreaks and in maintaining disease-free zones particularly in Western Turkey. Besides these direct losses from productivity, export restrictions on several animal products cause additional losses to the sector and the overall Turkish economy. Enhancing animal disease surveillance and control capacity is a priority in Turkey, particularly given the expected impacts of climate change on increasing the spread, severity, and distribution of pathogens and infectious animal diseases. Effective prevention and control of animal diseases is a key pillar of a resilient and safer agri-food system.

In sum, during the post-COVID phase of its economic recovery, Turkey has an unprecedented opportunity to advance its agri-food agenda for climate-smart, resilient, and green growth that delivers more jobs and income. The COVID-19 pandemic was a strong setback to the economic recovery from the 2018 recession. Unlike other sectors of the economy, agriculture was only moderately affected by the pandemic, owing to timely intervention by the GT, although recent estimates suggest a considerable labor contraction in the sector. Social assistance measures helped vulnerable populations, including agricultural workers, to survive the crisis, and farmers and agri-food enterprises benefited from credit lines and stimulus packages to ensure that critical agricultural value chains continued to function. In the post-COVID recovery phase, the project activities will contribute to enhance productive, green and resilient growth in the agri-food sector, while creating jobs and other livelihood opportunities. The project will help to place the sector onto a climate-smart growth path and prepare the country to take advantage of policy developments in key export

[12] https://efsa.onlinelibrary.wiley.com/doi/pdf/10.2903/j.efsa.2015.3985
[13] https://www.jscimedcentral.com/VeterinaryMedicine/veterinarymedicine-4-1079.pdf

markets. It will achieve these aims by (i) aligning green support packages to build the sector's resilience, sustainability, and resource-use efficiency, with an emphasis on inclusion and human capital development and by (ii) enhancing the GT's capacity for policy and programming, and effective service delivery in the sector, particularly around the soil and land use agenda, and animal health issues. More specifically, the project will support higher levels of market integration, climate-resilient production, and improved productivity through innovation and technology adoption; reinforce human capital development through skills training; and strengthen system capacity to meet new demands and opportunities created by the modernization of agri-food systems.

2. Project Description

The Project Development Objective (PDO) of the "Turkey Climate Smart and Competitive Agricultural Growth Project" is to enhance capacity for sustainable and competitive agricultural growth and promote the use of climate-smart approaches in the agricultural sector in Turkey.

The project will support the agri-food sector in transitioning toward a more climate-smart, inclusive orientation by supporting innovation and the use of smart farming/climate-smart technologies and practices by farmers and agricultural enterprises and by enhancing capacity for sustainable and competitive growth in a range of areas, including: information generation and dissemination to support sustainable soil and land-use planning/management; agricultural data collection and analysis; and animal health aspects. The Project investments are expected to contribute to increased agricultural productivity; increased input and resource-use efficiency; and increased overall agricultural productivity resilience, and sustainability. Project activities will largely focus on the production stages, although a subset of activities (particularly in fruit and vegetable value chains) will promote opportunities for enhancing efficiencies beyond the farm gate.

2.1. Project Components

The project will be implemented through four components:

Component 1: Institutional Capacity Strengthening for Climate Smart Agri-food Policy, Planning, and Investments. Activities under this component will support the strengthening of an environment for sectoral planning, with a particular focus on narrowing information gaps in relation to Turkey's soils and land natural capital, to enhance its sustainable planning and management. They will also enhance MoAF's digital blueprint for data collection and information management to support smart policy monitoring and programming. Component funds will mainly support non-consulting and specialized consulting services; acquisition of software/hardware/equipment required and training. Activities under this component will be implemented through two subcomponents.

Subcomponent 1.1: Narrowing information gaps to enhance soil health and land-use planning/management. Subcomponent activities aim at narrowing information and capacity gaps in relation to Turkey's soils/land natural capital, to contribute to their sustainable planning and management. Subcomponent activities will support: i) the generation of key soil and land information needed to inform soil and land classifications, thus, expanding and strengthening the ongoing efforts led by the MoAF in this area; ii) the development of information and tools to strengthen MoAF capacity to monitor soil conversation and land planning; and iii) the preparation and dissemination of land plans/notes to guide land utilization decisions at the provincial level. More specifically, Subcomponent 1.1 will finance technical services to carry out detailed soil surveys and classification studies; laboratory analysis; preparation of maps (soil, threats etc.); soil sample preservation; soil and land information systems spatial data infrastructure and related subcomponents; and preparation of land utilization management plans and land notes. The subcomponent will also invest in equipment and computer infrastructure to enhance management of the large volumes of data and information generated by the project. The activities under this subcomponent are divided into the following output blocks:

(i) Determination of land and soil resources: The subcomponent will strengthen ongoing MoAF's efforts to undertake detail soil surveys and the preparation of soil classifications maps (1:5000 scale) to be carried out in approximately 12.05 million hectares. The soil maps will be produced using site descriptions, auger controls, and

laboratory analysis. In addition to expanding ongoing work by MoAF, the subcomponent will support the establishment of a national soil archive, in alignment with international standards. It will support the identification of soil monitoring sites to generate a dynamic system for periodic monitoring of soil threats, nationally.

(ii) Strengthening of the Digital National Profile Soil Database by hosting soil/land profile information and soil threats thematic maps.

(iii) Establishment of a system and service development for soils and land including the development of policies for data sharing and use, in alignment with international good practice experience; the development of soil-land spatial data infrastructure (SDI) and National Soil & Land Information System; the establishment of National Soil monitoring sub-system for soil selected indicators; and the establishment of Dynamic Modelling/Mapping System. A Geospatial Soil Organic Carbon Information System will also be created (as a submodule of the land and soil information system) specifically designed to develop and guide climate change mitigation and adaptation strategies.

(iv) Classification of lands across the country, according to global and national standards leading to the definition of Turkish agricultural frontier (agricultural land versus other uses). Land classification activities to be supported by the project will cover approximately 69.5 million hectares.

Capacity building activities to targeted users of the soil and land information, will also be supported. Therefore, a set awareness campaigns, and dissemination and training efforts will be undertaken, targeting particularly local provincial governments and provincial Soil Conservation Boards, with specific tools developed by the project to support such dissemination/training efforts. To facilitate data use, subcomponent activities will support upgrading, developing and/or validating user-friendly applications (e.g. via mobile phone) on soil and land information generated by the project. Pilot initiatives to apply the information generated by the project will be supported, including preparation of crop suitability maps at the provincial/regional levels, as well as the design and piloting (in selected regions/provinces) of a decision support system aimed at supporting land use planning processes, based on the soil and land information generated by the project, but also linked to other socioeconomic and environmental aspects.

The soil and land information generated by the project will be used by MoAF to implement provisions included in Regulation No. 30265/2017 on the conservation, use and planning of agricultural land, aimed at preventing soil and land degradation and misutilization. Within MoAF, users of the information generated in this subcomponent include departments with responsibilities in reducing land degradation and erosion, in protecting and enhancing soil carbon and conserving soil biodiversity, etc. The information generated will inform cross-sectoral work on land valuation, guide future land consolidation policies and investments led by MoAF and will provide data for a wide set of land planning processes. The range of external users include mainly local provincial governments and provincial Soil Protection Boards, as well as a wide range of users, including the academy, private sector investors, and farmers.

Subcomponent 1.2: MoAF digital blueprint for sectoral information collection and management. Activities under this subcomponent will enhance MoAF's capacity for data collection and sectoral information management to support smart climate policy and

programs. This subcomponent will strengthen the capacity of MoAF for collecting timely agricultural data and will strengthen the effectiveness of current MoAF information systems. It will also support the development and testing of modelling approaches for monitor crops and yields and provide production forecasts (including also climate factors) for food price monitoring, food security assessments, and other applications.

Component 2: Enhancing animal health capacity for effective disease surveillance and control: This component aims at enhancing animal disease surveillance and control capacity in Turkey. The component will support two main activities: upgrading the infrastructure of regional veterinary control institutes and establishing the National Veterinary Medical Product Control Center. The component will invest in services to support feasibility assessments, works, laboratory equipment, training, and information systems. The specific activities under each subcomponent are described below.

Subcomponent 2.1: Strengthening the capacity of animal health institutes: This activity will support improvements in Turkish network of animal health institutes, specifically in relation to upgrades to biosafety laboratory infrastructure, information systems (including opportunities for digitalization) and capacity building. The network of laboratories targeted under this subcomponent include eight institutes affiliated with the MoAF located in the provinces of Adana, Elazig, Erzurum, Konya, Samsun, Izmir, Istanbul and Ankara. These institutes provide key services on animal disease diagnostics, analysis, research, and training, and also serve as national reference services for specific animal diseases. Laboratories servicing regions and border provinces, where the risks of animal diseases (including zoonotic diseases) are higher such as Adana, Erzurum, Samsun, and Elazig, are inadequate in terms of biosecurity levels preventing them from undertaking diagnostic analysis, disease surveillance and prevention, and research for priority diseases, due to lack of an appropriate environment for safely and securely handle animal disease-related pathogens. The project will specifically support upgrades to the institutes' infrastructure to increase the biosafety label (BSL) of laboratory units. The improved laboratories will also be key to support veterinary faculties and researcher initiatives within Turkey and promote collaborative efforts with neighboring countries on early diagnosis of epidemic diseases threatening Middle East and Asian countries. The project will specifically invest in critical construction work and equipment needs, biosafety, and biosecurity trainings as well as the establishment of a common laboratory information management system for the targeted institutes. A detailed need assessment and analysis of upgrades required will be undertaken during the first year of project implementation. The project will support the development of a national animal-health laboratory policy.

Subcomponent 2.2: Strengthening and improving veterinary medical product control: This subcomponent will support activities to improve the capacity of Turkey to control and regulate veterinary medicines. It will do so, by supporting the establishment of a centralized Veterinary Medical Control Center, bringing together the functions that are now disaggregated through different veterinary institute. Currently, the Directorate General of Food and Control (DGFC) relies on two institutes to implement veterinary medical product oversight: Bornova Institute for vaccines controls and Pendik Institute for drug safety. However, these institutes do not have the animal biosafety level 3 infrastructure and dedicated personnel to perform the necessary control of veterinary medicinal products and target animal studies require for biosafety and lack of appropriate capacity to perfmon drug surveillance. Furthermore, some of the DGFC affiliated institutes are manufacturers of

veterinary medical products, which raises conflict of interest issues. The project will invest in works, equipment, and technical services to build: i) test, analyses and administrative facilities; ii) a national vaccine strain collection bank and ii) experimental animal units. Activities will also support capacity building and training, and some operational costs. The supported installations will meet international accreditation standards. The new institute is expected to be self-sustaining through the provision of fee for services (licensing, GMP inspections, training and expert services, etc.) to private sector i.e. manufactures, importers, exporters etc. The ministry through DGFC will retain its coordination and regulatory role while the institute will perform day to day operations and due diligence. A detailed feasibility assessment will be undertaken the first year of project implementation, analyzing issues of location, technical design, costs and sustainability. It is expected that the construction of the center will be initiated the second year of project implementation.

Component 3: Investments for Enhanced Productivity, Resource-Efficiency, and Climate Resilience. This component will support the dissemination, validation and adoption of CSA technologies and practices, as well as research and development efforts aimed at enhancing agriculture performance by improving productivity, reducing costs, promoting more efficient resource use (fertilizers, pesticides, energy, water), and improving climate resilience. Investments under this component are also expected to generate key agricultural data to be support decision making by farmers and enterprises and to inform policy design. The encourage the uptake and effective use of innovative/disruptive climate smart technologies by closing knowledge and skill gaps and by providing financial support and technical assistance to producers and enterprises. The investments supported through grants and technical assistance and knowledge sharing are expected to contribute to livelihood opportunities (creating jobs and generating income) and to reduce the overall environmental footprint of the agri-food sector, particularly as related to growing pollution from ineffective input/resource use and GHG emissions. Activities supported under Component 3 will be implemented through four subcomponents.

Subcomponent 3.1: Strengthening climate resilience, productivity, and resource-use efficiency in vegetable value chains. Price and supply fluctuations are a recurrent problem in Turkey's vegetable value chains due to several factors, with climate-related factors playing an increasingly important role. Protected agriculture, through the establishment of greenhouse production has been a priority in Turkey in the past decade, particularly for highly climate sensitive crops such as vegetables. This subcomponent will support ongoing public and private sector efforts to enhance protected agriculture in Turkey for vegetable production, via upgrades on traditional greenhouse infrastructure, improved production management and the piloting of innovative clustering approaches, to enhance the efficiency of protected agriculture and its role on climate resilience, while achieving efficiencies on energy /input use and improving soil health, generating important mitigation co-benefits as well. Improved greenhouse production can also support crop diversification for increased production of higher value and nutrient-rich vegetable products, contributing to nutrition outcomes. This subcomponent will be implemented through two main activities:

a. Modernization of small-scale greenhouse production. Small, family-run greenhouse operations covering less than 0.3 ha of area account for 75% of the greenhouse area in Turkey. Much of this infrastructure is traditional, where average size of glass and plastic greenhouses is 785 m2 and 833 m2, respectively (Yilmaz et al., 2010). The construction of these greenhouses is also not efficient as they have poor ventilation and heating. As a result, these greenhouses fail to achieve their potential. Moreover,

they also receive minimal maintenance, suffer from frequent weather damage (especially in winter), and poor technology and management do not allow for an effective control of phytosanitary problems causing producers to use high levels of pesticides and other inputs, resulting in higher costs, and market access challenges (e.g. increased product rejections and overall food safety risks for consumers domestically and abroad). Investments under Subcomponent 2.1 will improve existing traditional greenhouse infrastructure on small family farms to improve farm profitability per unit area, resource-use efficiency and climate resilience. Matching grants will co-finance the infrastructure investments and technical assistance. These investments are likely to be concentrated in Adana, Antalya, and Aydin subregions, where the bulk of greenhouse production occurs, however, opportunities for expanding investments to other subregions will be considered during project implementation, particularly as a mean to improve smallholder outreach. Subcomponent funds will mainly support construction work linked to upgrading greenhouse infrastructure; acquisition or materials/equipment (roofing, A/C, ventilation, etc.), technical assistance and training.

b. Pilot model for clustering greenhouse production around an efficient energy source (geothermal energy). When geothermal energy replaces fossil fuel in modern ("technology-based") greenhouses, it significantly reduces the costs, energy consumption, and the environmental footprint of greenhouse production. Private firms have established an estimated 440 ha of geothermally heated greenhouses in Turkey. Through the Greenhouse Development Project, prepared in 2019 by MoAF, the GT together with stakeholders set a target to expand the area of geothermally heated greenhouses to 2,500 ha by 2023. The three largest public-private investments to expand this infrastructure operate under the legal framework of the Specialized Greenhouse Industrial Zones Based on Agriculture (Tarıma Dayalı İhtisas Organize Sanayi Bölgesi—TDİOSB). Implementation has been slow owing to the complexities of the governance structure and business model, including challenges related to the participation and capital contributions of various public and private entities and the high costs of building ancillary infrastructure such as recreational and industrial areas, among other factors. Subcomponent 2.1 provides support to pilot an alternative business model with a less complex organizational and governance structure that should make it possible to build infrastructure and mobilize private investors more rapidly, while maintaining the advantages of a cluster. The model will be piloted in at least one site, selected from among the 14 sites where feasibility studies have already been undertaken by the GT/ BÜGEM. Criteria for site selection will be further detail during the first six months of project implementation, but would include technical/financial viability, opportunities to have higher social impacts, no requirements for private land acquisition, demonstrated interest and co-financing opportunities provided by local governments, among others. Subcomponent funds will cover consulting services for zone planning and geological surveys and basic enabling infrastructure (civil infrastructure and construction works such as: geothermal drilling, energy transmission line and network backup power line; potable and utility water, foundation drainage connection line; etc.), as well as studies and analysis of the feasibility of different investment models and dissemination and outreach activities to target partnerships with the private sector.

Subcomponent 3.2: Promoting the adoption of CSA technologies/practices across relevant crops. The objective of this subcomponent is to expand the use of emerging innovative/disruptive CSA and energy-efficient technologies on small and medium farms to enhance the productivity and profitability of farm operations, increase input-efficiencies and reduce carbon footprint and other negative environmental impacts. This subcomponent will primarily focus on awareness creation, dissemination and providing co-finding opportunities for digitally enabled technologies and solutions (smart and precision agriculture) and energy efficient technologies.

a. Digital CSA technologies. Subcomponent investments will focus on supporting awareness & dissemination activities and investments around emerging digital CSA technologies, including: (i) decision support systems for agriculture production that integrate remote sensing technologies with cloud computing and Internet of Things devices (sensors, field stations); (ii) variable-rate technology to apply agricultural inputs; and (iii) digitally assisted steering systems to optimize field operations, and (iv) harvesting losses (specifically in wheat and cotton). Subcomponent activities will aim at expanding the use of readily available commercial technologies in partnership with the private sector and will cover co-sharing the costs of acquiring equipment/machinery and related goods, license fees for remote sensing and cloud-based analytical services, and training. The focus will be on technologies that are suitable for small and medium farm enterprises, either through direct adoption by individual producers or by sharing equipment across farms and facilitating access to related services. In the case of harvesting losses, the focus will be on generating incentives to optimize harvesting practices by service providers. Increased access to CSA digital technologies will optimize the use of fertilizer, pesticides, water, and energy, will reduce harvest losses and increase farm profitability reducing pollution and GHG emissions.

b. Solar energy as an alternative power source for pump irrigation systems. Although it varies according to the type of production, the energy need constitutes an important input cost in agricultural production in Turkey. Energy costs for irrigation has emerged as a critical problematic area and have created a major financial burden for the irrigation cooperatives. The subcomponent will co-finance the establishment of solar energy systems to substitute for side fuels as well as the adoption of digital tools to enable more efficient irrigation scheduling based on real-time information through soil moisture sensors and digital weather stations. Solar energy is a much cheaper source of energy and the switch from fossil fuels has important climate co-benefits. Furthermore, achieving water efficiency is a key adaptation measured in Turkey. The focus will be on the provinces with the highest density of irrigation cooperatives, such as Konya, Afyonkarahisar, Mersin, Burdur, Eskisehir, Manisa, and Amasya. According to a recent MoAF survey, 72% of the 1,369 responding irrigation cooperatives used pressurized irrigation systems and half of the respondents used groundwater. To ensure a sustainable use of ground and surface water, measures will be implemented such as: the use of hardwired abstraction controls, introduction of volumetric metering, and – possibly - other measures to increase irrigation efficiency. During the first year of implementation, support will be deployed to a selected number of cooperatives, with lessons learned systematized, particularly around water consumption patterns, before deploying support to a much larger scale.

The focus of the subcomponent activities will be to demonstrate and innovate, with careful attention paid to assure replicability and inform policies. For digital CSA technologies, a matching grant (cost-sharing) mechanism will be established, with separate windows (to be defined) targeting four groups of users: (i) individual farmers; (ii) producer organizations; (iii) agribusinesses working with contracted farmers; and (iv) private service providers targeting small and medium farm enterprises. Targeting approaches will be implemented to ensure that female farmers, producer organizations with women members, agribusinesses owned by women, and private service providers owned by women or with experience in working with women owned or staffed enterprises participate in the matching grants scheme. The grant windows for groups two through four will facilitate access to technologies and related services by smaller farmers who may be unable to purchase and use them effectively on an individual basis. Matching grant support is demand driven. Depending on the technology, focus will be on field and industrial crops as well as on orchards and other tree crops (e.g., grapes, olives). Training and capacity building, implemented in close partnership with technology providers, universities and other relevant entities, will complement the grant program and target a wide range of stakeholders, including: (i) MoAF staff at the provincial level (especially extension agents); (ii) farmers and their associations; and (iii) other trainers and service providers, to build local capacity. Information and communication technology (ICT) will be used to strengthen an innovation network to exchange knowledge and information that can support dissemination. This network will include a web-based platform providing a one-stop shop for smart and precision agriculture solutions targeting different problems and uses. This platform will also facilitate data sharing between farmers, service providers, other actors and the Ministry. Protocols for data protection and sharing will be developed. Project funds will mainly support acquisition of equipment/machinery and related goods, license fees for remote sensing and cloud-based analytical services, training and specialized consulting services. The subcomponent will also operate an incentive scheme to reduce harvester losses, working together with the association of private harvesters. For the solar and irrigation activities, the subcomponent will also deploy a grant mechanism targeted to irrigation cooperatives.

Subcomponent 3.3: Enhancing the productivity and greening profile of cattle production in Turkey. Nearly 70% of cattle milk production in Turkey comes from farms with fewer than 50 cows; of those farms, 71% (about 264,500) have fewer than 10 cows and contend with significant management and profitability problems, leading to disease outbreaks and low productivity. Furthermore, increasing concerns, globally and nationally, on the negative environmental impacts of cattle production on climate change and water pollution, represent a challenge but at the same time an opportunity to push forward an agenda around greening the sector. Investments under Subcomponent 3.3 will complement ongoing efforts by MoAF to improve livestock productivity (for example, efforts around pasture reclamation and management, as well as, for the modernization of barns and improvement of animal genetics), with additional support focusing on innovative technology-based approaches to enhance productivity, sustainability and climate resilience. It will do so by supporting two strategies: the piloting and implementation of a Precision Livestock Farming (PLF) program and the implementation and piloting of innovative approaches on manure management.

a. Piloting of a Precision Livestock Farming (PLF) program. Throughout the world, PLF is gaining recognition for its use of digital technology to precisely calibrate livestock production and productivity parameters reducing costs, supporting animal health and welfare, improving food safety (by reducing the risk of antibiotic overuse), reducing

pollution and GHG emissions. Subcomponent 3.3a will provide technical and financial incentives (via matching grants) to support the uptake of PLF, targeting particularly small and medium farm enterprises, including equipment and technology such as electronic sensors, measurement devices, controls, and data processing. These technologies will be prioritized based on the specific problems to be addressed, which will be identified through a participatory process involving farmers, dairy processing companies, and private service providers. Activities will also support the further strengthening of the associated services for the adoption of PLF (e.g. installation and operation of equipment, data analytics, etc.), which will create jobs and attract young people with an interest in applying innovative digital technologies to animal production. Based on lessons from applying this technology in the EU, USA, and elsewhere, the PLF program will be implemented in a stepwise manner, beginning with small groups of farmers and gradually moving to larger groups (potentially reaching 5,000 farmers altogether). The novel aspects of this program include: (i) training a large number of farmers to use PLF technology; (ii) monitoring animals continuously over a long period and many production cycles (data are expected to be collected for 15,000 production cycles); (iii) developing and providing semi-automated feedback to farmers, alerting them to problems that should be addressed; and (iv) collecting data for statistical analysis of the impacts of PLF technologies on farmers' livelihoods and households and on the environment, which will be critical to inform policy decision making. A team of specialized staff within MoAF will be hired to coordinate the implementation of the PFL program. Subcomponent funds will support equipment/technology for dairy farms (via a matching grant program) and related data analytics and technical backstopping, training & demonstrations, and specialized consulting services.

b. Reducing cattle production pressures on water pollution and GHG emissions. The subcomponent will focalize work on the Küçük Menderes sub-basin (in the Aegean region) identified by MoAF as a Nitrated Vulnerable Zone (NVZ), particularly in the provinces of Odemis, Tire, Kiraz and Torbali. Water pollution in the sub-basin results mainly, from the presence of a significant amount of medium/large sized cattle farms. The main source of contamination comes from improper manure management, which also generates important GHG emissions. Overall, the lack of efficient manure management contributes importantly to water pollution, but also to GHG emissions in Turkey, as of the total emissions from agriculture, 13% are from methane mainly from livestock (cattle); and the sector contributes 62.4% of the country methane emissions.

Livestock enterprises in the sub-basin and across Turkey, currently do not have proper manure collection/storage facilities in compliance with Good Agriculture Practice (GAP) code. This is due to the lack of suitable areas to build manure storage facilities on-farm and to other logistical (e.g., distance for manure collection), knowledge and financial challenges. The subcomponent activities will focus on piloting and promoting innovative approaches for manure management, including: establishment of an information network of relevant stakeholders to share experience and knowledge around manure management, including on new and evolving technology for manure treatment/reuse; support the piloting/testing of innovative emerging technologies, and enhance capacities of professionals to support manure management plans/monitoring (e.g. through training and

certification programs); and piloting incentives/approaches for sustainable manure management, including undertaken a pilot for encouraging third-party manure collection and processing, potentially linked to biogas generation, and narrowing information gaps to inform policy/regulatory action. The subcomponent will finance construction works and equipment to set up the manure-energy-biofertilizer facility as well as equipment for transportation and application of biofertilizer in fields; training and demonstrations.

Subcomponent 3.4: Research and innovations to support CSA. While subcomponent 3.2 will focus on validating and mainstreaming commercially available technologies, this subcomponent focuses on the development, validation and/or dissemination of in-house (by TAGEM) climate/green agricultural technologies. Activities under this subcomponent will support the implementation of a research and innovation agenda around CSA in alignment with priorities identified in the recently launched Green Deal Plan, by the Turkish government, including reducing the use of pesticides; enhancing nutrient management (through biofertilizers), and enhancing energy and water efficiencies and support climate - related assessments. The subcomponent will support research, validation and dissemination efforts around Integrated Pest Management systems (particularly for export crops, facing significant rejections in export markets (peppers, citrus, tomato); expanding the use of biofertilizers (particularly around legume crops) to enhance fertilizer management and reduce the use of chemical fertilizers; undertaking other climate-related dissemination activities around energy-saving technologies produced by TAGEM (e.g. solar milking prototype), and carrying out climate assessments to create awareness around climate impacts in crops, and on the opportunities for reducing the water and carbon footprint of key priority value chains and optimize crop planning (e.g. based on water needs). The subcomponent will also support TAGEM's research, development, and innovation (RD&I) agenda on irrigation and drainage, aimed at optimizing water use and reduce pollution. This will be done by strengthen the Izmir International Agricultural Research and Training Center (UTAEM), positioning it to serve as a reference center for irrigation and drainage technology RD&I and to work with state-of-the-art equipment and private providers of irrigation and drainage technology in the region.

Component 4: Project Management, Monitoring, and Evaluation. Activities under this component will support all project management functions. It will include support for a Project Coordination Unit (PCU) under ABDGM, and Project Implementation Units (PIUs) under TRGM, DGIT, BUGEM, TAGEM, HAYGEM and DGFC, for (i) strengthening capacity for day-to-day project management of technical, fiduciary, Monitoring and Evaluation (M&E), E&S issues; (ii) E&S risk management, including preparation of site-specific E&S instruments required; (iii) grievance redress, citizen engagement, and communications; and (iv) M&E of project activities, including impact assessments, beneficiary satisfaction surveys, and development of an integrated system for project management and monitoring of project outputs and outcomes.

The summary of subcomponents, outputs and locations are given in Table 1.

Table 1: Summary of subcomponents, outputs, implementing agencies, and locations

Subcomponent	**Outputs**	**Locations**
Component 1: **Institutional Capacity Strengthening for Climate Smart Agri-food Policy, Planning, and Investments**		
Subcomponent 1.1:	Determination of land and soil resources	Country wide

Subcomponent	Outputs	Locations
Narrowing information gaps to enhance soil health and land-use planning/management	Development of the Digital National Soil Profile Database	N/A
	System and Service Development	N/A
	Improved classification of lands	N/A
	Capacity building activities	Country wide
Subcomponent 1.2: MoAF digital blueprint for sectoral information collection and management	• Capacity strengthening for collecting timely agricultural data • strengthening the effectiveness of current information systems • development and testing of modelling approaches for monitor crops and yields • provide production forecasts for food price monitoring, food security assessments	N/A
Component 2: **Enhancing Animal Health Capacity for Effective Disease Surveillance and Control**		
Subcomponent 2.1: Strengthening the capacity of animal health institutes	• Upgrading institutes' infrastructure to increase the biosafety label (BSL) of laboratory units • Establishment of a common laboratory information management system for the targeted institutes • Capacity building	Adana, Ankara, Elazig, Erzurum, İstanbul, İzmir, Konya, and Samsun
Subcomponent 2.2: Strengthening and improving veterinary medical product control	• Establishment of a centralized Veterinary Medical Control Center ○ test, analyses and administrative facilities ○ national vaccine strain collection bank ○ experimental animal units	[tbd]
Component 3: **Investments for Enhanced Productivity, Resource-Efficiency, and Climate Resilience**		
Subcomponent 3.1: Strengthening climate	a) Modernization of small-scale greenhouse production	• Improvement of existing traditional greenhouse infrastructure • Capacity building	Adana, Antalya, Aydın and in other sub-regions to be determined

Subcomponent		Outputs	Locations

resilience, productivity, and resource-use efficiency in vegetable value chains	b) Pilot model for clustering greenhouse production around an efficient energy source (geothermal energy)	• Zone planning
		• Geological surveys
		• Basic enabling structure
		  ○ Geothermal drilling
		  ○ Energy transmission line and network backup power line
		  ○ Potable and utility water
		  ○ Foundation drainage connection line
		• Feasibility studies for different investment models
			At least one site, selected from among the 14 sites

Subcomponent 3.2: Promoting the adoption of CSA technologies/ practices across relevant crops	a) Digital CSA technologies	• DSSs for agriculture production that integrate remote sensing technologies with cloud computing and IoT devices (sensors, field stations) • Variable-rate technology to apply agricultural inputs • Digitally assisted steering systems to optimize field operations • Harvesting losses • Capacity building	Country wide
	b) Solar energy as an alternative power source for pump irrigation systems	• Establishment of solar energy systems • Adoption of digital tools • Capacity building	Afyonkarahisar, Amasya, Burdur, Eskişehir, Konya, Manisa and Mersin
Subcomponent 3.3: Enhancing the productivity and greening profile of cattle production in Turkey	a) Piloting of a Precision Livestock Farming (PLF) program	• Support the uptake of PLF • Strengthening of the associated services for the adoption of PLF • Capacity building	Country Wide
	b) Reducing cattle production pressures on water pollution and GHG emissions	• Establishment of an information network • Supporting the piloting/testing of innovative emerging technologies • Enhancing capacities of professionals to support manure management plans/monitoring • Piloting incentives/approaches for sustainable manure management • Capacity building	Küçük Menderes sub-basin

Subcomponent	Outputs	Locations
Subcomponent 3.4: Research and innovations to support CSA	• Research, validation and dissemination efforts around Integrated Pest Management systems • Expanding the use of biofertilizers • Undertaking other climate-related dissemination activities around energy-saving technologies produced by TAGEM • Carrying out climate assessments. • RD&I agenda on irrigation and drainage, aimed at optimizing water use and reduce pollution.	None (İzmir?)
Component 4: **Project Management, Monitoring, and Evaluation**		
Component 4: Project Management, Monitoring, and Evaluation	• Strengthening capacity for day-to-day project management of technical, fiduciary, Monitoring and Evaluation (M&E), E&S issues; • E&S risk management, including preparation of site-specific E&S instruments required; • Grievance redress, citizen engagement, and communications; and • M&E of project activities, including impact assessments, beneficiary satisfaction surveys, and development of an integrated system for project management and monitoring of project outputs and outcomes.	N/A

2.2. Purpose of the ESMF

In accordance with the WB ESF, for the current project, an ESMF has been prepared as the specific locations/footprints and technical information about the sub-projects will be known during implementation. The ESMF examines the overall risks and impacts of the project and determines the scope of the comprehensive environmental and social management approach to be adopted to address the potential environmental and social impacts of the Turkey Climate Smart and Competitive Agricultural Growth Project.

The main objectives of this ESMF is,

(i) to establish procedures for the Environmental and Social (E&S) screening, review, approval, implementation, and monitoring of activities;

(ii) to provide guidance on the preparation of the sub-project specific Environmental and Social Management Plans (ESMPs)/Environmental and Social Impact Assessment (ESIA) reports,

(iii) to specify the institutional arrangements, responsibilities and outline the necessary reporting procedures, for managing and monitoring environmental and social concerns related to sub-projects;

(iv) to determine the training, capacity building needed to successfully implement the provisions of the ESMF building trainings;

(v) to address mechanisms for public consultation and disclosure of project documents as well as summarizes the stakeholder engagement and grievance mechanism which are detailed in a Stakeholder Engagement Framework (SEF) and sub-project specific Stakeholder Engagement Plans (SEP); and

(vi) to integrate relevant measures from the Labor Management Procedures (LMP) to address labor risks associated with the project.

- describes the Project in general along with the Institutions that will implement the Project,

This ESMF, along with the Labor Management Procedure (LMP), Stakeholder Engagement Plan (SEP) and Resettlement Framework (RF) that are prepared specifically for the Project will be integrated in the Project Operation Manual (POM) and serve as a basis for the Project implementation.

3. Baseline Analysis

Baseline will be changed.

3.1. Baseline of Turkey

3.1.1. Geographical location

Turkey is like a bridge between the continents of Asia and Europe. Besides this, it lying partly between 36°–42° NL and 26°–45° EL in the Northern Hemisphere. Turkey has a total surface area of 780,043 km2 and its land-use areas' 31.1% is agricultural lands. On account of Turkey's very topographical characteristics, it has available many climate zones. In the coastal regions of our country, more temperate climatic features are seen with the effect of the seas. The North Anatolian Mountains and the Taurus mountain range prevent sea influences from entering the interior. Therefore, continental climate characteristics are seen in the inner parts of our country. Turkey has many advantages such as product diversity based on climatic conditions, endemic species richness, and proximity to countries with high import-based food consumption.

Turkey is indisputably one of the countries with the most favorable geographical location where people can live on earth. In this respect, Turkey is both a European country, an Asian country, a Mediterranean country, a Middle Eastern country, and a Caucasian country at the same time. This geographical location is of vital importance in many areas such as geopolitical, geostrategic, commercial, cultural interaction, and transportation between the Middle East, Central Asia, Europe, and North Africa.

3.1.2. Population

Turkey's population in 2020 is 83,614,362 people, the majority (92 percent) living in provincial or district centers. Turkey's population has not only increased in recent years but has also begun to shift towards urban centers. Urbanization in Turkey is primarily the result of internal migration, which tends to follow a pattern of movement from the eastern parts of the country to the "more densely [populated] and economically developed Western regions", although there are some eastern provinces experiencing positive migration. Migration from rural to urban areas in a given area is also common. Turkey's population has been shaped by complex migration patterns, not only rural to urban migration and migration from Turkey, but also a large post-conflict refugee population.

As the population increases day by day in the world and in Turkey, the need for natural resources such as nutrition, shelter, clean water resources and especially agricultural resources is increasing day by day. In order to meet the food requirement due to the increasing population, it is necessary to increase the productivity in agricultural production. However, the uneven distribution of agricultural resources around the world, excessive consumption, wrong agricultural policies have paved the way for more serious problems in terms of agricultural resources.

3.1.3. Morphology

Turkey is a country that is quite diverse in terms of its physical geographical conditions. Turkey is a geographical location with long-distance mountain ranges with an average elevation of more than 1000 m, generally high slope values. It has the characteristics of a field where different climatic characteristics are seen under the influence of these conditions, soil diversity is high and water resources are not evenly distributed. The eastern parts of our country show a high topographic feature. Here, the surface is fragmented by the river network, allowing the formation of deep valleys, while the highest points of the country are also located in this region. Plains, one of the topographic units commonly encountered in our country, are the most important areas in terms of agriculture, although they take up little space in general area. Almost all of the plain types expressed with

concepts such as delta plains, coastal plains, valley flood plains, flood plains, tectonic depression plains, foothill plains, old lake bottom plains, and karst plains are located in our country. While a wide variety of agricultural life is observed in our country from the coasts to an altitude of 500-600 m, from this altitude to the 2000 m altitude line, agricultural activities gradually weaken, the variety is lost and the amount of yield decreases. On the other hand, in the altitude levels after 2000 m, a type of economic activity based on animal husbandry emerges with products such as barley and rye.

3.1.4. Rivers Basins

DSI has divided Turkey into 26 basins in terms of drainage areas in order to study the problems related to water resources development on a large scale. The total annual average flows of the basins are 186 billion m^3. Since the annual precipitation is not the same in each of the hydrological watersheds, their yields and water potentials are also different. The Euphrates Basin has the highest water yield with 31.61 billion m^3. The Tigris Basin ranks second with 21.33 billion m^3. The Euphrates and Tigris Basins constitute approximately 28.5% of the total water potential of the country. Akarçay (Afyon) Basin with 0.49 billion m^3 and Burdur Lake Basin with 0.50 billion m^3 are the basins with the lowest water potential .According to the Right to Water Report of the Chamber of Civil Engineers, Water Working Group (2009), the annual amount of technically and economically usable water per capita in Turkey is 1430 m^3. According to these figures, Turkey is a country that suffers from water stress. Again, according to this report, 40 billion m^3 (36%) of the 112 billion m^3 water potential can be utilized, while the rest cannot be used efficiently. Two criteria determined for the water sector of the Environment chapter of Turkey within the scope of full membership negotiations with the EU are harmonization of water legislation and preparation of River Basin Management Plans (RBMP). The Water Framework Directive was harmonized with the "Regulation on Preparation, Implementation and Follow-up of Basin Management Plans" published on 17.10.2012 and the preparation of the RBMP has begun.

3.1.5. Lakes

Turkey has a very rich structure in terms of lakes compared to its neighbors. Even if temporary ponds and marshes are not taken into account, the number of permanent lakes reaches 300 and their total area reaches the width of the Marmara Sea. This total area is 9,861 km^2 and constitutes 1.2% of the country's surface area. However, it should be noted right away that all these lakes and wetlands in our country are about 1/8 of Lake Chad in Africa or Lake Superior in the USA. In our country, the number of lakes exceeding 1,000 hectares reaches 60.

3.1.6. Climate

Turkey is located between the temperate zone and the subtropical zone. The fact that Turkey is surrounded by seas on three sides, the length of the mountains and the diversity of landforms have led to the emergence of different climate types. In the coastal regions of our country, more temperate climatic features are seen with the effect of the seas. The North Anatolian Mountains and the Taurus mountain range prevent sea influences from entering the interior. Therefore, continental climate characteristics are seen in the inner parts of our country. Based on the criteria used in climate classifications made worldwide, Continental, Mediterranean, Marmara (transitional) and Black Sea climate types can be distinguished in our country.

Due to the socio-economic importance of the agriculture and food sectors, it is essential today to evaluate the impact of future climate change on crop productivity and food security. In other words, since agriculture and food are the sectors that will be most affected by climate change in the future, the measures to be taken in agricultural production are important in terms of ensuring food security as well as not adversely affecting the economy in Turkey. According to the IPCC Reports, the

characteristics of climate change should be well understood in order to formulate better policies and strategies in agriculture in Turkey, which is located in a geography that is most affected by climate change. For example, insufficient rainfall is known as the most important factor limiting agriculture and water resources. The necessary policies and strategies to increase sustainable food production and water resources can only be established by knowing the characteristics and future status of this parameter in the best way.

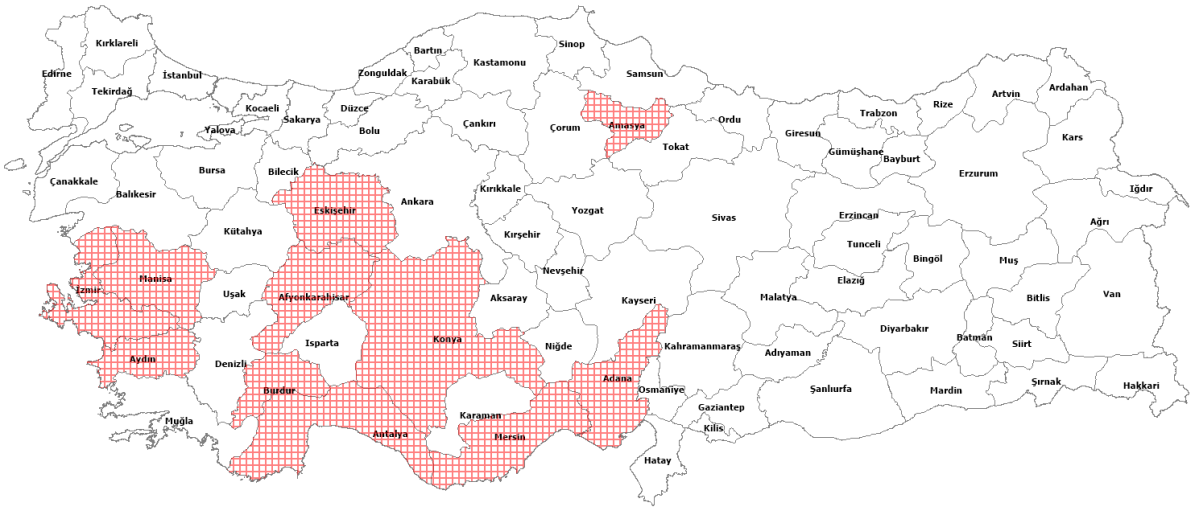
3.1.7. Biodiversity

Three of the seven biogeographically regions in the world, elements of the Mediterranean, European Siberia and Irano-Turanian regions are found in Turkey. Each biogeographic region has its own unique ecosystems. The largest forest in the world of the cypress, one of the Mediterranean elements, is located here. The Euro-Siberian element consists of Black Sea forests, including Alpine meadows. Due to the fact that Turkey is a bridge between continents, its climate and geographical features change in short distances. As a result, Turkey is a small continent in terms of biodiversity with its forest, mountain, steppe, wetland, coastal and marine ecosystems, their different forms and combinations. This extraordinary diversity of ecosystems and habitats also includes significant species diversity. Turkey's fauna diversity is rich in comparison with temperate zone countries. Invertebrates, mostly insects, are the living group with the most species, with 60 000-80 000 species. The Mediterranean Region is the place with the highest plant diversity in Europe. Turkey is one of the richest countries in the world in terms of plant species diversity with 167 families, 1320 genera and 9 996 species. Turkey is one of the few self-sufficient countries in the world in terms of food production. Fertile soils, suitable precipitation and climatic conditions provide opportunities for the cultivation of all kinds of crops.

3.1.8. Endemism

The endemism rate of the flora of Turkey is 31.8%, and many species are added to it every year. The richest family in Turkey in terms of endemic species is Asteraceae (Daisygiller) with 572 endemic taxa, followed by Fabaceae (Legumes) with 385 taxa and Lamiaceae (Ballıbabagiller) families with 326 taxa. There are also 14 endemic genera in Turkey. Some of the 3649 endemic plant taxa in Turkey are relatives of cultivated plants that feed the world. For example, some field crops (wheat, barley, rye, oats, flax, lentils, chickpeas, and peas), pasture crops (clover, sainfoin, vetch, and grass forage crops) and garden crops (cherry, apricot, plum, almond) , figs and grapes) can be listed. The extraordinary number of the world population, imposes a great responsibility on Turkey in terms of ensuring that they are protected before they become extinct.

3.2. Baseline of the Project Areas



3.2.1. Adana

Adana is situated on the south of Turkey with a population of 2.258.718 in 2020. Adana is located at the northeastern edge of the Mediterranean, where it serves as the gateway to the Çukurova plain, which has historically been known in the West as the Cilicia plain. This large stretch of flat, fertile land lies southeast of the Taurus Mountains. From Adana, crossing the Çukurova westwards, the road from Tarsus enters the foothills of the Taurus Mountains, eventually reaching an altitude of nearly 4.000 m. It goes through rocky Gülek Crossing and continues to the Anatolian plain. The north of the city is surrounded by the Seyhan reservoir. The Seyhan Dam, completed in 1956, was constructed for hydroelectric power and to irrigate the lower Çukurova plain. Two irrigation channels in the city flow to the plain, passing through the city center from east to west. There is another canal for irrigating the Yüreğir plain to the southeast of the city.

Adana has a Mediterranean climate with very hot summers and cool winters. Frost does occasionally occur at night almost every winter, but snow is a very rare phenomenon. Summers are long, hot, humid and dry. During heat waves, the temperature often reaches or exceeds 40 °C.

Annual average precipitation is 681 mm. The dominant wind directions are north and northeast in winter, south in March and September, and southwest in June, July and August. North and northeast winds (Yıldız and Poyraz) are dry and do not bring precipitation. However, especially in the winter months, they reduce the temperature of the air perceptibly. Lodos, blowing from the southwest, brings rain and coolness in summer. According to the seasons, in summer, the lands are under thermal low pressure and the seas are in thermal high pressure, in winter the lands (Taurus) create dynamic high pressure and the seas create thermal low pressure. Therefore, the dominant winds blow from two opposite directions.

The agricultural potential of the Adana and its surroundings is of great importance in the rapid population and spatial development of the city. In addition to the sloping and fertile agricultural lands, the high irrigation opportunities make the field more attractive from an agricultural point of view. In the area where the Mediterranean climate is dominant, the warm winters make it possible to get products from the soil in the winter season. Therefore, the climate of the Adana can be considered as another potential that will increase agricultural productivity.[12]The lands that are not suitable for agriculture within the borders of the central district are concentrated in the north and northeast, far away from the city area. Thus, Seyhan and Ceyhan rivers and dams built in the region have significantly increased agricultural yields.

Thanks to the irrigation project in Adana, the cotton and corn production area in Cukurova expanded rapidly. The need for intensive labor during the collection of cotton has been one of the factors that accelerated migration. In addition, the high winter temperatures and the scarcity of frost events facilitated both the increase in greenhouse activities and the cultivation of citrus fruits. Thus, it is possible to purchase at least two products during the year. Such advantages have led to the rapid opening of arable lands to production and thus to seasonal and permanent migrations. These migrations, which are mostly seasonal at first, became permanent over time. As a result, fertile soils, suitable climatic conditions, and irrigation facilities enable some agricultural products, which play an important role in Turkey's domestic and foreign trade, to be grown in Adana city and its immediate surroundings. Thus, due to these advantages, Adana has been an important agricultural center and therefore it has become a region that constantly receives migration. This situation accelerated the population growth and spatial development of the city.

Adana is an industrialized city where large-scale industry is based mostly on agriculture. Food processing and fabricated metal products are the major industries constituting 27 percent of Adana's manufacturing. The largest company in Adana, Temsa Global, an automotive manufacturer, has more than 2,500 employees and manufactures 4,000 buses annually. Marsan- Adana is the largest margarine and plant oil factory in Turkey. Advansa Sasa is Europe's largest polyester manufacturer. Organized Industrial Region of Adana has an area of 1,225 hectare with 300 plants, mostly medium-scale.

According to the activity report of ASKI, in 2020, 597 km potable water pipeline and 76 km stormwater and sewage collectors were implemented in 14 district municipalities in order to improve the infrastructure services.

A summary of the disaster and climate risks of Adana provided by the World Bank and GFDRR *Think Hazard* website, shows that Adana has high hazard ratings for river and coastal flood, landslide, extreme heat and wildfire. Earthquake, urban flood, tsunami and volcano is rated moderate

3.2.2. Afyonkarahisar

Afyonkarahisar spans over three of Turkey's geographical regions (Aegean, Mediterranean, Central Anatolia). Most of it is located in the Inner West Anatolian part of the Aegean region. The population of the province is 736.912 in 2020.

The city is bordered by Konya in the east, Uşak in the west, Kütahya in the northwest, Denizli in the southwest, Burdur in the south, Isparta in the southeast and Eskisehir in the north. Mountains constitute 47.5% of Afyonkarahisar province land, plateaus 32.6% and plains 19.9%.

Afyonkarahisar, Çay and Bolvadin plains stretch from the northwest to the southeast of the province. Although the city is very high from the sea, it has plenty of water resources. Half of Akşehir Lake is in Afyonkarahisar. Just to the west of this lake, which is 990 meters above sea level, there is Eber Lake, which is entirely within the borders of the province. Capalı lake in the southwest, Karamık lake and Acıgöl, which it shares with Denizli, are other important lakes.

Livelihoods of people residing in Afyon province is generally based on agriculture and animal husbandry. Along with seasonal vegetable production, fruit production is also carried out to a large extent. Vegetable production is dominant in areas where irrigated agriculture is possible. On the other hand, grain production is carried out in large quantities according to climatic conditions and soil characteristics. In addition, industrial plants such as poppy, sugar beet, potato, and sunflower are also grown.

In Afyon, where traditional animal husbandry has decreased and modern animal husbandry has begun to increase, meat and meat products production has improved. In the field of livestock, Afyonkarahisar has a higher potential than neighboring provinces. Dairy cattle breeding, small and large cattle breeding, beekeeping and poultry farming are existing.

Afyonkarahisar has a temperate continental climate with warm summers and cool winters. Rainfall occurs mostly during the spring and autumn. Annual average precipitation is 451 mm.

A summary of the disaster and climate risks of Afyon provided by the World Bank and GFDRR *Think Hazard* website, shows that Afyon has high hazard ratings for river flood, landslide, earthquake and wildfire hazard. Urban flood and extreme heat is rated moderate.

3.2.3. Amasya

Amasya is situated between the Black Sea and inner Anatolia in a region of fertile plains irrigated by the Tersakan, Çekerek and Yeşilırmak rivers, Amasya lies in a beautiful narrow river valley, bounded by almost vertical cliffs and the high peaks of the Canik and Pontus mountains. Population of the province is 335.494 in 2020.

Amasya has a temperate marine climate with hot summers and cool winters. It has a transitional climate between the oceanic climate of the Black Sea and a continental and Mediterranean climate. However, this narrow valley causes Amasya to have a temperate climate. This effect is due to the Yeşilirmak river that moderates its climate.

The region's valley structure and this valley structure provide a temperate climate for many fruits growing. Agricultural products of the city mostly consist of products like apple, cherry, okra, onion, poppy seeds, lentil, bean and peach. In additionally, agro-based industries have an important place for the local economy. Sucrose, dairy products, egg, sunflower oil, provender, flour, yeast are major agro-based industries in Amasya.

Other economic activities in the region include mining, textiles and cement manufacture. Most part of the city's economy comes from agriculture and agricultural products likewise, greenstuffes and fruit production are also important incomes for the Amasya's economy. Villages have economically concentrated relations with districts of Amasya. In recent years, electrical machine production and household tools, algiculture and woodcraft machines, textile and food industry was developed in the Merzifon district of Amasya.

A summary of the disaster and climate risks of Amasya provided by the World Bank and GFDRR *Think Hazard* website, shows that Amasya has high hazard ratings for river and urban flood, earthquake, landslide and wildfire hazard. Extreme heat is rated moderate.

3.2.4. Antalya

Antalya is situated in Anatolia's southwest coast bordered by the Taurus Mountains, which is the largest Turkish province on the Mediterranean coast outside the Aegean region with the population of 2.548.308.

Antalya has a Mediterranean climate with very hot summers and cool winters. It experiences hot, dry summers and mild, rainy winters. While rainy spells are common and often heavy in winter, Antalya is very sunny, with nearly 3,000 hours of sunlight per year.

In Antalya, where more than 400 ancient cities and historical artifacts are located, only the ancient city of Xanthos is on the permanent list of UNESCO World Heritage list and 9 sites in the city have been on the temporary list for 25 years.

Antalya region is on the shores of Mediterranean Sea and situated in the gulf bearing the same name, in the south of Anatolia peninsula. The southern edge of Antalya gulf is open with the other three edges being surrounded by very steep and thickly wooded mountains which start almost from the sea and reach a considerable altitude in a short distance to the Mediterranean. Bey mountain group extends to the west of the Antaya gulf and Toros Mountain is located to the north and north east. At some sites the rivers descending from these mountains formed short but deep canyons. The best known canyons are Koprulu Kanyon (Canyon with Bridge) and Guver Kanyonu (Guver Canyon). From west to the east the most important among these rivers are: Goksu, Candir, Duden Stream, Aksu (Kestros), Koprucay (Eurymedon), Manavgat (Melas), Alara and Kargi Stream. On some of the rivers of Antalya region waterfalls have formed to exhibit extraordinary beauties of nature such as Manavgat, Kursunlu, Lower and Upper Duden etc.

There are 25 dams in Antalya as stated in General State of Hydraulics database, such as Oymapinar and Karacaoren. The high mountains except the southern edge, protect the region against the cold weather events. The presence of the rivers and this tepid and warm climate have created the plains which are very suitable sites for agriculture.

Climate conditions which are very suitable have provided the region with a perfect flora. Mountains which are very steep surrounding the whole Antalya Gulf are covered with cedar forests which descend to the sea in some places. The feet of mountains are covered with maquis (the plant species peculiar to Mediterranean region). The watery plains covered with alluvion host the cultivation of many different types of vegetables and fruits, especially citrus fruits. In the region agriculture, Floriculture also has an important place. Also the fruits like kiwi and banana, which may be cultivated only in tropical countries, have been observed to adapt to the region’s climate and their cultivation has been started on a large scale. The fact that there is no frost and snow during the winters has made it possible for the greenhouses to become widespread in the region.

The province has 1.6% of the collectively arable and arable areas in Turkey. However, the contribution of the province in terms of agricultural production value (4.3%) is greater. The agricultural sector, which has experienced a process parallel to the rapid development of the city in the last five years, has also undergone profound changes in its own structure. With 1997 values, the contribution of trade to the province's GDP is 33.2%, 19% of agriculture, and 5.6% of the industry. In the region where intensive agriculture is practiced, it is very important to create employment as well as production income. Agricultural production structure of the province; It draws attention in terms of diversity in production and production for the market. Antalya province is among the most important citrus growing provinces in Turkey and takes first place in orange production with a share of 30%. On the other hand, 80% of the glass greenhouse area in Turkey and 50% of the plastic greenhouse area is located in Antalya. Again, the province of Antalya is the center with its 90% share from the cut flower production for the foreign market. Wheat and cotton products have been dominant in the agricultural production pattern of the Antalya region for years. However, there has been a significant decrease in cotton production in recent years. Cotton cultivation in the province, which had an area of around 40,000 hectares in the past, decreased to 15,000 hectares in 1998. It is reported that this is mainly due to the fact that the net profit obtained from cotton has decreased compared to previous years.

Antalya makes the biggest contribution to Turkey's animal husbandry with the presence of small cattle. Due to the land structure of the province, the hair goat takes the largest share in animal existence. Hair goats and sheep breeding, partly dairy cattle breeding, in the highland areas, dairy cattle breeding, and poultry are gaining weight.**Hata! Yer işareti tanımlanmamış.**

A summary of the disaster and climate risks of Antalya provided by the World Bank and GFDRR Think Hazard website, shows that Antalya has high hazard ratings for river, urban and coastal flood, landslide, extreme heat and wildfire. Earthquake and tsunami is rated moderate

3.2.5. Aydın

Aydın is located in the Aegean Region, in the south-west of Turkey with a population of 1.119.084.

The central and western parts of the province are fertile plains watered by the largest river in the Aegean region the Büyük Menderes River, with the Aydın Mountains to the north and the Menteşe Mountains to the south. The western end of the province is the Aegean coast with Lake Bafa a major feature of the Menderes delta area. Aydın has a Mediterranean climate with very hot summers and cool winters. The Germencik region contains a number of hot springs.

Aydın Mountains are located in the north of Aydın province, which is located on the Büyük Menderes Basin and has a surface area of 8007 km^2, and there are Menteşe Mountains in the south, and the middle and western parts are fertile plains. Agriculture is carried out in 46% of Aydın, which is established on an area of 800,700 hectares on the fertile plains irrigated by the Büyük Menderes River.

Aydın, which has suitable ecological features, landform, and climatic conditions, has a strong agricultural potential. Soils that can be produced in four seasons in the field of agricultural cultivation are suitable for polyculture agriculture. In Aydın, whose industry is mainly for processing agricultural products, 55% of the population earns their living from the agricultural sector. Aydın, which is the first order in fig and chestnut production in our country; ranks second in olive, cotton, artichoke, and strawberry production and third in peanut production. Agricultural products such as fresh vegetables and fruits, canned olives, canned tomatoes, tomato paste, processed figs produced in Aydın, and agricultural machinery produced within the scope of industrial products have an important potential in the domestic market and export. Among Aydın's 368,336 hectares of agricultural land, fruits, beverage, and spice crops occupy the largest area with 216,657 ha and 59% share. 313,632 hectares of the remaining lands are forest, 25,242 hectares of meadow-pasture, 14,950 hectares of lake-swamp, and 78,540 hectares of agriculture. The herbal products that create the most added value in our province are figs, olives, cotton, and chestnuts.

Also, it has been determined that greenhouse cultivation still maintains its traditionalism in Aydın region, although environmentally friendly production techniques have gained importance and sensitivity has increased, our producers do not have enough knowledge on this subject.

The city of Aydın has a number of antique ruins and Ottoman period mosques. The province's countryside and scenery include a stretch of the Aegean coast and a number of historic sites.

Aydın Water and Sewage Administration is working actively to improve municipal services all around the city. According to the 2020 activity report; almost 283 km potable water, 18 km stormwater and 64 km sewage collectors were constructed in addition to many water utilities, such as pumping stations and storage tanks and ongoing treatment plant constructions.

A summary of the disaster and climate risks of Aydın provided by the World Bank and GFDRR Think Hazard website, shows that Aydın has high hazard ratings for river and urban flood, landslide, earthquake and wildfire. Coastal Flood, tsunami and extreme heat is rated moderate

3.2.6. Burdur

Burdur is situated in the inner part of the Mediterranean Region and in the region called Lakes Region, in the transition area from the Mediterranean Region to the Aegean and Central Anatolian

Regions. Burdur is surrounded by Antalya in the South, Denizli in the West, Muğla in the Southwest, Isparta and Afyon in the East and North. Population of the province is 267.092. The area of the province is 7.176 km² and its altitude is 950 meters. 60.6% of the provincial land is mountainous, 2.7% is plateau, 19% is plain and 17.6% is rough. Soils generally have a clayey and calcareous structure.

Karataş, Salda, Sıralı, Gölhisar and Burdur Lakes formed in the pits have caused this region to be called the Lakes Region. The highest point is Koçaş Mountain with a height of 2598 meters.

The temperate marine climate prevails in Burdur, with hot summers and cool winters.

Burdur Lake, located in the city center of Burdur, is the seventh largest lake in Turkey in terms of surface area and the third largest among salty lakes. It is among the deepest lakes of Turkey.

Burdur Lake sub-basin is one of the most important habitats of our country in terms of bird species. More than 200 bird species have been identified in the studies carried out. Especially in the autumn and winter months, there is a significant increase in bird species and an enormous natural beauty emerges. Additionally, Salda Lake, known as Turkey's Maldives, one of the clearest lakes in the world with its unique turquoise tones and white beaches.

The economy of Burdur is mainly based on agriculture and animal husbandry. It is one of the leading provinces with its dairy cattle breeding, breeding heifers and milk production. 26,566 enterprises operating in Burdur deal with agricultural and animal husbandry activities. These families; In terms of its field of activity, 15% grows herbal products, 15% grows animals and 70% carries out both vegetative production and animal husbandry. Additionally, fruits such as cherry, plum, apple, peach and pear as agricultural products within the borders of Burdur; Vegetable production such as tomato, pepper, eggplant are also made.

A summary of the disaster and climate risks of Burdur provided by the World Bank and GFDRR *Think Hazard* website, shows that Burdur has high hazard ratings for river and urban flood, earthquake, landslide and wildfire hazard. Extreme heat is rated moderate.

3.2.7. Eskişehir

Eskisehir is situated in the north-west of Turkey with a population of 888.828. The city is located on the banks of the Porsuk River, 792 m above sea level, in the nearby hills one can find hot springs. Known as a university town, both Eskisehir Osmangazi University and are based in Eskisehir. The province covers an area of 2,678 km2.

Eskisehir has a temperate continental climate with warm summers and cold winters. The city features cold, snowy winters and warm, dry summers. Rainfall occurs mostly during the spring and autumn. Due to Eskisehir’s high altitude and its dry summers, nightly temperatures in the summer months are cool. Precipitation levels are low, but precipitation can be observed throughout the year.

Eskisehir province area covers the Sakarya River and Porsuk and Sarısu Streams basins. The rivers have formed very wide plains by piling up the materials they carry from the high parts of the basins to the low parts. The share of the plains in the total area of the province is around 26%. A normal topography consisting of plains, mountains surrounding the plains and plateaus is seen in Eskisehir. There are 5 dams within the border of the city such as Porsuk and Sarıyar. In addition to the surface waters, there are many thermal water sources as well as groundwater.

The Central Anatolian steppes, North Anatolian and Western Anatolian forests form the vegetation of Eskisehir. On the southern slopes of the Sundiken Mountains overlooking the Porsuk Valley, oak

bushes and then dwarf oaks can be seen above 1000 meters. Black pines, Red pines Scotch pines and High oaks are also seen among the pine forests. There is no forest in the plateaus and Cifteler Plain in the south of Eskisehir, but there are characteristic steppe plants.

A summary of the disaster and climate risks of Eskisehir provided by the World Bank and GFDRR *Think Hazard* website, shows that Eskisehir has high hazard ratings for river and urban flood, landslide and wildfire hazard. Earthquake and extreme heat is rated moderate

3.2.8. Izmir

İzmir, is located in the west of Turkey and is the third largest province of the country with a population of 4.394.694. The city is under the risk of natural disasters as earthquake, flood, landslide and rock falls. Due to the tectonic regime in Western Anatolia, there are many fault lines in the immediate vicinity that threaten the city. There is a fault line known as Izmir fault along the metropolitan area.

İzmir has a Mediterranean climate with very hot summers and cool winters. The average yearly precipitation is quite ample, at 730.5 mm however, the vast majority of the city's rainfall occurs from November through March, and there is usually very little to no rainfall from June through August, with frequent summer droughts. Maximum temperatures during the winter months are mostly between 10 and 16 °C. Although it is rare, snow can fall in İzmir from January to February, with a record 32 cm of snow depth recorded on January 31, 1945. During summer, the air temperature can climb as high as 40 °C from June to September; however, the high temperatures are usually between 30 and 36 °C.

İzmir is also a city of different nations and tolerence, where different cultures, life styles and religious beliefs (Muslims, Christians, Jews, Armenians, People with Greek roots) have been living together in peace for thousands of years.

İzmir is located on a land with the heritage of many civilizations lived in history, some of which still remain unearthed. These historic cities include Tepekule (Bayraklı), Symrna, Efes, Pergamon (Bergama), Teos (Sığacık), Lebedos (Ürkmez), Kyme (Aliağa), Allianoi (Yortanlı), Thyrea (Tire), Phokaia (Foça), Kolophon (Değirmendere), Erythrai (Çeşme), Klazomenai (Urla), Metropolis (Torbalı), Claros (Ahmetbeyli) and Myrina (Aliağa).

İzmir has a geography surrounded by Madra Mountains and Balıkesir provincial border in the north, Kuşadası Gulf and Aydın provincial border in the south, Çeşme Peninsula and İzmir Gulf in the west, and Manisa provincial border in the east. Within the borders of the city, there is the lower branch of Gediz river, which is one of the most important rivers in Aegean Region and also Kucuk Menderes and Bakırçay are active rivers.

Gediz River has its source from the Mountain of Murat, which is in Central Western Anatolia. Its total length is 400 km. Kemalpaşa Stream, which has its source in the Yamanlar Mountain within İzmir provincial border, is one of the most important branches of Gediz River. Gediz arrives İzmir provincial border on the western edge of Manisa plain and completes its journey to the Aegean Sea in the south of Foça after passing through Menemen Channel which is located between Yamanlar Mountain and Dumanlı Mountain.

Kucuk Menderes River has its source in Boz Mountains. Its length is 124 km. It waters a very fertile plain known with the same name and then arrives the Aegean Sea on the west of Selçuk district. Together with the alluvial deposit brought by Kucuk Menderes, shore line continuously went farther

in history and as a result, one of the most important port cities in history, Efes was left 5-6 km far from seacoast.

Bakırçay River consists of the branches coming from Ömerdağ Mountain in the east, Madra Mountain in the north, Yunt Mountain in the south and it has a length of 128 km. It is the most important river of Bakırçay Basin, which is a part of Aegean Basin and located in İzmir provincial borders for the most part of it. It arrives the Aegean Sea at Çandarlı Gulf.

Landforms of İzmir province is a result of geologic events of rather recent times. Subsidence plains and alluvial deposit plains located between mountains lying on east-west line, form the main outlines of the landforms. On the farthest north of the province there is Madra Mountains. These mountains, having an altitude of more than 1250 m, form a significant height between Burhaniye-Havran Plains on their north and Bergama Plain on their south. Some parts of these mountains reach towards southwest to Altınova and Dikili and arrive to the seashore by descending to the plains. Southwestern edge of Madra Mountains is known as Geyiklidağ on the west side of Bergama district. Here its altitude reaches 1061 m.

Izmir is located in the Kusuc Menderes River basin. While the majority of the basin is formed by İzmir, 5% of the area is composed of Aydın and Manisa. Küçük Menderes Basin consists of 6 sub-basins: Çeşme-Karaburun, İzmir Bay, Tahtalı-Seferihisar, Aşağı Menderes, Upper Menderes, Kuşadası. The sub-basins are as follows: Bayındır-Torbalı Sub-Basin, Selçuk Sub-Basin, Ödemiş-Tire Sub-Basin and Kiraz Sub-Basin.

Due to the rapidly growing population, urbanization and pollution caused by humans, Izmir's ecosystem is in danger. Since people are also part of the ecosystem, the negative impacts will affect health of them. For example, changes in the physical parameters of Izmir Bay, such as temperature, pH, decrease of water flow, overgrowth or decrease of some species, can cause chain problems in ecosystem which may affect human health negatively by causing the reproduction of toxins or spreading disease factors. Besides that, pollutant factors may interfere with food, drinking water or air and adversely affect public health.

A summary of the disaster and climate risks of Izmir provided by the World Bank and GFDRR *Think Hazard* website, shows that Izmir has high hazard ratings for river, coastal and urban flood, landslide and wildfire. Earthquake, tsunami and extreme heat is rated moderate.

3.2.9. Konya

Konya is located in the south of the Central Anatolian Region. Most of its lands are on the high plains of Central Anatolia. The southern and southwestern parts are included in the Mediterranean region. The population of the province is 2.250.000.

Its area is 38,873 km2 (excluding lakes). With this area, it is the province with the largest surface area of Turkey. Its average altitude is 1,016 m. Konya province, Haymana Plateau in the north, Cihanbeyli Plateau and Salt Lake in the northeast, Beyşehir Lake and Akşehir Lake in the west, and starting from the Sultan Mountains in the south to the south of Karaman province, it was formed along a fault line in front of the inner slopes of the Taurus arc. It extends to the volcanic mountains and to the Obruk plateau in the east. In Konya and its surrounding Çumra, Ereğli, Cihanbeyli, Akşehir, Yunak plains, there is groundwater between 20-100 meters and in some places this water becomes artesian. The landform with the largest area in Konya is plains and plateaus. Closed basins were formed in the pits located at the bottom of the plains.

Temperate continental climate prevails in Konya. Summers are hot and winters are cold. The temperature difference between night and day is between 16-22 degrees in summer. In spring and winter, this difference decreases to 9-12 °C due to humidity. Snow stays on the ground for an average of 3 months.

It is very affected by the hot-cold air centres around it. Although it is located in the southernmost region of Central Anatolia, it is colder than other Central Anatolian cities. The reason for this is that the middle Taurus completely avoids the sea effect.

There are mostly seasonal and flood regime streams within the borders of Konya province. Streams in the region are fed by snow and rain water. Since the precipitation regime in Konya is irregular, the regime of these rivers is also irregular.

Salt Lake is located within the borders of Konya province. It is the second largest lake in Turkey in terms of area. Its depth is around 12 m. In summer, its area is considerably smaller due to the effect of evaporation. Salt deposits occur in the dried sections. A part of Turkey's salt need is supplied from here. It cannot be used for irrigation and aquaculture. In addition to Salt Lake there are many lakes such as Beysehir, Sugla and Ilgın, etc.

Konya has rich underground water. But many boreholes have also been drilled, generally for agricultural purposes. The annual precipitation varies from 280 mm to 350 mm in most parts but the rainfall amount don’t have uniform distribution. It is the special region due to having agricultural drought. Recently, the increase of the cultivated land used for high water consumption in Konya plain, transition to the new crop cultivation such as maize and senseless water uses have accelerated the excess water uses. This situation has resulted water level depletion in groundwater so that hydrological drought has observed in Konya basin. The irrigated agriculture results in two fold more irrigation water uses than amount of groundwater potential allocated safely uses under present conditions. The utilization of water in agriculture is 92.2% under present conditions at basin.

A summary of the disaster and climate risks of Konya provided by the World Bank and GFDRR *Think Hazard* website, shows that Konya has high hazard ratings for river flood, landslide and wildfire hazard. Urban flood, earthquake, volcano and extreme heat is rated moderate.

3.2.10. Manisa

Manisa is a large city in Turkey's Aegean Region and a booming center of industry and services, advantaged by its closeness to the international port city and the regional metropolitan center of İzmir and by its fertile hinterland rich in quantity and variety of agricultural production. The population of the province is 1.450.616.

Manisa has a Mediterranean climate with very hot summers and cool winters. Summers in Manisa are hotter than their western neighbor İzmir, while winters are colder due to its inland location. Snowfall, while fairly uncommon, does accumulate most winters.

Manisa has a lot of plains nearly % 38 of the land is productive in agriculture. The most productive areas are Gediz, Bakırçay, Alaşehir, Salihli and Turgutlu plains located around the rivers Gediz and Bakırçay. The city is well known for its olives, grapes, pistachios and corn. Modern Manisa is also a booming center of industry and services, advantaged by its closeness to the international port city and the regional metropolitan center of İzmir and by its fertile hinterland rich in quantity and variety of agricultural production.

The variety in soil, climate and environmental conditions of Manisa is also reflected in the vegetation. The fact that the mountain masses cut off the effect of the sea causes the Mediterranean climate

and terrestrial climate plant species to be intertwined. 46% of Manisa province lands are covered with forests and maquis. Covering a large area, maquis are located on the northern and western slopes of the mountains. The forests consist of oak, ash, elm, larch, red pine, juniper, wild pine and plane tree. Forests are generally found at altitudes above 1000 meters. (It covers a large area in vineyards and olive groves) 39.1% of the province's lands are cultivated and planted land, 6.6% are meadows and pastures, 8% are unsuitable for agriculture.

A summary of the disaster and climate risks of Manisa provided by the World Bank and GFDRR *Think Hazard* website, shows that Manisa has high hazard ratings for river flood, earthquake, landslide and wildfire hazard. Urban flood and extreme heat is rated moderate.

3.2.11. Mersin

Mersin is a large city and a port on the Mediterranean coast of southern Turkey which is an important hub of Turkey's economy, and Turkey's largest seaport is located in the city. The population of the province is 1.868.757.

The land border of the province is 608 km, the sea border is 321 km, and its surface area is 15,853 km2. The western and central Taurus Mountains constitute a large part of Mersin province, which are quite high, rugged and rocky. Plain and gently sloping areas have developed in areas such as the city center, Tarsus, and Silifke, where these mountains extend towards the sea. Apart from this, plain or slightly sloping areas are seen in the north between the mountains or in their high parts. Mersin constitutes approximately 2% of Turkey's total surface area with an area of 1,585,300 hectares. The land of the province is 21% agricultural land, 4% meadow and pasture, 52% forest land and 23% as non-agricultural land. 12% of Turkey's total fresh fruit production, 61% of banana production, 35% of strawberry production and 53% of lemon production are carried out in our Mersin province.

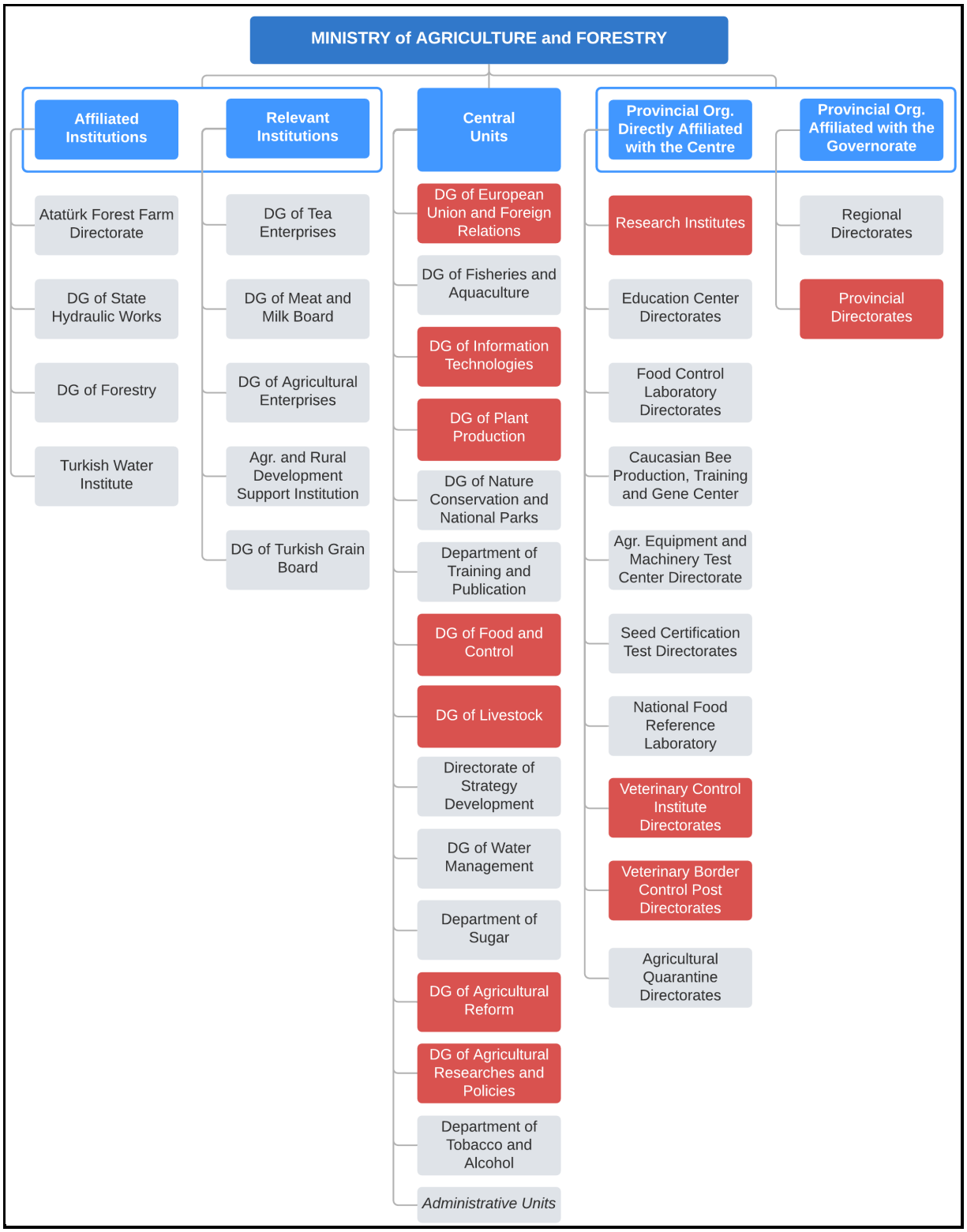
Mersin has a Mediterranean climate with very hot summers and temperate winters. The annual average precipitation is 615 mm.

The Port of Mersin is the mainstay of city's economy. The port is an international hub for many vessels routing to European countries. There are 45 piers, a total port area of 785,000 square metres with a capacity of 6,000 ships per year. Adjacent to the port is Mersin Free Zone established in 1986, the first free zone in Turkey, with warehouses, shops, assembly-disassembly, maintenance and engineering workshops, banking and insurance, packing-repacking, labelling and exhibition facilities. Additionally, Turkey’s first nuclear power plant is being constructed in Akkuyu that is located in 80 miles west of Mersin.

4. Institutional Framework

Responsibility for overall project management and coordination will lie within the Ministry of Agriculture and Forestry (MoAF), through its General Directorates. The organization chart of MoAF is given in Figure 1, showing the units that will have a role in the Project in red rectangles.

Figure 1: Organization chart of MoAF



The General Directorates that will take place in the Project as Implementing Units, their responsibilities according to Presidential Decree no.1 on the Presidential Organization within the scope of the Project, and the subcomponents that they will implement are given in Table 2.

Table 2: Responsibilities of General Directorates

General Directorate	**Legislative Responsibilities within the Scope of the Project**	**Institutional Responsibilities within the Project**

General Directorate	Legislative Responsibilities within the Scope of the Project	Institutional Responsibilities within the Project
Directorate General of Agricultural Reform (TRGM)	• Prepare, implement and monitor programs for the creation of a competitive agricultural sector, the development of physical potential, environment and land, the improvement of the quality of life and economic diversity in rural areas, and the creation of local rural development capacity, • Increase the knowledge level of the producers; to allow the establishment of cooperatives, unions and other producer organizations; to supervise and support cooperatives, unions, chambers, producer organizations and their affiliates; to take the necessary measures to conclude their actions and transactions in accordance with the law, • Determine the establishment principles of soil and irrigation water analysis laboratories; to analyze land, soil, water resources and to classify soil, land and water, • Carry out studies for the purpose of determining policies and strategies on agricultural mechanization, to prepare plans and projects and to ensure that they are put into practice, to carry out the necessary studies for raising the level of agricultural mechanization, • Establish and operate the farm accounting data network, • Collect agricultural data and create statistics, • Operate the integrated administration and control system, • Increase productivity in agricultural irrigation, to ensure the use of appropriate irrigation techniques, to protect soil resources, • Perform the duties assigned by the Law on Soil Conservation and Land Use, dated 3/7/2005 and numbered 5403, • Work and make proposals on the support to be given to the agricultural sector and rural areas.	Lead the implementation of • Subcomponent 1.1: Narrowing information gaps to enhance soil health and land-use planning/management • Subcomponent 3.2: Promoting the adoption of climate-smart agricultural technologies/practices • Subcomponent 3.3b. Reducing cattle production pressures on water pollution and GHG emissions

General Directorate	Legislative Responsibilities within the Scope of the Project	Institutional Responsibilities within the Project
Directorate General of Information Technologies (DGIT)	• Make and have all kinds of information systems and projects including data and information flow related to Ministry services, to ensure online and offline data flow, sharing and coordination between systems in national and international scope, and to determine the procedures and principles regarding this, • Carry out the works related to the establishment, maintenance, supply, development and update of the information infrastructure of the Ministry, to provide communication and cyber security, to develop security policies, to create security layers, • Carry out studies on the creation, development and processing of the spatial data infrastructure of the Ministry and the transmission and supply of all kinds of data that the Ministry may need, • Monitor international developments in the fields of information systems and technologies, artificial intelligence, and big data on the subjects of the Ministry, to share country practices and experiences, to cooperate with international organizations when necessary, to reflect the gained experience in necessary practices,	Lead the implementation of • Subcomponent 1.2: MoAF digital blueprint for sectoral information collection and management

General Directorate	Legislative Responsibilities within the Scope of the Project	Institutional Responsibilities within the Project
Directorate General of Food and Control (DGFC)	• Determine the health conditions related to foreign trade of live animals, plants, animal and plant products, food and feed, to determine and carry out border control points and their working principles, • Carry out studies aimed at ensuring animal welfare, • Combat against animal diseases and animal health services and to determine the relevant principles, • Determine and announce the conditions of manufacture, sale, transportation and storage of therapeutic and protective substances used in animal health and their active and auxiliary substances, • Determine the principles regarding institutions and organizations operating in animal health, diagnosis and treatment services, animal sales, slaughter and training places and shelters,	Lead the implementation of • Component 2: Enhancing animal health capacity for effective disease surveillance and control
Directorate General of Plant Production (BUGEM)	• Increase production, productivity and diversity in plant products, • Determine and supervise the appropriateness and standards of the use of inputs and production technologies used in plant production, • Direct the plant production in such a way as to ensure its integration with the agriculture and industry sectors, • Determine new production methods by taking into account human health and ecological balance, to support and disseminate them and to ensure coordination with the relevant institutions for the prevention of pollution that may arise as a result of the activities within its scope of duty, • Establish and use information systems related to plant production, and	Lead the implementation of • Subcomponent 3.1: Strengthening climate resilience, productivity, and resource-use efficiency in vegetable value chains

General Directorate	Legislative Responsibilities within the Scope of the Project	Institutional Responsibilities within the Project
Directorate of General Livestock (HAYGEM)	• Develop and encourage animal husbandry and to determine incentive principles, • Carry out studies on animal production with methods that protect human health and ecological balance, and to supervise them, • Carry out activities to increase animal production, • Carry out studies related to animal production and development projects, • Establish an information system related to animal husbandry.	Lead the implementation of • Subcomponent 3.3a. Piloting of a Precision Livestock Farming (PLF) program
Directorate General of Agricultural Research and Policies (TAGEM)	• Carry out studies, to prepare projects, to have them prepared, to implement and to have them implemented in order to determine agricultural research and development strategies and priorities in line with national development plans, • Monitor the national and international developments in the agricultural product markets, to carry out researches on the subjects falling under the Ministry's field of duty and to have them done, • Conduct research for the development and rational use of soil and water resources, • Determine the research objectives of the research institutions affiliated to the Ministry and to supervise these institutions, • Conduct research on vaccines, serums, biological and chemical substances and protection drugs used in animal and plant diseases, and effective and auxiliary substances in their composition, • Conduct research on food, feed and mechanization, • Carry out national and international R&D activities and to support projects within this scope	Lead the implementation of • Subcomponent 3.4: Research and innovations to support CSA Support the implementation of • Subcomponent 1.1: Narrowing information gaps to enhance soil health and land-use planning/management • Subcomponent 3.2: Promoting the adoption of climate-smart agricultural technologies/practices

General Directorate	Legislative Responsibilities within the Scope of the Project	Institutional Responsibilities within the Project
Directorate General of European Union and Foreign Relations (ABDGM)	• Carry out the relations of the Ministry with foreign countries and international organizations, to ensure coordination, to assist in the preparation of bilateral and multilateral scientific, industrial and technical cooperation agreements and regional cooperation agreements and protocols, • Ensure the preparation, coordination, execution and control of the projects and programs carried out by the Ministry with the European Union, other foreign countries and international organizations.	Lead the implementation of • Component 4: Project Management, Monitoring, and Evaluation

5. Environmental and Social Assessment Policy and Regulatory Framework

In this section, national environmental and social legislations will be analyzed and compared with the World Bank's (WB) Environmental and Social Framework (ESF) to identify the gaps and define the measures to close the gaps where necessary. It should be noted that the environmental and social management policy adopted by the Project will be adhered to both the country's laws and WB ESF and Environmental, Health and Safety (EHS) Guidelines. Where gaps exist between the country's laws and the WB policies, gap filling measures provided in this ESMF will prevail.

5.1. World Bank Environmental and Social Framework

The World Bank Environmental and Social Framework (ESF) sets out the World Bank's commitment to sustainable development, through a Bank Policy and ten Environmental and Social Standards (ESSs)[14] that are designed to support projects, with the aim of ending extreme poverty and promoting shared prosperity. The ESSs set the requirements to be met by Borrowers with respect to the identification, evaluation and mitigation of social and environmental risks and impacts associated with projects supported by the Bank through Investment Project Financing. The ESSs will;

- support Borrowers in achieving good international practice relating to environmental and social sustainability;
- assist Borrowers in fulfilling their national and international environmental and social obligations;
- enhance nondiscrimination, transparency, participation, accountability and governance; and
- enhance the sustainable development outcomes of the Project through ongoing stakeholder engagement.

These ESSs establish the standards that the Project will meet throughout the project life cycle through defining objectives and requirements to avoid, minimize, reduce and mitigate risks and impacts, and where significant residual impacts remain, to compensate for or offset such impacts.

Eight out of ten ESSs establish the standards that the Borrower and the Project will meet through the project life cycle, as follows;

- ESS 1: Assessment and Management of Environmental and Social Risks and Impacts
- ESS 2: Labor and Working Conditions
- ESS 3: Resource Efficiency and Pollution Prevention and Management
- ESS 4: Community Health and Safety
- ESS 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement
- ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources
- ESS 8: Cultural Heritage
- ESS 10: Stakeholder Engagement and Information Disclosure

"ESS 7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities" and "ESS 9: Financial Intermediaries" will not be applied in the Project, since there is no community in Turkey that matches with the definition under ESS 7 and the Project does not involve any Financial Intermediary (FI).

[14] https://www.worldbank.org/en/projects-operations/environmental-and-social-framework

In addition to ESSs, World Bank Group Environmental, Health, and Safety Guidelines (EHS Guidelines) which are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP) will be applied in the Project. These EHS Guidelines contain the performance levels and measures that are normally acceptable to the World Bank Group, and that are generally considered to be achievable in new facilities at reasonable costs by existing technology. In cases where the Turkish requirements differ from the levels and measures presented in the EHS Guidelines, the more stringent one (such as the most stringent discharge and emission standards) will be applied in the project specifications.

In the below sections, national environmental and social legislations will be analyzed and compared to World Bank Environmental and Social Framework to identify the gaps and define the measures to close the gaps where necessary.

5.2. ESS 1: Assessment and Management of Environmental and Social Risks and Impacts

ESS1 sets out the Borrower's responsibilities for assessing, managing, and monitoring environmental and social risks and impacts associated with each stage of a project supported by the Bank through Investment Project Financing, in order to achieve environmental and social outcomes consistent with the Environmental and Social Standards (ESSs). The objectives of ESS1 are:

- To identify, evaluate and manage the environment and social risks and impacts of the project in a manner consistent with the ESSs.
- To adopt a mitigation hierarchy approach to:
    - Anticipate and avoid risks and impacts,
    - Where avoidance is not possible, minimize or reduce risks and impacts to acceptable levels,
    - Once risks and impacts have been minimized or reduced, mitigate; and
    - Where significant residual impacts remain, compensate for, or offset them, where technically and financially feasible.
- To adopt differentiated measures so that adverse impacts do not fall disproportionately on the disadvantaged or vulnerable, and they are not disadvantaged in sharing development benefits and opportunities resulting from the project.
- To utilize national environmental and social institutions, systems, laws, regulations and procedures in the assessment, development, and implementation of projects, whenever appropriate.
- To promote improved environmental and social performance, in ways which recognize and enhance Borrower capacity

As per requirements of ESS1, the Borrower will: (i) conduct an environmental and social assessment to assess risks and impacts of the proposed sub-projects; (ii) prepare sub-project specific ESIA or ESMP; (iii) undertake stakeholder engagement and disclose appropriate information in accordance with ESS10; (iv) develop an Environmental and Social Commitment Plan (ESCP), and implement all measures and actions set out in the legal arrangement including the ESCP; and (v) conduct monitoring and reporting on the environmental and social performance of the project against the ESSs.

Borrower will also be responsible to apply the relevant requirements of the WBG EHS Guidelines (EHSGs). In case the national standards or legislative requirement differ from the levels and measures stipulated in the EHS Guidelines, the Borrower will be required to achieve or implement whichever is the most stringent.

Relevance to the Project

This ESMF is prepared as per the requirements of ESS1 and sets out the MoAF's responsibilities for assessing, managing, and monitoring environmental and social risks and impacts associated for each stage of the project, in order to achieve sustainable development. After the details of the sub-projects are finalized, site-specific ESIAs/ESMPs will be prepared based on the initial E&S assessments, disclosed and consulted upon.

5.2.1. National Legislation

According to national legislations: institutions, organizations and businesses that may cause environmental problems as a result of their planned activities are obliged to prepare an Environmental Impact Assessment Report or project introduction file in accordance with Article 10 of the Environmental Law (No.2872) which is regulated by Environmental Impact Assessment Regulation (25.11.2014/29186).

The Environmental Impact Assessment (EIA) Regulation (25.11.2014/29186) entered into force for the first time in Turkey on 07.02.1993. Since then, it has undergone various revisions within the scope of harmonization with EU legislation in line with Turkey's pre-accession efforts.

Directorate General of Environmental Impact Assessment, Permit and Inspection (DGEIAPI) of the Ministry of Environment, Urbanization and Climate Change (MoEUCC) is the responsible public authority for the application of EIA.

In addition to national legislations, MoEUCC has prepared Key Environmental Impacts Booklets and Industry Guidelines within the scope of the Technical Assistance Project for Strengthening the Capacity of the Ministry of Environment and Urbanization in the Field of EIA with contract number 2007TR16IPO001.3.06/SER/42. Both the booklets and the guidelines are not legally binding documents.

Key Environmental Impacts Booklets are prepared for the public, investors and other relevant institutions and organizations and their representatives who want to have an idea in the field of Environmental Impact Assessment (EIA) and want to be informed about the basic Environmental Impacts (EIs) of planned investments. The booklets covering project activities are;

- EIs of Cattle Breeding Facilities
- EIs of Electric Power Transmission Lines
- EIs Associated with Waste Treatment Activities
- EIs of the Facilities where the Active Ingredients of Pharmaceutical Products are Produced
- EIs on Extraction and Use of Geothermal Resources
- EIs of Solar Power Plants

Industry Guidelines are prepared to inform the interested parties involved in the examination of environmental impact assessment studies or the preparation of EIA Reports and/or Project Introduction Files about the environmental impacts of the facilities and the precautions to be taken for the land preparation, construction, operation phases and post-operation period. The guidelines covering project activities are;

- Asbestos
- Energy Transmission Lines
- Solar Power Plants
- Animal Breeding Facilities

- Geothermal Power Plants

5.2.1.1. The Process of EIA

When an investment project is prepared, as a first step, the summary of the project is presented to MoEUCC or Provincial Directorate of Environment, Urbanization and Climate Change (PD of EUCC) under the responsible Governorate. The MoEUCC or the PD of EUCC decides whether the project is subject to EIA or not. If the project is not subject to EIA, an exemption letter is issued by MoEUCC or PD of EUCC and the project can commence. If the project is subject to EIA, and if the project is covered by Annex II of the Regulation it goes under selection and elimination process. For selection and elimination process a Project Description File (PDF) is prepared and presented to PD of EUCC. PD of EUCC evaluates the application and decides whether EIA is necessary for the project or not. If PD of EUCC decides that EIA is not necessary, it issues a "EIA Not Required Decision" and the project can commence in 5 years.

If EIA is necessary for the project or if the project is subject to Annex I of the regulation, then the EIA Application File is prepared and presented to MoEUCC. Afterwards MoEUCC

- establishes a commission consisting of representatives of relevant public institutions and organizations, Ministry officials, the project owner and EIA Firms by taking into account the information in the application file
- announces to the public via announcements, on boards/hardcopy announcements, the internet, and etc. that the application has been made regarding the project, the EIA process has begun, the EIA Application File has been made available to the public for their comments, and that the opinions and suggestions regarding the project can be conveyed to the PD of EUCC or the MoEUCC until the EIA process is completed. These announcements are made by both the MoEUCC and the PD of EUCC.
- sends an official letter indicating the date of giving opinion for the Public Participation Meeting and determining the scope, and the EIA Application File prepared in accordance with the Annex III of the regulation, to the members of the Commission.

Public Participation Meeting

In order to inform the public about the investment and to receive their comments and suggestions of the public regarding the project; a Public Participation Meeting is held with the participation of the EIA Firms and the project owner/investor, on a date determined by the MoEUCC, at a central place and time determined by the Governor's Office, where the relevant public, who is expected to be most affected by the project, can easily reach.

EIA Firms publish an announcement stating the date, time, place and subject of the meeting at least ten (10) calendar days before the meeting date, together with the local periodical published in the region where the project will be carried out, in a newspaper defined as a common periodical.

The purpose of the meeting is to ensure the public is informed about the project and their opinions, questions and suggestions are received. The moderator of the meeting may request the participants to give their opinions in writing. The meeting minutes are sent to the MoEUCC and one copy is archived by the Governor's Office.

Determination of Scope and Format Tailored for the Project

After the public participation meeting, the MoEUCC prepares the EIA Report Special Format in line with the opinions and suggestions of the commission member institutions/organizations and the opinions and suggestions from the public and delivers it to the EIA Firms.

Review and Evaluation of EIA

Members of the commission express their views on matters concerning the central and local institutions/organizations they represent. In case of significant deficiencies and mistakes in the EIA Report, the Commission requests the EIA Firms or related institutions to correct them.

The EIA Report, which is examined and finalized by the Commission, is opened for public opinion in ten (10) working days by the MoEUCC and/or the Governor's Office via a on boards/hardcopy announcements and the internet, in order to receive the opinions and suggestions of the public. The MoEUCC, in line with the opinions of the public and other institutions and organizations, may request the completion of the deficiencies in the report, additional studies, or the reconvening of the Commission.

Decision

The MoEUCC, taking into account the work of the Commission and the opinions of the public and other institutions and organizations, gives the "EIA Positive" or "EIA Negative" decision for the project within ten (10) working days and notifies the Commission members. The "EIA Positive" or "EIA Negative" decision given for the project is announced to the public by the MoEUCC and the PD of EUCC via on boards/hardcopy announcements and the internet.

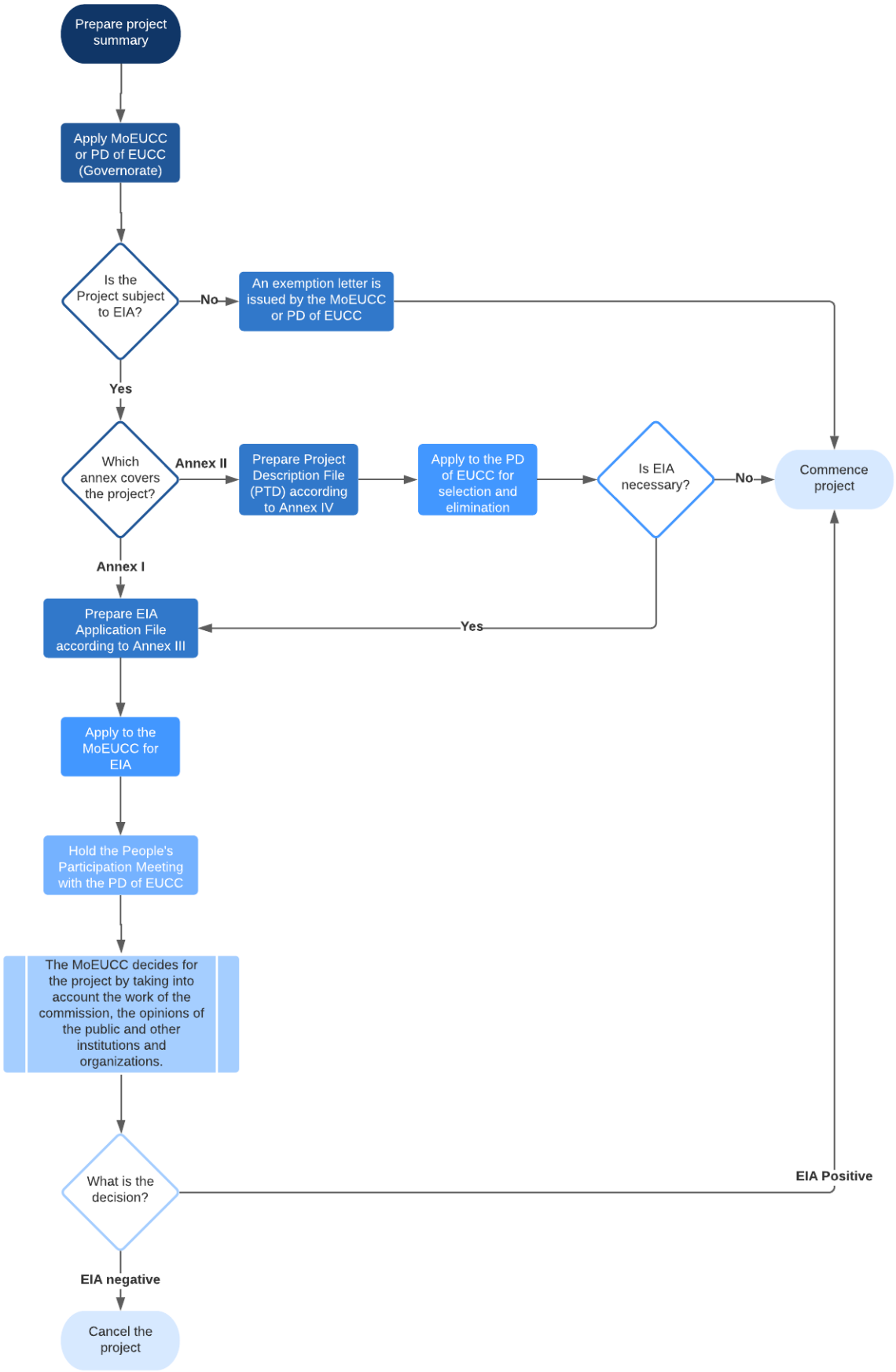
The project owner is obliged to notify the MoEUCC or the PD of EUCC of the changes to be made in the project subject to Regulation, after taking the decision of "EIA Positive" or "EIA Not Required".

Monitoring and Control

The MoEUCC monitors and controls the fulfillment of the commitments in the Final EIA Report regarding the projects with an "EIA Positive" or a "No EIA Required" decision and/or in the Project Introduction File, which is the basis for the "EIA Not Required" decision.

The flow chart for EIA process is given in Figure 2.

Figure 2: EIA Process Flow Chart


Prepare project summary
Apply MoEUCC or PD of EUCC (Governorate)
Is the Project subject to EIA?
No
An exemption letter is issued by the MoEUCC or PD of EUCC
Yes
Which annex covers the project?
Annex II
Prepare Project Description File (PTD) according to Annex IV
Apply to the PD of EUCC for selection and elimination
Is EIA necessary?
No
Commence project
Annex I
Prepare EIA Application File according to Annex III
Yes
Apply to the MoEUCC for EIA
Hold the People's Participation Meeting with the PD of EUCC
The MoEUCC decides for the project by taking into account the work of the commission, the opinions of the public and other institutions and organizations.
What is the decision?
EIA Positive
EIA negative
Cancel the project

5.2.2. Gaps and Measures

The gaps between the ESS 1 and the Environmental Impact Assessment Regulation are;

- **Social impacts**. The social component of EIA reporting, in line with the EIA Regulation, is limited, generic and based on secondary data collection and does not include defined area of influence, a solid social baseline, stakeholder consultations/results, identified impacts and mitigations, social risk matrix, cumulative impacts and a social and environmental monitoring plan. The gaps identified above, results in lack of identification and assessment of project related social impacts including impacts on disadvantage or vulnerable or gender related issues.
- **Absence of and Executive Summary and information on the legal and institutional framework** in the Turkish EIA.
- **Project Categorization**. The projects that require EIA is given in the Annexes of the Regulation. Annex I lists the projects for which environmental impact assessment will be applied, and Annex II lists the projects for which selection and elimination criteria will be applied. ESS 1 does not provide a pre-made list. Instead, it states that methods and tools for assessments should be proportionate to the project-specific risks and impacts, which will be determined by project-basis.
- **Cumulative impacts:** The Regulation on EIA does require limited or no cumulative impact assessment with the other projects (several hydro facilities on same river, impacts resulting from associated facilities, [transmission lines, access roads], etc.)
- Public consultation: The Turkish EIA Regulation requires "pre-scoping" public consultation only for projects requiring an EIA, and only requires announcement of the environmental assessment together with the justification.. However, ESF does not specify an exact number and method of public consultation and information disclosure but instead the standard requires a continuous stakeholder engagement approach through the life cycle of the project that will be decided proportionate to the nature, scale and impact magnitude of the project.
- Ongoing E&S management: ESS1 requires relevant E&S management plans (such as ESMP, OHS Plan, Cultural Heritage Management Plan, Biodiversity Management Plan, etc.) for all projects commensurate with project risks and impacts, covering both construction and operation, as needed.

To close the gaps between the ESS 1 and the EIA Regulation, this Environmental and Social Management Framework (ESMF) has been prepared. In addition, during the implementation stage, site-specific ESIAs/ESMPs will be prepared based on the initial E&S assessments once the investments and their location details are finalized and these documents will be disclosed and consulted upon and annexed to the bidding documents and construction contracts as binding documents. The contractors will be responsible for the implementation of the ESIA/ ESMP and MoAF will be responsible for the review and approval of all documents and the quality of each ESIA/ESMP documents. MoAF will also be responsible for monitoring the implementation of the E&S documents and report the status of implementation to the Bank on regular basis.

This ESMF will be applied for both activities to be financed directly under the project as well as the associated activities.

5.3. ESS 2: Labor and Working Conditions

ESS2 recognizes the importance of employment creation and income generation in the pursuit of poverty reduction and inclusive economic growth. Borrowers can promote sound worker-

management relationships and enhance the development benefits of a project by treating workers in the project fairly and providing safe and healthy working conditions. The objectives of ESS2 are;

- To promote safety and health at work.
- To promote the fair treatment, nondiscrimination and equal opportunity of project workers.
- To protect project workers, including vulnerable workers such as women, persons with disabilities, children (of working age, in accordance with this ESS) and migrant workers, contracted workers, community workers and primary supply workers, as appropriate.
- To prevent the use of all forms of forced labor and child labor.
- To support the principles of freedom of association and collective bargaining of project workers in a manner consistent with national law.
- To provide project workers with accessible means to raise workplace concerns.

The applicability and scope of application of ESS2 depends on the environmental and social assessment described in ESS1 and the type of employment relationship between the Borrower and the project workers.

ESS2 requirements cover; the development and implementation of written Labor Management Procedures (LMP) which will be applicable to the project. These procedures will set out the way in which project workers will be managed, in accordance with the requirements of national law and this ESS, and will include the description of the following;

(i) working conditions and management of worker relationships (such as development and implementation of labor management procedures applicable to the project and CoC that will be followed by project contrcators) including terms and conditions of employment, nondiscrimination and equal opportunity, and worker's organizations;
(ii) protecting the work force including defining a minimum age for workers, prohibition of child labor and forced labor;
(iii) grievance mechanism (for the workers, including arrangements for referral to national system for any potential SEA/SH risks);
(iv) occupational health and safety;
(v) contracted workers;
(vi) community workers; and
(vii) primary supply workers.

Relevance to the Project

Project workers include the direct workers, contracted workers and primary supply workers. MoAF PIU employees are civil servants and direct employees of this project. Contractors engaged in civil works are contracted workers. Primary supply workers will be determined under ES studies of the sub-projects. MoAF has prepared a Labor Management Procedures (LMP), which includes requirements for different categories of workers including contracted workers.

During project implementation, when bidding for civil works will take place, LMP will be attached to bidding documents. Awarded contractors will then adopt project LMP (including Code of Conduct). Main contractors will be responsible to manage their sub-contractors.

LMP sets out the basic procedures and requirements to be implemented by MoAF to ensure that MoAF and its Project Partners and Contractors respect and protect the fundamental principles and rights of workers through promoting a decent workplace. This includes; (i) fair treatment, (ii) non-discrimination and equal opportunities of workers, (iii) establishing, maintaining and improving a

sound worker-management relationship, (iv) compliance with national labor and employment laws; code of conduct, (v) protecting and promoting the safety and health of workers, especially by promoting safe and healthy working conditions, (vi) preventing the use of forced labor and child labor (as defined by the WB and Turkish legislation), (vii) Covid-19 related measures in accordance to the national laws and regulations as well as guidelines suggested by WHO and other international institutions, in order to manage and minimize Covid-19 pandemic risks related to construction works and operation phase of the sub-projects, and (viii) Induction training for employees regarding to code of conduct, HSE and WB requirements etc.

The LMP will help all parties and contractors to ensure they meet the requirements set out in Tender documentation for managing employment. Grievance Mechanism (GM) for all project workers are explained in detail under Section XXX.

5.3.1. National Legislation

Occupational Health and Safety

In recent years, Turkey has undergone a reform to improve its national Occupational Health and Safety (OHS) system through adapting a set of international and regional standards into its national level requirements for the prevention occupational risks as defined in the ILO Occupational Safety and Health Convention, 1981 (No. 155). The convention, along with the Occupational Health Services Convention, 1985 (No. 161) were both ratified by Turkey in 2005 who Turkey is also party to the Labor Inspection Convention, 1945 (No. 81) since 1951. In 2014, Turkey ratified the Promotional Framework for Occupational Safety and Health Convention, 2006 (No. 187). During 2012, a stand-alone Law on OHS (No. 6331) was put into force (20 June 2012). The OHS Law governs workplace environments and industries (both public and private) as well as virtually all classes of employees including part-time workers, interns, and apprentices. The legislation is comprehensive and is generally applicable across all sectors and many industries.

Labor and Working Conditions

Turkey is party to a multitude of ILO conventions, including but not limited to conventions on equal treatment of employees, gender equality, child labor, forced labor, OHS, right of association and minimum wage. Accordingly, the current Turkish Labor Law (No.4857) is to large extent consistent with ESS2 requirements. There are also secondary legislations that may apply to the project which include regulations on annual leave, working hours, overtime work, minimum wage, female and child employees. The Ministry of Labor and Social Services has published various communiques and circulars that set ground for the implementation of the Labor Law which may also be referenced during project implementation.

5.4. ESS 3: Resource Efficiency and Pollution Prevention and Management

ESS3 recognizes that economic activity and urbanization often generate pollution to air, water, and land, and consume finite resources that may threaten people, ecosystem services and the environment at the local, regional, and global levels. The current and projected atmospheric concentration of greenhouse gases (GHG) threatens the welfare of current and future generations. At the same time, more efficient and effective resource use, pollution prevention and GHG emission avoidance, and mitigation technologies and practices have become more accessible and achievable. The objectives of ESS3 are;

- To promote the sustainable use of resources, including energy, water and raw materials.

- To avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities.
- To avoid or minimize project-related emissions of short and long-lived climate pollutants.
- To avoid or minimize generation of hazardous and non-hazardous waste.
- To minimize and manage the risks and impacts associated with pesticide use.

Relevance to the Project

This standard is relevant. Modernizing greenhouses and pilot model for clustering greenhouse production around geothermal energy will include the use of energy, water, and materials such as sand, cement, timber, etc. The potential risks and impacts of sub-project activities during associated civil works include noise and dust emissions and the generation of construction wastes, including hazardous (i.e., Asbestos-Containing Materials – ACM) and non-hazardous waste, as well as workers health risks related to pest management activities. Waste management beyond construction related wastes will also need to be considered, especially in rural areas with weak waste management infrastructure.

5.4.1. National Legislation

Most of the environment related laws and regulations are continuously revised and harmonized with the European Union (EU) Directives in the scope of pre-accession efforts of GT.

- Environmental Law (No: 2872) aims to protect the environment, which is the common property of all living things, in line with the principles of sustainable environment and sustainable development. The regulations that will be applied in the Project, but not limited to are:
    - Permit and Monitoring
        - Environmental Impact Assessment Regulation (25.11.2014/29186)
        - Environmental Permit and License Regulation (10.09.2014/29115)
        - Environmental Audit Regulation (12.06.2021/31509)
    - Air Emissions and Air Quality
        - Air Quality Assessment and Management Regulation (06.06.2008/26898)
        - Regulation on Monitoring of Greenhouse Gas Emissions (17.05.2014/29003)
        - Industrial Air Pollution Control Regulation (03.07.2009/27277)
        - Air Pollution caused by Heating Control Regulation (06.06.2008/26898)
        - Exhaust Gas Emission Control Regulation (11.03.2017/30004)
        - Regulation on Control of Odor Generating Emissions (19.07.2013/28712)
    - Contaminated Land
        - Regulation on Control of Soil Pollution and Point Source Polluted Areas (08.06.2010/27605)
    - Noise
        - Regulation on the Noise Emissions in the Environment Generated by Equipment Used in Open Area (30.12.2006/26392)
        - Assessment and Management of Environmental Noise Regulation (04.06.2010/27601)
    - Waste Management
        - Waste Management Regulation (02.04.2015/29314)
        - Regulation on of Wastes (26.03.2010/27533)
        - Control of Excavation Soil, Construction and Debris Waste Regulation (18.03.2004/25406)

        - Medical Waste Control Regulation (25.01.2017/29959)
        - Packaging Waste Control Regulation (26.06.2021/31523)
        - Waste Oil Management Regulation (21.12.2019/30985)
        - Waste Vegetable Oils Control Regulation (06.06.2015/29378)
        - Waste Batteries and Accumulators Control Regulation (31.08.2004/25569)
        - End-of-Life Tires Control Regulation (25.11.2006/26357)
        - Zero Waste Regulation (12.07.2019/30829)
        - Regulation on Incineration of Waste (06.10.2010/27721)
    - Wastewater and Water Quality
        - Regulation on the Protection of Ground Water against Pollution and Deterioration (07.04.2012/28257)
        - Regulation on Quality and Treatment of Water Supplied to Drinking Water (06.07.2019/30823)
        - Regulation on Waters for Human Consumption (17.02.2005/25730)
        - Law on Groundwater (No: 167)
        - Protection of Water against Nitrate Pollution from Agriculture Regulation (23.07.2016/29779)
        - Regulation on Control of Pollution Caused by Hazardous Substances in Water and Its Environment (26.11.2005/26005)
        - Water Pollution Control Regulation (31.12.2004/25687)
        - Surface Water Quality Regulation (30.11.2012/28483)
- Energy Efficiency Law (No: 5627)
    - Energy Efficiency Auditing Regulation (06.07.2018/30470)
    - Regulation on Increasing Efficiency in the Use of Energy Resources and Energy (27.10.2011/28097)
    - Energy Performance Regulation in Buildings (05.12.2008/27075)

5.4.2. Gaps and Measures

Although, there is no major gap between ESS3 and legislative requirements, national EIA does not require detailed management perspective on potential impacts, mitigation measures and residual impacts and monitoring. Thus, while implementing civil works, the project will address resource efficiency and pollution prevention and management measures through the project lifecycle consistent with WB ESF and GIIP to ensure sustainable use of resources and minimizing adverse impacts on human health and the environment. The relevant mitigation and management procedures are outlined in the ESMF (which in some cases may warrant the need for waste management plans). Respectively, ESMF identifies and assesses all the potential risks and impacts associated with material use and waste generation of all subprojects and determine if additional management plans such EHS or Traffic Management Plan, as are necessary, based on the initial assessments. Furthermore, generic risk and impact management and mitigation measures are also laid out in the ESMF which will be further elaborated in detail in site-specific safeguards instruments, following applicable national regulations, ESS3 and the ESF's mitigation hierarchy, WBG's EHS General, and sector-specific guidelines, and GIIP. These mitigation and monitoring activities to be specified in the site-specific E&S documents will include issues on pesticides and fertilizers purchase, transportation, storage, use, handling, and disposal – for the subprojects that will involve greenhouses' operation. Furthermore, the ESMF document includes a template for an Integrated Pest Management Plan. In addition, the opportunities for energy and resource efficiency will be sought throughout all greenhouse modernization activities. As some of the agricultural sub-projects to be supported will be significant consumers of water, in a water-scarce environment the ESMF also

indicates that for some sub-projects will require preparation of water balances, providing in this regard clear criteria for when this would be required.

5.5. ESS 4: Community Health and Safety

ESS4 recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impacts. In addition, communities that are already subjected to impacts from climate change may also experience an acceleration or intensification of impacts due to project activities. The objectives of ESS4 are;

- To anticipate and avoid adverse impacts on the health and safety of project-affected communities during the project life cycle from both routine and nonroutine circumstances.
- To promote quality and safety, and considerations relating to climate change, in the design and construction of infrastructure, including dams.
- To avoid or minimize community exposure to project-related traffic and road safety risks, diseases and hazardous materials.
- To have in place effective measures to address emergency events.
- To ensure that the safeguarding of personnel and property is carried out in a manner that avoids or minimizes risks to the project-affected communities.

ESS4 requirements cover: (i) community health and safety including infrastructure and equipment design and safety (including safety of dams), safety of services, traffic and road safety, ecosystem services, community exposure to health issues, management and safety of hazardous materials, and emergency preparedness and response; and (ii) security personnel.

Relevance to the Project

This standard is relevant for the Project. The potential risks and adverse impacts on community health and safety (CHS) are associated with the proposed activities which will finance civil work. These potential risks and impacts include emissions of dust, noise, odor, and vehicle exhausts; traffic jams and traffic and road safety risks due to increased traffic volume and movements of heavy-duty vehicles; temporary road blockades and closures; increased waste and wastewater generation (including hazardous waste like ACM). Community's potential exposure to waste (including hazardous waste), particulate matters, may lead to increased risks of health issues, resulting from poor site management, and communicable diseases relating to labor influx (i.e., Covid-19, HIV/AIDS, and sexually transmitted diseases [STDs]).

5.5.1. National Legislation

Main national laws covering ESS 4- Community Health and Safety are;

- General Health Protection Law (No: 1593)
- Law on Aids to be Made with Measures to be Taken Due to Disasters Affecting Public Life (No: 7269)
    - Turkey Building Earthquake Regulation (18.03.2018/30364)
    - Disaster Regulation for Infrastructure (15.02.2007/26435)
- Law on Building Auditing (No: 4708) (Construction and Usage Permits)
- Zoning Law (No: 3194) (Construction and Usage Permits)
- Law on Private Security Services (No: 5188)
- Law on the Disabled (No: 5378)

5.5.2. Gaps and Measures

Although no specific gaps are identified, ESMF and site specific ESIAs/ESMPs will propose management plans (if necessary) to mitigate the adverse impacts of the Project on community.

The ESMF and site-specific ESIAs/ESMPs or ESMP Checklists will assess the risks and impacts to the health and safety of project-affected communities, including groups that might be vulnerable. These instruments will also detail management and mitigation measures to secure community health and safety during civil works and operations, as well as monitoring and reporting requirements. When preparing site specific ESMPs, particular attention will be given to i) avoiding and minimizing exposure to project-related traffic and road safety risks; ii) assessing the likelihood of excessive noise and dust emission and potential exposure to hazardous waste (including ACM) and proposing mitigation measures (i.e., dust control, notification of risks to communities, clear procedures for handling hazardous waste). The project will also include measures for addressing SEA/SH risks, including a Code of Conduct for workers, a mechanism to report SEA/SH cases and training and awareness sessions for project workers and affected communities. If during the project's life cycle, the PIU or its contractors decide to employ security personnel to safeguard the staff and properties, the arrangements regarding hiring, rules of conduct, training, equipping, and monitoring of such workers shall be guided by the principles of proportionality and GIIP, and applicable national regulations to minimize any potential risks and impacts on CHS. The details on the potential risks and suitable mitigation measures related to employment of security personnel are assessed and provided in LMP and ESMF.

5.6. ESS 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement

ESS5 recognizes that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons. Project-related land acquisition or restrictions on land use may cause physical displacement (relocation, loss of residential land or loss of shelter), economic displacement (loss of land, assets or access to assets, leading to loss of income sources or other means of livelihood), or both. The term "involuntary resettlement" refers to these impacts. Resettlement is considered involuntary when affected persons or communities do not have the right to refuse land acquisition or restrictions on land use that result in displacement. The objectives of ESS5 are;

- To avoid involuntary resettlement or, when unavoidable, minimize involuntary resettlement by exploring project design alternatives.
- To avoid forced eviction.
- To mitigate unavoidable adverse social and economic impacts from land acquisition or restrictions on land use by:
    - providing timely compensation for loss of assets at replacement cost and
    - assisting displaced persons in their efforts to improve, or at least restore, their livelihoods and living standards, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.
- To improve living conditions of poor or vulnerable persons who are physically displaced, through provision of adequate housing, access to services and facilities, and security of tenure.
- To conceive and execute resettlement activities as sustainable development programs, providing sufficient investment resources to enable displaced persons to benefit directly from the project, as the nature of the project may warrant.

- To ensure that resettlement activities are planned and implemented with appropriate disclosure of information, meaningful consultation, and the informed participation of those affected.

The applicability of ESS5 depends on the environmental and social assessment described in ESS1 and applies to permanent or temporary physical and economic displacement resulting from the types of land acquisition or restrictions on land use undertaken or imposed in connection with project implementation described in ESS5.

ESS5 requirements cover the preparation and implementation of a resettlement framework or resettlement plan which will set ground for: (i) general requirements such as eligibility classification, project design, compensation and benefits for affected persons, community engagement, grievance mechanism, planning and implementation; (ii) physical and economic displacement; (iii) collaboration with other responsible agencies or subnational jurisdictions; and (iv) technical and financial assistance.

Relevance to the Project

At this stage the details of the land acquisition requirements of the sub-projects are limited. Although physical displacement is not expected, proposed activities to be carried out for the investments under Subcomponent 3.1b. and Subcomponent 3.2b may cause economic displacement of affected people due to land acquisition and land use requirements. The site selection criteria for these activities will be discussed during preparation but would include technical/financial viability, opportunities for higher social impacts, no requirements for private land acquisition, among others.

Although the selection/eligibility criteria (to be discussed during project preparation) will be aiming to screen out any project that will require land acquisition for the areas to be identified for greenhouse construction, the construction activities to be carried out for the establishment of the basic enabling infrastructure (drilling wells; pumping stations, geothermal energy transmission pipelines; electricity network and backup power lines; water supply and sanitation network; IT infrastructure; etc.) will likely require land acquisition and will inevitably bring along temporary or permanent land use restrictions, rights of easement, impacts on livelihoods or removal of assets and structures from the land. The exact scale and scope of land acquisition required for infrastructure investments is currently not known, since the exact locations of the project activities have not been determined yet.

The project will aim to minimize resettlement impacts on both private and public lands used for income-generating activities. Potential land acquisition/land use related impacts of the project may affect individuals including vulnerable groups such as squatters, refugees, migrant workers, women, poorer or young/elder farmers, etc.

5.6.1. National Legislation

In the scope of the Turkish legal framework, land acquisition/expropriation related issues are handled through the Expropriation Law No: 2942. Compensation for the subject property/assets to be expropriated is determined according to procedures and principles outlined in Articles 8, 10 and 11 of the Law. Article 27 authorizes the expropriation agency to confiscate the assets required by the project earlier than the time needed in normal expropriation procedure. This process does not prevent challenges of the property owners against the determined valuation. .”

5.6.2. Gaps and Measures

Turkish legislation on land acquisition mainly corresponds to requirements stipulated by ESS5. However, some differences include; preparation of a Resettlement Plan (RP), compensation at replacement costs, continuous consultation during RP implementation, impact assessment on informal land users, vulnerable groups and land-based livelihood restoration are the major gaps in terms of ESS5 requirement.

The gaps between the provisions of Expropriation Law no. 2942 and the requirements of the ESS 5 are summarized below;

- Identification and Assessment of Resettlement Impacts: ESS5 states that all adverse direct and indirect resettlement impacts of the land acquisition/ land use restrictions will be identified and minimized. There is no provisioning in the Turkish Law for livelihood restoration.
- Eligibility Classification: ESS5 defines eligibility criteria as being affected by the project activities; which means, not only title deed holders, but also customary owners, tenants, public land users and squatters are entitled to compensation. However, being legal owner of the asset is the eligibility criteria according to Law. So, ESS5 proposes to conduct a census to identify all affected persons and assets, legal ownership data is obtained from directorates of Land Registry and Cadastre in case of national applications.
- Project Design: Social costs and impacts of the project design on poor/vulnerable are not considered. There is no provision regarding the avoiding or minimization of resettlement.
- Compensation and Benefits for Affected Persons: ESS5 requires that compensation should be calculated at replacement cost. However, the expropriation value set in the Law is calculated at market value and depreciation cost is deducted from expropriation value. Also, registration and transfer taxes are not included in expropriation value. No legal provisioning is made in the Turkish legislation regarding the compensation of income losses.
- Transparency of procedures: The estimated value for expropriation is not disclosed to affected party in negotiations for purchase. However, ESS5 supports full transparency.
- Vulnerable Individuals/Groups: According to ESS5, particular attention is to be paid to the needs of vulnerable groups, especially those below the poverty line, the landless, the elderly woman and children. However, there is no provision regarding the specific consideration of vulnerable groups during land acquisition.
- Land replacement: Replacement land can be offered in lieu of expropriation payment, but this is not set as the prior method if the livelihood of the owner depends on the land
- Common property resources: No legal provisioning is made in the Turkish legislation. The pasture and meadow losses of the families or the associated income losses of villages are not compensated. However, ESS5 requires compensation for livelihood losses of individuals and communities that result from acquisition of pasturelands.
- Escrow accounts: ESS 5 states that escrow accounts can be used in case of absentee owners, lengthy legal proceedings over disputes about the ownership of land and continuous rejections for the compensations without reasonable justification, with prior agreement of the Bank with contingency amounts. Also, in Turkey, escrow accounts can be used with court decision; however, no contingency amount is reserved.
- Finally, community engagement, gender impacts and grievance mechanism does not take place in Law no. 2942.

As presented above, there are many gaps identified between the ESS5 requirements and the Expropriation Law no. 2942. To close the gaps, MoAF has prepared and disclosed a Resettlement

Framework (RF) which clarifies resettlement principles, entitlement matrix, implementing arrangements for sub-project specific Resettlement Plans (RPs), and design criteria to be applied to sub-projects to be prepared under the project. Once the subproject details are defined and the necessary information becomes available, this framework will be expanded into sub-project specific resettlement plan(s). Once RPs are prepared for sub-projects they will be send to Bank for no-objection and then subsequently disclosed.

It is likely that, prior to approval of the World Bank loan, a geothermal plant which will be utilized for the establishment of the basic infrastructure could have been recently operationalized (within the last five years). An Ex-Post Social Audit will be carried out before construction works to be financed by the project commence for identifying the past land acquisition activities implemented, project-affected people, their compensation status, satisfaction levels and feedback regarding the land acquisition process followed. For the land acquisition that will take place during project financing, the Borrower will prepare sub-project specific Resettlement Plans including census/survey data regarding the affected people and their assets, detailed land acquisition requirements, entitlements defined for each impact and affected group etc. Entitlements regarding economic displacement will be diagnosed in the RF and set in the sub-project specific RPs.

5.7. ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources

ESS6 recognizes that protecting and conserving biodiversity and sustainably managing living natural resources are fundamental to sustainable development. Biodiversity is defined as the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species, and of ecosystems. Biodiversity often underpins ecosystem services valued by humans. Impacts on biodiversity can therefore often adversely affect the delivery of ecosystem services.

The objectives of ESS6 are;

- To protect and conserve biodiversity and habitats.
- To apply the mitigation hierarchy and the precautionary approach in the design and implementation of projects that could have an impact on biodiversity.
- To promote the sustainable management of living natural resources.
- To support livelihoods of local communities, including Indigenous Peoples, and inclusive economic development, through the adoption of practices that integrate conservation needs and development priorities.

ESS6 requirements cover: (i) general requirements including assessment of risks and impacts, conservation of biodiversity and habitats (modified, natural, and critical habitats), legally protected and internationally recognized areas of high biodiversity value, invasive alien species, and sustainable management of living natural resources; and (ii) primary suppliers.

5.7.1. National Legislation

- National Parks Law (No: 2873)
- Hunting Law (No: 4915)
- Aquaculture Resources Law (No: 1380)
- Forest Law (No: 6831)
- Pasture Law (No: 4342)
- Law on Veterinary Services, Plant Health, Food and Feed (Law No: 5996),

- Law on Protection of Animals (Law No: 5199),
- Biosafety Law (Law No: 5977),
- Regulation on the Working Procedures and Principles of Animal Testing Ethical Committees
- Law on Improvement of Olive Growing and Graft of Wilds (No: 3573)
- Soil Conservation and Land Use Law (No: 5403)
    - Regulation on Protection, Use and Planning of Agricultural Lands (09.12.2017/30265)
- Coastal Law (No: 3621)
- Wetlands Protection Regulation (04.04.2014/28962)

5.7.2. Gaps and Measures

There is no gap in terms of policy level. On the other hand, in some cases, level of the considerations of not legally protected sensitive ecological areas such as Key Biodiversity Areas in local EIA Process are not sustain the requirements stipulated by ESS6. Furthermore, management and monitoring of potential impacts, mitigation measures and residual impacts are not detailed in general. To close the gaps:

- Depending on the location of the sub-project and the level of the impacts, Biodiversity Management Plans will be annexed to the ESIAs/ESMPs.
- In addition, desktop reviews, which gives legally protected areas, field studies should be conducted to collect potentially critical biodiversity aspects, habitats, or natural resources

In addition, to ensure the risks for biodiversity will be of small scale, it will be agreed that, based on the feasibility studies which also include a biodiversity assessment, there will be selected only those piloting sites which are located outside of critical habitats. Furthermore, during the initial environmental screening of associated geothermal infrastructure development activities or of new greenhouses, all investments that will be in or near to critical or natural habitats or those with significant biodiversity impacts will be excluded from financing. In this regard, the ESMF document provides criteria for such exclusion. Furthermore, all site specific ESIA and ESMPs for these investments will include a site biodiversity assessment and as needed, relevant mitigation and monitoring activities. And for the electricity transmission lines, ESMF specifies that bird surveys should be carried out as part of site-specific assessments, and where relevant, bird protection measures should be included in the project design (e.g., bird flight diverters, anti-perching/nesting structures etc.).

5.8. ESS 8: Cultural Heritage

ESS8 recognizes that cultural heritage provides continuity in tangible and intangible forms between the past, present, and future. People identify with cultural heritage as a reflection and expression of their constantly evolving values, beliefs, knowledge, and traditions. Cultural heritage, in its many manifestations, is important as a source of valuable scientific and historical information, as an economic and social asset for development, and as an integral part of people's cultural identity and practice. ESS8 sets out measures designed to protect cultural heritage throughout the project life cycle. The objectives of ESS8 are:

- To protect cultural heritage from the adverse impacts of project activities and support its preservation.
- To address cultural heritage as an integral aspect of sustainable development.
- To promote meaningful consultation with stakeholders regarding cultural heritage.
- To promote the equitable sharing of benefits from the use of cultural heritage.

The Borrower will avoid impacts on cultural heritage. When avoidance of impacts is not possible, the Borrower will identify and implement measures to address impacts on cultural heritage in accordance with the mitigation hierarchy. Where appropriate, the Borrower will develop a Cultural Heritage Management Plan and Chance Find Procedure.

Relevance to the Project

This standard is relevant. Although the proposed civil works under sub-component 2.1 will be implemented with the existing greenhouse areas and no risks and impacts on cultural heritage are expected, while developing infrastructure for access to geothermal energy and building new greenhouses under sub-component 2.1.b there are chances that CH are encountered, especially those that include excavation and earthworks.

5.8.1. National Legislation

Cultural heritage in Turkey is governed by

- Protection of Cultural and Natural Assets (No: 2863)
- Foundations Law (No: 5737)

5.8.2. Gaps and Measures

The gaps between ESS8 – Cultural Heritage and Law No: 2863 are;

- Paragraph 4 of the ESS8 states that the definition of cultural heritage covers both tangible and intangible heritage. Although carrying out studies for the purpose of researching, compiling, archiving, promoting and registering the intangible cultural heritage is among the duties of General Directorate of Research and Education of Ministry of Culture and Tourism (10.7.2018/30474), the legislations do not cover activities or measures to protect those intangible cultural heritages. Law No: 2863 covers only the movable and immovable tangible cultural and natural assets.
- Law covers only registered cultural assets while paragraph 6 of ESS8 states that the requirements of ESS8 apply to cultural heritage regardless of whether or not it has been legally protected.

To close the gaps:

- If the environmental and social assessments that will be conducted on the field prior to the implementation of the Project reveals that there are cultural assets that are not legally protected in the project area or the Project would have material effects on the intangible cultural heritages, a Cultural Heritage Management Plan will be prepared in accordance with the mitigation hierarchy.
- A Chance Find Procedure which is annexed to this document will be integrated into ESIAs/ESMPs, where needed.

5.9. ESS 10: Stakeholder Engagement and Information Disclosure

This ESS recognizes the importance of open and transparent engagement between the Borrower and project stakeholders as an essential element of good international practice. Effective stakeholder engagement can improve the environmental and social sustainability of projects, enhance project acceptance, and make a significant contribution to successful project design and implementation.

The objectives of ESS10 are;

- To establish a systematic approach to stakeholder engagement that will help Borrowers identify stakeholders and build and maintain a constructive relationship with them, in particular project-affected parties.
- To assess the level of stakeholder interest and support for the project and to enable stakeholders' views to be taken into account in project design and environmental and social performance.
- To promote and provide means for effective and inclusive engagement with project-affected parties throughout the project life cycle on issues that could potentially affect them.
- To ensure that appropriate project information on environmental and social risks and impacts is disclosed to stakeholders in a timely, understandable, accessible and appropriate manner and format.
- To provide project-affected parties with accessible and inclusive means to raise issues and grievances, and allow Borrowers to respond to and manage such grievances, and allow Borrowers to respond to and manage such grievances. ESS10 applies to all projects supported by the Bank through Investment Project Financing

ESS10 requirements cover the development of a Stakeholder Engagement Plan that will define the following; (i) engagement during project preparation including stakeholder identification and analysis, stakeholder engagement plan, information disclosure, and meaningful consultation; (ii) engagement during project implementation and external reporting; (iii) grievance mechanism; and (iv) organizational capacity and commitment.

Relevance to the Project

Given the sensitivity and complexity of some sub-projects, site specific stakeholder engagement plans will be prepared by XXXX. MoAF has also prepared a SEP which is a guidance document for the preparation of sub-project specific SEPs.

The Project SEP includes additional measures that will be employed during the outbreak of the Covid-19 pandemic and how MoAF will consult and disclose project related information during limitations applied by the government. The sub-project specific SEPs that will be prepared by the XX will also incorporate similar measures that will be utilized in the sub-projects' area of influence (AoI) according to diversifying needs of their stakeholders.

The various sub-projects require stakeholder engagement, and consultations with project-affected peoples are particularly important. MoAF already has a grievance mechanism in place. At present, MoAF is using Presidency's Communication Center (CİMER) system, to collect and to respond public grievances. CİMER, (published in the Official Gazette on November 20, 2006) was established in order to convey the demands, notices and complaints of citizens directly to the presidency. With this service the citizens of Republic of Turkey can use their rights given by Right to Information Act (No. 4982) and the Right to Petition (No. 3071). The citizens can utilize the system through their Turkish Republic identity number, name, surname and address It is also possible to log a grievance via CİMER by phone and letter. Complaints made can be followed up automatically with the application number generated by the system.

Since both the environmental and social risks of the project is "**Substantial**", the capacity of MoAF's and XXXX to manage stakeholder engagement need to be improved considerably during project preparation in order to minimize the risk of community resistance. In this respect, MoAF will establish a separate project-based GM during the implementation of the project as a part of project specific SEPs. The project-based GM is intended to serve as a mechanism to:

- allow for the identification and impartial, timely and effective resolution of issues affecting the project;
- strengthen accountability to beneficiaries, including project affected stakeholders, and provide channels for them to provide feedback and raise concerns; and
- Allow anonymous grievances to be processed per requirements of the ESS10.

Vulnerable and disadvantaged groups (such as XXXX, AA, BB, CC, etc.) will be identified through the ESIAs/ESMPs, RPs and during the preparation of sub-project specific SEPs. Additionally, local NGOs/CSOs (particularly working with refugees on social cohesion issues), community leaders, universities, and local government representatives residing or working in the project areas will also be considered as stakeholders.

Having an effective GM in place will also serve the objectives of reducing conflicts and risks such as external interference, corruption or mismanagement; improving the quality of project activities and results; and serving as an important feedback and learning mechanism for project management regarding the strengths and weaknesses of project procedures and implementation processes. Any potential SEA/SH risks will be assessed for sub-projects, and if needed the community-level GM will be enhanced to accept SEA/SH-related issues/cases. Details to the project GM have been provided under the project SEP.

5.9.1. National Legislation

There is no straight-forward national legislation covering all investment projects on stakeholder engagement and information disclosure. Nevertheless, the existing legislations that can be helpful for stakeholder engagement and information disclosure are:

- **Law on the Protection of Personal Data (No: 6698).** The purpose of this law is to protect the fundamental rights and freedoms of individuals, especially the privacy of private life, in the processing of personal data and to regulate the obligations and procedures and principles to be complied with by real and legal persons who process personal data.
- **Right to Acquire Information Law (No: 4982).** The objective of this law is to regulate the procedure and the basis of the right to information according to the principles of equality, impartiality and openness that are the necessities of a democratic and transparent government.
- **Right to Petition (No: 3071) and Appeal to the Ombudsperson.** "Citizens and foreigners resident in Turkey, with the condition of observing the principle of reciprocity, have the right to apply in writing to the competent authorities and to the Grand National Assembly of Turkey with regard to the requests and complaints concerning themselves or the public. The result of the application concerning himself/herself shall be made known to the petitioner in writing without delay. Everyone has the right to obtain information and appeal to the Ombudsperson. The Institution of the Ombudsperson established under the Grand National Assembly of Turkey examines complaints on the functioning of the administration .
- **Right to Constitutional Complaint (Constitution, Article 148).** Everyone may apply to the Constitutional Court on the grounds that one of the fundamental rights and freedoms within the scope of the European Convention on Human Rights which are guaranteed by the Constitution has been violated by public authorities. In order to make an application, ordinary legal remedies must be exhausted." "Article 24, Appeal process - The applicant whose request for information was rejected may appeal to the Board within fifteen days starting from the official notification before appealing for judicial review. Appeals should be written. The Board shall render a decision within 30 days.

- Environmental Impact Assessment Regulation (25.11.2014/29186)

5.9.2. Gaps and Measures

In general Right to Acquire Information Law no. 4982 regulates the principles and procedures regarding the right to acquire information by individuals. According to Article 5 “Obligation to provide information”, “(i)institutions and organizations are obliged to take the necessary administrative and technical measures in order to make all kinds of information or documents available to the applicants, (…), and to conclude the information applications effectively, quickly and accurately”. However, Law no. 4982 does not cover stakeholder participation activities, it just allows the one-way transmission of information as Law on the exercise of the Right to Petition (No. 3071) which regulates the exercise of the right to petition of Turkish citizens and foreigners residing in Turkey to the Turkish Grand National Assembly and the competent authorities regarding their requests and complaints regarding themselves or the public. According to Article 4 “Mandatory conditions for the petition”, in order for the petition to be processed, the petitioner's name, surname and signature, as well as her work or residence address, must be included in the petition. Responses are sent with reasons within 30 days at the latest.

At project specific issues, when a project requires EIA–as defined in Environmental Impact Assessment Regulation–a public participation meeting is held in order to inform the public about the investment and to receive their opinions and suggestions regarding the project. Full EIA report is also disclosed at https://eced-duyuru.csb.gov.tr/eced-prod/duyurular.xhtml with the cut-off-date for comments.

The measures to close the gaps between the ESS10 and the existing legislations are presented in detail in the SEP document prepared for the Project.

World Bank Safeguards Policies

After enactment of the ESF, environmental and social safeguard policies of the World Bank got abolished, but some remained in force. One of them is OP 7.50 - Projects on International Waterways. It describes the types of waterways and projects that the policy applies, and the requirements and conditions of financing projects on international waterways. With regard to OP 7.50, MoAF is responsible for ensuring that the sub-projects financed are located and dependent on national waterways only. Any sub-project which triggers OP 7.50 will not be financed under this project. The waterways identified as NOT being international waterway (do not trigger OP 7.50) in Turkey are the following: Susurluk, North Aegean, Gediz, Kucuk Menderes, Buyuk Menderes, Western Mediterranean, Antalya, Sakarya, Western Black Sea, Yesilirmak, Kizilirmak,Konya Kapali, Eastern Mediterranean, Seyhan, Ceyhan, Eastern Black Sea, Burdur, Afyon, Orta, Anadolu, and Van. The sub-projects affecting water quantity and quality other than those waterways will be ineligible for financing.

6. Analysis of Environmental and Social Impacts for the Proposed Activities/Subprojects

In this section the major environmental and social issues pertaining to the potential types of subprojects and their associated facilities will be identified and assessed. The project will generate a series of direct and indirect environmental and social risks and impacts and are presented below.

6.1. Overall positive environmental and social impacts

The project will generate a series of positive impacts in various sectors:

Environment and Climate Change: By supporting the adoption of climate-smart agriculture, including climate-smart infrastructure (such as geothermally heated greenhouses) and climate-smart technologies and practices, the project will make its contribution to reducing vulnerability to climate shocks and increasing climate resilience, as well and improving resource-use efficiencies, reducing greenhouse (GHG) emissions and pollution due to more effective agricultural input use. The project will also expand Turkey's capacity for land-use planning and enhancing soil health, which will contribute to long-term agricultural sustainability and resiliency.

Overall, the project activities are strongly aligned with improved climate outcomes and the National Development and Climate Action Plans, both in terms of mitigation and adaptation. The activities financed under the project address multiple climate-related challenges facing the sector and invest in activities related to capacity building, farmer education and training, incentives and research and innovation. The project is expected to generate significant climate co-benefits by promoting a range of activities that will enhance the adaptation and mitigation capacity of farming systems in Turkey.

Specifically, Component 1 would support the agenda on (i) protection and conservation of soils and lands by strengthening national capacity around determining and monitoring soil health and (ii) the protection of agricultural land and its sustainable use, which are intrinsic to the climate change agenda. By determining soil types/classifications and producing maps and dynamic monitoring systems for soil threats (soil erosion, organic matter, desertification, salinity, etc.), the project will contribute critical information to inform climate policies and support decision making processes. The mapping of carbon sinks and the production of dynamic models that monitoring their changes over time is a critical tool for the assessment of climate change impacts and fulfill international reporting requirements. Land use classifications will inform a set of policies around conservation of agricultural lands and their sustainable use. This will inform practices that improve soil health through efficient nutrient management, changes in crop patterns that are aligned with climate change and reducing pressure on non-agricultural by improving productivity and sustainability of current agricultural lands. The project would also support the development and piloting of methodologies for crop and yield forecasting (including incorporating climate data).

Component 3 will contribute to climate change mitigation and prevention of environmental pollution through (i) better manure management, (ii) validating and mainstreaming renewable and energy efficient technologies (solar, geothermal) and more efficient resources use; and (iii) supporting technologies displacing use of chemical fertilizers and with organic fertilizers and overall increasing effectiveness of fertilizer applications; and (iv) supporting digital technologies that increase the effectiveness of input use and animal welfare, contributing to emission reductions. In terms of adaptation, the project would support climate assessments to understand climate impacts and adaptation strategies. Expansion of modern greenhouses would also encourage adoption of drip irrigation and other water-saving technologies, and modern greenhouses structures and materials are more resilient to weather elements and less susceptible to climate shocks i.e. heavy rains, high

winds, hail among others. Also, the project's Component 3 would support applied research on CSA practices, IPM, and precision agriculture through better natural resource management and reduced use of fertilizers, and adoption of GAP through extension services. These public programs would promote both mitigation of and adaptation to climate change and will scale up CSA.

By supporting measures that will help farmers mitigate and increase their adaptive capacity and resilience to climate change as well as the project will contribute to Turkey's National Development and Climate Action Plans, relevant to the agricultural sector. Project activities will contribute towards its INDCs (Intended Nationally Determined Contribution) goals both in terms of adaptation as well as mitigation. Under all components, the infrastructure, including buildings, laboratories, offices, storage facilities etc., constructed and rehabilitated by the project, will be encouraged to utilize energy-efficient and climate-resilient materials and designs, and all activities related to human resource development will include topics on understanding climate change better and frameworks, tools and techniques to facilitate designing and implementing climate adaptation and mitigation approaches. The project Results Framework includes a set of climate-related indicators.

Reducing GHG Emissions: The Ex-Ante Carbon-balance Tool (EX-ACT) was applied to estimate the GHG impact of agricultural activities supported by the proposed operation. The analysis measured the potential GHG impact generated from 1) protecting fertile agricultural land from conversion to non-agriculture uses as result of the soil analysis and preparation of land use planning notes and 2) reduction of agricultural inputs from investment in subproject on modernization of greenhouses, geothermal pilot, precision agriculture technologies (including livestock) as well as manure management technologies. The results indicate that over the project lifetime duration of 20 years, the project constitutes a net carbon sink of around 4.27 million tCO2-eq. The annualized carbon sink is estimated at 213,414 tCO2-eq per year or around 10.4 tons of tCO2-eq per hectare per year.

Improving Food and Animal Safety. The project will support effective one-health and food safety systems through reducing of animal diseases (including zoonotic) and by enhancing animal health-related monitoring and control capacity, including quality control of veterinary medicines, which overall will help promoting approaches to reduce antibiotic, pesticide, and input use. Component 2 will focus on enhancing capacity for early detection and effective control of animal diseases. The epidemiology and adaptation capacity of animal diseases is highly affected by climate change. Therefore, activities in this component will also contribute to agriculture climate change adaptation.

Nutrition: The project will support innovations and productivity enhancement on crops that constitute part of a healthy diet and critical from a food security perspective, such as legumes and vegetables. It will also provide opportunities for crop diversification, within greenhouse infrastructure, and the overall reduction of pesticides and pollution, that will contribute to the food safety of consumers in Tukey. Furthermore, effective monitoring of animal diseases will contribute to safer agriculture production, with benefits in terms of animal and human health.

Employment and Income Generation: Project activities are expected to contribute to sustained long-term sectoral growth and provide opportunities for local youth and contribute to preventing out-migration. Furthermore, it will also provide income opportunities in the agri-food sector by promoting innovation and technology adoption to achieve cost efficiencies, enhance productivity, and preserve growth-oriented agricultural sectors. The project will also support human capital development among farmers, service providers, including youth and women, through skills training and technical support.

Gender: The project will focus on closing two gender gaps, lack of technical and business skills and access to financial products and services. It will also contribute to enhancing working conditions for

women and overall to reducing gender stereotypes in the agriculture sector. Under Component 2, the project will target technical support to women to ensure that grant applicants include women in their management and/or membership. To monitor the progress of closing the gender gap in women's access and control of assets and technical skills, the indicator "Female beneficiaries as counterpart in the implementation of the matching grant scheme (%)", and; in addition, specific targets for disaggregated (for women) indicators on training of farmers and extension service providers will be included in the project's Results Framework. Under Subcomponent 3.4: Research and innovations to support CSA, activities will be promoted around of the generation, adaptation or dissemination of gender-inclusive technologies, such as the dairy milking technology powered with solar energy, which facilitate milking processes often carried out by women. Furthermore, under Subcomponent 3.1. the project will support improved greenhouse infrastructure as well as efforts to reduce pesticide applications in vegetable production, which will contribute to improved working conditions for women, as the majority of the labor force in greenhouse production is made of women. The expansion of greenhouse infrastructure investments will also support the generation of labor opportunities for women.

6.2. Overview of adverse environmental and social impacts, risksand mitigation measures

Along with specified above positive impacts and overall outcomes, during the implementation phase, there might be generated a series of moderate to substantial adverse environmental risks and impacts. While the activities under Component 1, Subcomponent 3.2a, Subcomponent 3.3a, Subcomponent 3.4 and Component 4 will not likely generate any environmental and social adverse impacts, all others might generate such impacts. These are related to civil works proposed under Subcomponent 3.1 on (a) "Modernization of small-scale greenhouse production"; and (b) "Piloting model for clustering greenhouse production around an efficient energy source (geothermal energy)" or under Subcomponent 3.2 that would support promoting installation of solar panels. These investments will finance building basic infrastructure for getting access to geothermal and solar energy, creating opportunities for private sector for getting access for more reliable and clean energy to modernize or to build new greenhouses. Associated with these investments risks and potential adverse impacts include: emissions of dust and vehicle exhausts impacting air quality; noise and vibration causing disturbances; generation of hazardous (possibly Asbestos-Containing Materials – ACM) and non-hazardous waste; OHS-related risks; traffic and road-related risks from increased traffic volume and movement of heavy-duty vehicles; associated community health and safety (CHS) (including traffic management related risks and Sexual Exploitation and Abuse/Sexual Harassment [SEA/SH]); health risks associated with pest management activities in greenhouse, land acquisition risks and impacts correspondingly loss of livelihood; and risks of spreading COVID-19 infection. A series of adverse environmental risks and impacts will be also generated under Subcomponent 3.3 which will support improving manure management activities as well as construction and equipment to set up the manure-energy-biofertilizer facility as well as equipment for transportation and application of biofertilizer in fields. These activities might generate along with already specified above risks and impacts those related to technical safety, GHGs emissions. The proposed activities under Component 2 targeted at "Enhancing animal health capacity for effective disease surveillance and control" that would support along with upgrades to the institutes' infrastructure to increase the biosafety label (BSL) of laboratory units by investing in critical construction work and equipment needs, biosafety, and biosecurity trainings, the establishment of a centralized Veterinary Medical Control Center which require civil works. Respectively, in addition of those risks and impacts specified above for civil works these activities might generate a series of biosafety risks.

While building infrastructure for getting access to geothermal energy or supporting new construction proposed under the project, there might be some impacts on natural habitats and supporting by them flora and fauna resources, although they will be on small scale as all investments that will be located in critical natural habitats will be excluded from financing, based on the initial environmental screening.

Overall, as the proposed types of civil works are well known and will be relatively in small scale, these risks and impacts are not expected to produce significant or irreversible adverse effects on human health and/or the environment, - they will be mostly moderate but in some cases (construction of a biogas installation or of a Veterinary Medical Control Center as well as construction of large greenhouses or building of infrastructure for getting access to geothermal energy) the impacts and risks can be substantial.

While the generic risks and mitigation measures for the activities are given in detail in Annex 12 through Annex 18, Table 3 provides the summary for potential adverse environmental and social risks, impacts and references for mitigation measures. In addition, the risks and impacts that are specific for different types of activities are explained in detail in Section 6.3. The proposed measures will be used for development of ESMPs for selected sub-projects.

Table 3: Summary of potential environmental and social risks/impacts and mitigation measures

Subcomponent	Activities	Potential Adverse Environmental and Social Risks/Impacts	Reference to Prevention and/or Mitigation Measures
Component 1: **Institutional Capacity Strengthening for Climate Smart Agri-food Policy, Planning, and Investments**			

Subcomponent	Activities	Potential Adverse Environmental and Social Risks/Impacts	Reference to Prevention and/or Mitigation Measures
Subcomponent 1.1: Narrowing information gaps to enhance soil health and land-use planning/management	• Soil surveys, Mapping & Classification • Development of detailed soil maps (1:5K) • Laboratory analysis • Identification of the soil monitoring sites • Establishment/Strengthening the National Soil Archive Facility • Development of national harmonized soil profile database • Production of soil property and threat maps • Development of data sharing & use policy • Development of soil-land spatial data infrastructure (SDI) and National Soil & Land Information System • Establishment of national soil monitoring sub-system for selected indicators • Establishment of Dynamic Modelling/Mapping System • Development of land plans/notes and land classification • Establishment of Decision Support System (DSS) to delineate absolute agricultural lands and alternatives for non-agricultural land use • Awareness campaigns	For construction/retrofication phase, general potential adverse risks are given in Section 6.3.2.	

Subcomponent	Activities	Potential Adverse Environmental and Social Risks/Impacts	Reference to Prevention and/or Mitigation Measures
	• Construction of …		
Subcomponent 1.2: MoAF digital blueprint for sectoral information collection and management	• Specialized consulting services • Acquisition of software / hardware / equipment • Training	No adverse environmental or social impact is expected	None
Component 2: **Enhancing Animal Health Capacity for Effective Disease Surveillance and Control**			

Subcomponent	Activities	Potential Adverse Environmental and Social Risks/Impacts	Reference to Prevention and/or Mitigation Measures
Subcomponent 2.1: Strengthening the capacity of animal health institutes	Upgrading institutes' infrastructure to increase the biosafety label (BSL) of laboratory units (Civil works in existing buildings))	For construction phase, general potential adverse risks are given in Section 6.3.2. For operation phase: • Environment ○Air emissions ▪ Emission of volatile organic compounds ▪ Emission of particulate matter ▪ Combustion Source Emissions ▪ Emission of GHGs ▪ Odor emissions from fermentation activities ○Generation of wastewater ▪ Industrial process wastewater containing chemicals ▪ High water consumption ○Generation of solid and hazardous wastes ○Use of hazardous materials ○Threats to Biodiversity ▪ Collection of genetic resources (bioprospecting) ▪ Accidental release of living modified organisms (biosafety) ○Bioethics • Occupational Health and Safety ○Burns due to steam or direct contact with hot surfaces and heat exhaust ○Exposure to and inhalation of chemicals ▪ Fire and Explosions ○Exposure to pathogens ○Exposure to radiological materials ○Exposure to high level of noise generated by utilities • Community Health and Safety ○Accidents while transporting hazardous materials ○Emergencies related to accidentally released chemicals, fire and explosions	For construction phase: The measures to prevent and/or mitigate adverse impacts are given in Annex 12 and in Section 6.3.2. For operation phase: The measures to prevent and/or mitigate adverse impacts are given in Annex 13 in Section 6.3.5.

Subcomponent	Activities	Potential Adverse Environmental and Social Risks/Impacts	Reference to Prevention and/or Mitigation Measures
	• Equipment needs • Information systems • Biosafety and biosecurity trainings	No adverse environmental or social impact is expected	None
Subcomponent 2.2: Strengthening and improving veterinary medical product control	Establishment of a centralized Veterinary Medical Control Center (Civil works)	For construction phase, general potential adverse risks are given in Section 6.3.2. In addition to those risks, below risks/impacts might occur for this activity: • Land acquisition (economic displacement impacts such as loss of land and land related income, restricted access to land, disturbance of land use practices etc.) • Chance finds For operation phase same as in Subcomponent 2.1.	For construction phase: Annex 12 and Section 6.3.2 For operation phase: Annex 13 and Section 6.3.5. For land acquisition: Section 6.3.9 For chance findings: Section 6.3.8
Component 3: **Investments for Enhanced Productivity, Resource-Efficiency, and Climate Resilience**			

Subcomponent		Activities	Potential Adverse Environmental and Social Risks/Impacts	Reference to Prevention and/or Mitigation Measures
Subcomponent 3.1: Strengthening climate resilience, productivity, and resource-use efficiency in vegetable value chains	a) Modernization of small-scale greenhouse production	Improvement of existing traditional greenhouse infrastructure (Civil works)	For construction phase, general potential adverse risks are given in Section 6.3.2. For operation phase: • Environment ○Physical and chemical degradation of soils ○Contamination of groundwater resources and eutrophication of surface water resources from surface runoff and leaching of nutrients ○Non-crop wastes or hazardous wastes from the production systems (e.g., pesticide containers, waste pesticides, and packaging) ○Decrease in the quantity of water resources due to irrigation ○Improper use of pesticides which eradicates all organisms ○Accidental spills during the transfer, mixing, storage, and application of pesticides which contaminates soils, wildlife, groundwater, or surface water resources ○Increased energy use resulting from site preparation, cultivation, management, irrigation, harvesting, transport, lighting ○Decreased air quality resulting from the operation of mechanized equipment or from combustion by-products from the disposal or destruction of crop residues or processing by-products ○GH Emissions resulting from (i) land use change (CO_2) during site preparation, (ii) fertilizers (NOx) and on-farm fuel and electricity use (CO_2) during production • Occupational Health and Safety ○Physical hazards ▪ Operational and workplace hazards including (i) slips, trips, and falls (ii) ergonomics hazards; (iii) sharp and moving objects; and (iv) over-exposure to noise, vibration, and extreme or adverse weather conditions. ▪ Accidents due to usage of machines and vehicles in	For construction phase: The measures to prevent and/or mitigate adverse impacts are given in Annex 12 and in Section 6.3.2 For operation phase: The measures to prevent and/or mitigate adverse impacts are given in Section 6.3.4 and 6.3.8

Subcomponent		Activities	Potential Adverse Environmental and Social Risks/Impacts	Reference to Prevention and/or Mitigation Measures
		• Technical assistance, training	No adverse environmental or social impact is expected	None

Subcomponent		Activities	Potential Adverse Environmental and Social Risks/Impacts	Reference to Prevention and/or Mitigation Measures
Subcomponent 3.1: Strengthening climate resilience, productivity, and resource-use efficiency in vegetable value chains	b) Pilot model for clustering greenhouse production around an efficient energy source (geothermal energy)	Geothermal drilling	For construction phase, general potential adverse risks/impacts are given in Section 6.3.2. In addition to those , below risks/impacts might occur for this activity: • Land acquisition (economic displacement impacts such as loss of land and land related income, restricted access to land, disturbance of land use practices etc.) • Chance finds For operation phase: • Environment ○Effluents ▪ Chemical additives in drilling fluids and oil-related contaminants in cuttings ▪ High temperature, low pH spent geothermal fluids, containing heavy metals ○Air emissions ▪ Emissions of hydrogen sulfide and mercury ▪ Other emissions depending on the characteristic of the geothermal resource ○Hazardous solid waste ▪ Varying concentrations of sulfur, silica, and carbonate precipitates. ▪ Leaching of silica compounds, chlorides, arsenic, mercury, vanadium, nickel, and other heavy metals ○Release of toxic drilling additives and fluids and hydrogen sulfide gases from underground formations caused by well blowouts and release of geothermal fluids and steam containing heavy metals, acids, mineral deposits, and other pollutants caused by pipeline failures ○Excess water extraction from surface water • Occupational Health and Safety ○Exposure to geothermal gases, mainly to hydrogen sulfide ○Accidents caused by confined spaces ○Burns due to exposure to steam or direct contact with hot surfaces as well as blowout accidents	For land acquisition: The measures to prevent and/or mitigate adverse impacts are given in Section 6.3.9. For chance findings: The measures to prevent and/or mitigate adverse impacts are given in Section 6.3.8. For construction phase: The measures to prevent and/or mitigate adverse impacts are given in Annex 12 and in Section 6.3.2 For operation phase: The measures to prevent and/or mitigate adverse impacts are given in Annex 14

Subcomponent		Activities	Potential Adverse Environmental and Social Risks/Impacts	Reference to Prevention and/or Mitigation Measures
Subcomponent 3.1: Strengthening climate resilience, productivity, and resource-use efficiency in vegetable value chains	b) Pilot model for clustering greenhouse production around an efficient energy source (geothermal energy)	Energy transmission line and network backup power line	For construction phase, general potential adverse risks/impacts are given in Section 6.3.2. In addition to those, below risks/impacts might occur for this activity: • Land acquisition, right of easement (economic displacement impacts such as loss of land and land related income, restricted access to land, disturbance of land use practices etc.) • Chance finds (if there are excavation works) For operation phase: • Environment ○Terrestrial Habitat Alteration ▪ Transformation of habitat caused by the construction of right-of-way ▪ Increased likelihood of the establishment of invasive species caused by excessive vegetation for right-of-way maintenance ▪ Forest fires caused by improper right-of-maintenance ▪ Fatal risks to birds and bats through collisions and electrocutions ○Aquatic Habitat Alteration ○Exposure to Electric and Magnetic Fields ○Hazardous materials ▪ PCBs which are used as insulating oils and fuels ▪ Preservatives used for wood preservation ▪ Pesticides that are used for maintenance of right-of-way • Occupational Health and Safety ○Live power lines ○Working at height on poles and structures ○Exposure to Electric and Magnetic Fields ○Exposure to chemicals (pesticides, PCBs). • Community Health and Safety ○Electrocution ○Electromagnetic interference during rain, sleet or	For land acquisition: The measures to prevent and/or mitigate adverse impacts are given in Section 6.3.9. For chance findings: The measures to prevent and/or mitigate adverse impacts are given in Section 6.3.8. For construction phase: The measures to prevent and/or mitigate adverse impacts are given in Annex 12 and in Section 6.3.2 For operation phase: The measures to prevent and/or mitigate adverse impacts are given in Annex 15 and in Section 6.3.6

Subcomponent		Activities	Potential Adverse Environmental and Social Risks/Impacts	Reference to Prevention and/or Mitigation Measures
Subcomponent 3.1: Strengthening climate resilience, productivity, and resource-use efficiency in vegetable value chains	b) Pilot model for clustering greenhouse production around an efficient energy source (geothermal energy)	Potable and utility water distribution system	For construction phase, general potential adverse risks/impacts are given in Section 6.3.2. In addition to those, below risks/impacts might occur for this activity: • Temporary land acquisition, right of easement (economic displacement impacts such as loss of land and land related income, restricted access to land, disturbance of land use practices etc.) • Chance finds For operation phase: • Environment ○ Water withdrawal resulting in decrease of the water supply in surface and groundwater resources. ○ Water distribution ▪ Water system leaks and loss of pressure ▪ Discharging of water containing suspended solids, residual chlorine, and other contaminants that can harm surface water bodies • Community Health and Safety ○ Contaminated water intake (water supply protection) ○ Deficiencies in the water distribution system	For land acquisition: Section 6.3.9. For chance findings: Section 6.3.8. 6.3.7 ….water balances For construction phase: The measures to prevent and/or mitigate adverse impacts are given in Annex 12 and in Section 6.3.2 For operation phase: The measures to prevent and/or mitigate adverse impacts are given in Annex 16
		• Consulting services • Dissemination and outreach activities	No adverse environmental or social impact is expected	None

Subcomponent		Activities	Potential Adverse Environmental and Social Risks/Impacts	Reference to Prevention and/or Mitigation Measures
Subcomponent 3.2: Promoting the adoption of CSA technologies/ practices across relevant crops	a) Digital CSA technologies	• Acquisition of equipment / machinery and related goods, training • License fees for remote sensing cloud-based analytical services	No adverse environmental or social impact is expected	None
	b) Solar energy as an alternative power source for pump irrigation systems	Establishment of solar energy systems (civil works)	For construction phase, general potential adverse risks/impacts are given in Section 6.3.2. In addition to those, below risks/impacts might occur for this activity: • Land acquisition (economic displacement impacts such as loss of land and land related income, restricted access to land, disturbance of land use practices etc.) • Chance finds For operation phase:[15] • Environment ○Permanent soil loss if the vegetable topsoil is not reused ○Spillage of chemicals stored onsite for maintenance purposes, and leaching into the soil ○Limited amount of electrical and electronic equipment wastes ○Reflection and glare might affect sensitive habitats • Community Health and Safety ○Reflection and glare affecting nearby communities, transportation routes, airports	For land acquisition: Section 6.3.9. For chance findings: Section 6.3.8. For construction phase: The measures to prevent and/or mitigate adverse impacts are given in Annex 12 and in Section 6.3.2 For operation phase: The measures to prevent and/or mitigate adverse impacts are given in Annex 17

[15] Technical Assistance for Strengthening the Capacity of the Ministry of Environment and Urbanization on Environmental Impact Assessment (EIA), 2017

Subcomponent		Activities	Potential Adverse Environmental and Social Risks/Impacts	Reference to Prevention and/or Mitigation Measures
		• Technical assistance, training	No adverse environmental or social impact is expected	None
Subcomponent 3.3: Enhancing the productivity and greening	a) Piloting of a PLF program	• Acquisition of equipment for dairy farms • Technical backstopping • Training & demonstrations • Specialized consulting services	No adverse environmental or social impact is expected	None

Subcomponent		Activities	Potential Adverse Environmental and Social Risks/Impacts	Reference to Prevention and/or Mitigation Measures
profile of cattle production in Turkey	b) Reducing cattle production pressures on water pollution and GHG emissions	• Manure collection and processing system • Biogas generation (integrated approach to manure management)	For construction phase, general potential adverse risks/impacts are given in Section 6.3.2. In addition to those, below risks/impacts might occur for this activity: • Land acquisition (economic displacement impacts such as loss of land and land related income, restricted access to land, disturbance of land use practices etc.) • Chance finds For operation phase: • Environment ○ Waste management ▪ Soil, water, and plant resources (for human, livestock, or wildlife consumption) might be affected by manure containing disease-causing agents such as bacteria, pathogens, viruses, parasites, and prions ○ Air emissions ▪ Emission of ammonia and odors ▪ Emission of GHGs ○ Generation of wastewater ▪ Industrial process wastewater containing nutrients, ammonia, sediment, pesticides, pathogens and feed additives, such as heavy metals, hormones, and antibiotics might contaminate surface or groundwater resources ▪ High water consumption • Occupational Health and Safety ○ Exposure to physical hazards ○ Exposure to chemical hazards ○ Exposure to biological agents ○ Confined spaces	For land acquisition: The measures to prevent and/or mitigate adverse impacts are given in Section 6.3.9. For chance findings: The measures to prevent and/or mitigate adverse impacts are given in Section 6.3.8. For operation phase: The measures to prevent and/or mitigate adverse impacts are given in Annex 12 and in Section 6.3.2 For construction phase: The measures to prevent and/or mitigate adverse impacts are given in Annex 18 and in Section 5

Subcomponent		Activities	Potential Adverse Environmental and Social Risks/Impacts	Reference to Prevention and/or Mitigation Measures
		• Equipment for transportation and application of biofertilizer in fields • Training & Demonstrations	No adverse environmental or social impact is expected	None
Subcomponent 3.4: Research and innovations to support CSA		R&D	No adverse environmental or social impact is expected	None
Component 4: Project Management, Monitoring, and Evaluation		Project Management, Monitoring, and Evaluation	No adverse environmental or social impact is expected	None

6.3. Proposed Mitigation Measures

6.3.1. General approaches.

The tables presented above specify not only anticipated environmental and social risks and impacts but also mitigation measures, based on the best international practices and specified in the World Bank Group in 2007 in its Environmental, Health, and Safety Guidelines , as well as outlined in the Best Available Techniques to the EU Integrated Pollution Prevention Control Directive , documents which could be consulted while conducting the EIA studies and preparing the Environmental and Social Management Plans.

Overall, the adverse environmental and social impacts and risks that will be generated under the activities of Component 2, Subcomponent 3.1, Subcomponent 3.2b and Subcomponent 3.3b will be mitigated in line with the principles of Mitigation Hierarchy as set out in WB ESS1(Figure 3).

Figure 3: Mitigation hierarchy

Anticipate and Avoid: Examples of avoidance measures include selecting project sites that are not environmentally or social sensitive and finding ways to enable current residents to continue to live on the project site rather than re-locating them.

Minimize or Reduce: Examples of measures to reduce or minimize risks include use of low-emission and "benign by design" technologies and lowering the height of a proposed dam to reduce the number of people needing resettlement.

Mitigate: Examples of mitigation measures include providing alternative access to important cultural or natural resource assets, installing underpasses or green bridges across busy roadways, and physical rehabilitation or ecological restoration of construction sites.

Compensate for or Offset: Significant Residual Risks In the final step, the terms "compensation" or "offsetting" usually refer to establishing biodiversity offsets to achieve "no net loss" or "net gain" in biodiversity value. This is acceptable only as a last resort under specific circumstances, as set out in ESS6. Compensation can also refer to providing benefits of various kinds to help make some types of project's impacts acceptable to stakeholders, as in the case of the project proponent developing a new community recreation area if the existing areas used for recreation are made less attractive or accessible as a result of the project. However, the term "compensation" as used in the Mitigation Hierarchy does not refer to financial compensation for project-affected people for loss of land or land-based assets in accordance with ESS5.

Where it is determined that it is technically or financially not feasible to compensate or offset for residual impacts, the rationale for this determination (including the options that were considered)

should be set out in the environmental and social assessment documentation and will be taken into consideration in the World Bank's decision on whether to support the proposed project.

Based on the existing WB and national ESIA rules and procedures, all potential impacts from planned economic activities must be identified and the set of mitigation measures has to be outlined. Furthermore, since preventive measures are favored over mitigating or compensatory measures, the Project will provide capacity building to all involved parties and especially to the PIU, to avoid or minimize potential environmental impacts through applying a set of good practices directed to sub-borrowing enterprise through providing guidance on environmental sustainability matters when advising on agricultural production, cattle farming, greenhouse production.

6.3.2. Overview of adverse environmental and social risks and proposed mitigation measures for activities supporting civil works

The potential environmental and social adverse risks and impactsfor civil works are:

- Environment
  - Noise and vibration
  - Soil loss and soil erosion
  - Air emissions
    - Dust
    - Exhausts from diesel engines of construction machineries
    - Asbestos
    - Emissions resulted from open burning of solid
  - Generation of solid and hazardous wastes
  - Use of hazardous materials which may release petroleum-based products
  - Generation of sanitary wastewater discharges in varying quantities depending on the number of workers involved
  - Contamination of land due to hazardous materials or oil
  - Intervention on biodiversity and habitats
- Occupational Health and Safety
  - Injuries resulted from over-exertion, slips and falls, work in heights, struck by objects, moving machinery, and confined spaces and excavations
  - Exposure to dust, including asbestos
  - Exposure to chemicals
  - Exposure to hazardous or flammable materials
  - Exposure to wastes
- Community Health and Safety
  - General site hazards resulting from inadvertent or intentional trespassing, including potential contact with hazardous materials, contaminated soils and other environmental media, buildings that are vacant or under construction, or excavations and structures which may pose falling and entrapment hazards
  - Communicable diseases resulted from labor influx
  - Traffic-related accidents and injuries resulted from the increase in traffic density or the movement of heavy vehicles for the transport of construction materials and equipment

The whole range of necessary measures to mitigate adverse project impacts and/or to maximize the positive ones are presented in the Annex12 through Annex18. The recommended mitigation

measures are based on the best international practices as well as on the existing practice in Turkey. This section of the ESMF focuses on main groups of such measures.

The potential impacts associated with the construction and rehabilitation activities in the case of veterinary laboratory upgrading or construction, or in the case of rehabilitation/small scale construction of greenhouses or solar panels, etc., will be easily mitigated by ensuring that all civil works will be designed and operated in accordance with environmentally sound engineering practices and governed by the applicable environmental standards of Turkey. This will be clearly specified in the construction contracts and enforced by the client. Such practices would include the following:

Organizational measures. Before starting the construction/rehabilitation activities it is necessary to inform the local construction and environment inspectorates and communities about upcoming activities in the media and/or at publicly accessible sites (including the site of the works). Furthermore, it is necessary to have in place all legally required permits. All works should be carried out in a safe and disciplined manner designed to minimize impacts on neighboring residents and environment. Construction workers should be properly dressed, having, when necessary, respirators and safety glasses, harnesses, and safety boots.

Protection of air quality and dust minimization. During construction/rehabilitation activities it is necessary to use debris-chutes above the first floor and to keep demolition debris in controlled area, spraying with water mist to reduce debris dust. It is also necessary to suppress dust during pneumatic drilling/wall destruction by ongoing water spraying and/or installing dust screen enclosures at site. It is strictly prohibited burning of construction/waste material at the site. For the transportation of any other dusty material to the rehabilitation site watering or covering of the cargo should be implemented. Reduction of dust on rehabilitation site during dry season of the year can be accomplished by watering the ground surface. Workers that perform the works should be introduced with protective closes and respirators.

Noise reduction. Before any beginning of the work, it is recommended to inform all potentially affected parties and especially the neighbors either directly or through local billboards or newspapers on the rehabilitation activities. The noise should be limited by using good management practice and limiting works on regular daily shift (during the vacation time) and or after the school classes. The construction equipment and machinery used should be calibrated according to the Noise Standards.

Construction wastes and spills. As a general requirement is that the existing building elements to be rehabilitated (walls, ground cement slabs etc.) should be carefully rehabilitated and the construction wastes should be sorted and removed in an organized way and disposed on an authorized land filed. All valuable materials (doors, windows, sanitary fixtures, etc.) should be carefully dismantled and transported to the storage area assigned for the purpose. Valuable materials should be recycled within the project or sold. Wastes wherever possible should be minimized, separated, and handled accordingly. When wastes are separated, they are more manageable. Some materials like doors or ceramics sinks might be usable on the site again. Non-usable materials should be taken to appropriate place for recycling. For non-recyclable wastes, in agreement with local councils the wastes will be deposited on authorized landfill. Open burning and illegal dumping of any waste is strictly prohibited. In addition to solid wastes, some amounts of hazardous wastes will be produced on the site: like the remaining from paints, enamels, oiled packaging, oils, material contaminated with oil, insulation material, etc., which must be collected and handed over to the local self-government body authorized for collection and transportation of hazardous waste.

Asbestos issues. The general approach while handling this material is that constructors avoided crushing/destruction of asbestos plates from the roofs and or from the walls insulation and deposited them in an organized manner on the construction sites. Also, the constructors should avoid releasing asbestos fibers into the air from being crushed. It is also imperative while working with asbestos plates the workers have to wear special closing, gloves and respirators. If the use of asbestos-containing materials (ACM) it is anticipated for the roof renovation, it is necessary to provide brief information about alternative non-asbestos materials, their availability and the rationale for the material choice made. Once the presence of ACM in the existing infrastructure has been presumed or confirmed and their disturbance is shown to be unavoidable, incorporate the following requirements in the ESMP and/or Waste Management Plan for construction works:

- Develop a plan for doing works involving removal, repair and disposal of ACM in a way that minimizes worker and community asbestos exposure. The plan should include: (i) Containment of interior areas where removal will occur in a negative pressure enclosure; (ii) Protection of walls, floors and other surfaces with plastic sheeting; (iii) Removal of the ACM using wet methods and promptly placing the material in impermeable containers; (iv) Final clean-up with vacuum equipment and dismantling of the enclosure and decontamination facilities; (v) Disposal of the removed ACM and contaminated materials in an approved landfill; (vi) Inspection and air monitoring as the work progresses, as well as final air sampling for clearance, by an entity independent of the contractor removing the ACM;
- Require that the construction firms/and or individuals employed during the construction have received training in relevant health and safety issues;
- Provide for all construction workers with personal protection means, including respirators and disposable clothing;
- Require that the beneficiary or the selected contractor notifies authorities of the removal and disposal according to applicable regulations and cooperates fully with representatives of the cognizant agency during all inspections and inquiries.

Temporary storage of materials (including hazardous). Stockpiling of construction material should be avoided if possible. If not, construction material should be stored on the construction site, and protected from weathering. Hazardous materials like paints, oils, enamels and others should be kept on impermeable surface, and adsorbents like sand or sawdust should be kept for handling small spillage.

Ensuring workers health and safety. The personal should have protective equipment, rubber gloves, respirators, goggles and breathing mask with filter, as well as helmets. Prior starting civil works, all workers have to pass labor safety training course. In addition, it is necessary to carry out the routine inspection of the machinery and equipment for purpose of the trouble shooting and observance of the time of repair, training and instruction of the workers engaged in maintenance of the machinery, tools and equipment on safe methods and techniques of work. Special attention should be paid to welding operations. It is prohibited to distribute the faulty or unchecked tools for work performance as well as to leave off hand the mechanical tools connected to the electrical supply network or compressed air pipelines; to pull up and bend the cables and air hose pipes; to lay cables and hose pipes with their intersection by wire ropes, electric cables, to handle the rotating elements of power-driven hand tools. In particular, prevention and control measures must ensure that only trained and certified workers access the facilities or any area that could present occupational health and safety hazards, with the necessary safety devices and respect for minimum setback distances.

6.3.3. Requirements for preventing COVID 19 infection

As COVID 19 infection might affect the project implementation in the country, while reviewing and approving the proposed activities it is necessary to ensure that the subproject beneficiaries and contractors: (i) have undertaken adequate precautions in place to prevent or minimize an outbreak of COVID-19, and (ii) has in place a plan what to do in the event of an outbreak. The necessary activities in this regard would include the following:

- undertaking measures to minimize the chances and contain the spread of the virus as a result of the movement of workers;
- ensure their sites are prepared for an outbreak;
- develop and practice contingency plans so that personnel know what to do if an outbreak occurs and how treatment will be provided;
- appointing COVID-19 issues focal point;
- requiring the Contractor to communicate with the focal point or project health and safety specialist and medical staff (and where appropriate the local healthcare providers), and coordinating designing and implementing the contingency plans; and
- encouraging to use the existing project grievance mechanism to report concerns relating to COVID-19, preparations being made by the project to address COVID-19 related issues, how procedures are being implemented, and concerns about the health of their co-workers and other staff.

With regards to all necessary COVID 19 related activities, the WB has issued a *Guidance Note on COVID 19 Considerations in Construction/Civil Works Contracts* (see Annex 8). The document is intended to advise Bank staff on ways to support Borrowers in addressing key issues associated with construction and civil works and COVID-19 and recommends assessing the current situation of the project, understanding the obligations of contractors under existing contracts (Section 3), requiring contractors to put in place appropriate organizational structures (Section 4) and developing plans and procedures to address different aspects of COVID-19 (Section 5). Among most important actions to be undertaken by Contractors are the following:

- Training staff on the signs and symptoms of COVID-19, how it is spread, how to protect themselves (including regular handwashing and social distancing) and what to do if they or other people have symptoms;
- Placing posters and signs around the working site, with images and text in local languages;
- Promoting good respiratory hygiene in the workplace: displaying posters promoting respiratory hygiene and combining this with other communication measures such as offering guidance from occupational health and safety officers, briefing at meetings and information on the intranet etc.; ensuring that face masks are available at your workplaces, for those who develop a runny nose or cough at work, along with closed bins for hygienically disposing of them; and,
- Ensuring handwashing facilities supplied with soap, disposable paper towels and closed waste bins exist at office premises. Where handwashing facilities do not exist or are not adequate, arrangements should be made to set them up. Alcohol based sanitizer (if available, 60-95% alcohol) can also be used.

Respectively, the PIU will ensure the project beneficiaries and their contractors will follow this Note and prepare a Contingency plan to be reviewed and approved by PFIs. Furthermore, in the case of subprojects involving civil works, the Contractor must prepare brief reports with regards to COVID situation, using attached template in Annex 9. It is important that the Bank team is informed of an

outbreak on a site to better coordinating the necessary responses with project management protocols. Such reporting should be done following the guidance in ESIRT for a 'Serious' incident, to ensure that the Bank team is informed and that the event is managed accordingly at the project level. An investigation into an outbreak of COVID-19 does not need to be undertaken by the PFIs or Contractor, but the PIU should keep teams informed of any concerns or problems associated with providing care to infected workers on project sites, particularly if infection rate is approaching 50% of the workforce.

6.3.4. Pest Management Issues and mitigation measures to be followed

While the Project will not directly support any activity that might use pesticides, the use of pesticides may increase as a result of the agriculture development activities, as possible indirect effect of stimulating greater use of agro-chemicals associated with more intensive cultivation and/or higher crop value. This might happen in the case of operation of greenhouses or in the case of ensuring implementing activities related to Component 3 on "Modernization of small-scale greenhouse production"; and on "Piloting model for clustering greenhouse production around an efficient energy source (geothermal energy)" where are used plant protection chemicals (pesticides) and under "Component 2 - Enhancing animal health capacity for effective disease surveillance and control" that may require usage of various chemicals, including acaricides. In these cases, the subproject beneficiaries will follow the WB ESSs on Pest Management which are targeted at: (i) to ensure good practices are applied in World Bank financed projects, (ii) avoid excessive use of pesticides, and (iii) promote environmentally sound and sustainable pest management. The main objectives in this regard include: (i) minimize the environmental and health hazards related to pesticide usage, (ii) ensure that pest management activities follow an Integrated Pest Management (IPM) approach, and (iii) develop national capacity to implement IPM-based crop protection and pesticide regulation as well as best practices in animal health chemicals use.

To decide if the proposed subproject needs to specifically address PM issues in site specific ESIA, all subprojects are the subject of environmental screening, when the type and specific of activity(ies) and respective risk categories are determined. At this stage, all proposed activities that relate to greenhouse improvements or construction are clearly subject to WB ESSs and the subjects of pest management screening should be checking of existing greenhouses pest management systems, licenses and permits, IPM plans or any, incl. official acts according to national regulations, etc. Overall, such initial assessment should go beyond checking for permits and licenses, to assessing whether the subproject is likely to result (indirectly) in increased usage of pesticides. This will also include an assessment of safety and appropriateness of the subproject beneficiaries' existing pesticide management practices (storage, handling/application, disposal of unused products and packages) and whether they are applying an Integrated Pest Management approach.

In this regard, each such particular sub-project has to be consistent with both relevant policies and regulations of Turkey and the World Bank on Pest Management. Furthermore, the responsibility of each such sub-project will be to prepare a Pest Management Plan, format of which is attached in the Annex 7 hereto. The PMP must be also prepared and implemented in the case of identified unsafe practices and/or of the absence of any type of IPM approach among the subproject beneficiaries.

The objective of the PMP is first of all to encourage adoption of Integrated Pest Management (IPM) approach, increasing beneficiaries' awareness of pesticide-related hazards and good practices for safe pesticides use and handling and implementing all necessary mitigation and monitoring activities in this regard. Considering these, all sub-project beneficiaries will be required to formally commit to preparing and implementing a PMP on their farms. Furthermore, one of the specific requirements in this regard will be specifying in the document providing farmers with tools, options, training and

technical support to encouraging them to adopt safer practices and IPM methods. Such commitment will constitute a condition for sub-project financing. Respectively, the PIU will ensure the PMPs are prepared before accepting sub-project financing and conducting environmental supervision and monitoring. The monitoring activities will include tracking compliance with the commitment or effectiveness of training and provided necessary technical support.

6.3.4.1. Principles of the Integrated Pest Management[16]

The primary aim of pest management is to manage pests and diseases that may negatively affect production of crops so that they remain at a level that is under an economically damaging threshold. Pesticides should be managed to reduce human exposure and health hazards, to avoid their migration into off-site land or water environments and to avoid ecological impacts such as destruction of beneficial species and the development of pesticide resistance. One important strategy is to promote and facilitate the use of Integrated Pest Management (IPM) through preparation and implementation of an Integrated Pest Management Plan (PMP).

Integrated Pest Management (IPM) consists of the judicious use of both chemical and non-chemical control techniques to achieve effective and economically efficient pest management with minimal environmental contamination. IPM therefore may include the use of:

- Mechanical and Physical Control;
- Cultural Control;
- Biological Control, and
- Rational Chemical Control.

IPM is the use of multiple techniques to prevent or suppress pests in a given situation. Although IPM emphasizes the use of nonchemical strategies, chemical control may be an option used in conjunction with other methods. Integrated pest management strategies depend on surveillance to establish the need for control and to monitor the effectiveness of management efforts. World Bank Group in the Environmental, Health, and Safety Guidelines provides the following stages should be considered when designing and implementing an Integrated Pest Management Strategy, giving preference to alternative pest management strategies, with the use of synthetic chemical pesticides as a last option. As a first essential step, those who make pest management decisions should be provided with training in identification of pests and beneficial (e.g. natural enemy) species, identification of weeds, and field scouting methods to evaluate which pests are present and whether they have reached an economic control threshold (the density at which they begin to cause economically significant losses).

6.3.4.2. Alternatives to Pesticide Application

Where feasible, the following alternatives to pesticides should be considered:

- Rotate crops to reduce the presence of pests and weeds in the soil ecosystem;
- Use pest-resistant crop varieties;
- Use mechanical weed control and/or thermal weeding;
- Support and use beneficial organisms, such as insects, birds, mites, and microbial agents, to perform biological control of pests;

[16] This section is based on the World Bank Group in the Environmental, Health, and Safety Guidelines prepared in 2007.

- Protect natural enemies of pests by providing a favorable habitat, such as bushes for nesting sites and other original vegetation that can house pest predators and by avoiding the use of broad-spectrum pesticides;
- Use animals to graze areas and manage plant coverage;
- Use mechanical controls such as manual removal, traps, barriers, light, and sound to kill, relocate, or repel pests.

6.3.4.3. Pesticide Application

If pesticide application is warranted, users are recommended take the following actions:

- Train personnel to apply pesticides and ensure that personnel have received applicable certifications or equivalent training where such certifications are not required;
- Review and follow the manufacturer's directions on maximum recommended dosage or treatment as well as published reports on using the reduced rate of pesticide application without loss of effect, and apply the minimum effective dose;
- Avoid routine "calendar-based" application, and apply pesticides only when needed and useful based on criteria such as field observations, weather data (e.g., appropriate temperature, low wind, etc.),
- Avoid the use of highly hazardous pesticides, particularly by uncertified, untrained or inadequately equipped users. This includes:
- Pesticides that fall under the World Health Organization Recommended Classification of Pesticides by Hazard Classes 1a and 1b should be avoided in almost all cases, to be used only when no practical alternatives are available and where the handling and use of the products will be done in accordance with national laws by certified personnel in conjunction with health and environmental exposure monitoring;
- Pesticides that fall under the World Health Organization Recommended Classification of Pesticides by Hazard Class II should be avoided if the project host country lacks restrictions on distribution and use of these chemicals, or if they are likely to be accessible to personnel without proper training, equipment, and facilities to handle, store, apply, and dispose of these products properly;
- Avoid the use of pesticides listed in Annexes A and B of the Stockholm Convention, except under the conditions noted in the convention and those subject to international bans or phase-outs;
- Use only pesticides that are manufactured under license and registered and approved by the appropriate authority and in accordance with the Food and Agriculture Organization's (FAO's) International Code of Conduct on the Distribution and Use of Pesticides;
- Use only pesticides that are labeled in accordance with international standards and norms, such as the FAO's Revised Guidelines for Good Labeling Practice for Pesticides;
- Select application technologies and practices designed to reduce unintentional drift or runoff only as indicated in an IPM program, and under controlled conditions;
- Maintain and calibrate pesticide application equipment in accordance with manufacturer's recommendations. Use application equipment that is registered in the country of use;
- Establish untreated buffer zones or strips along water sources, rivers, streams, ponds, lakes, and ditches to help protect water resources;
- Avoid use of pesticides that have been linked to localized environmental problems and threats.

6.3.4.4. Pesticide Handling and Storage

Contamination of soils, groundwater, or surface water resources, due to accidental spills during transfer, mixing, and storage of pesticides should be prevented by following the hazardous materials storage and handling recommendations. These are the following:

- Store pesticides in their original packaging, in a dedicated, dry, cool, frost-free, and well aerated location that can be locked and properly identified with signs, with access limited to authorized people. No human or animal food may be stored in this location. The store room should also be designed with spill containment measures and sited in consideration of potential for contamination of soil and water resources;
- Mixing and transfer of pesticides should be undertaken by trained personnel in ventilated and well lit areas, using containers designed and dedicated for this purpose.
- Containers should not be used for any other purpose (e.g., drinking water). Contaminated containers should be handled as hazardous waste, and should be disposed in specially designated for hazardous wastes sites. Ideally, disposal of containers contaminated with pesticides should be done in a manner consistent with FAO guidelines and with manufacturer's directions;
- Purchase and store no more pesticide than needed and rotate stock using a “first-in, first-out” principle so that pesticides do not become obsolete. Additionally, the use of obsolete pesticides should be avoided under all circumstances; a management plan that includes measures for the containment, storage and ultimate destruction of all obsolete stocks should be prepared in accordance to guidelines by FAO and consistent with country commitments under the Stockholm, Rotterdam and Basel Conventions.
- Collect rinse water from equipment cleaning for reuse (such as for the dilution of identical pesticides to concentrations used for application);
- Ensure that protective clothing worn during pesticide application is either cleaned or disposed of in an environmentally responsible manner;
- Maintain records of pesticide use and effectiveness.

6.3.4.5. Pest Management Plan

The content of the Pest Management Plan should apply to all the activities and individuals working. It should be emphasized also that non-chemical control efforts will be used to the maximum extent possible before pesticides are used.

The Pest Management Plan should be a framework through which pest management is defined and accomplished. The Plan should identify elements of the program to include health and environmental safety, pest identification, and pest management, as well as pesticide storage, transportation, use and disposal. Management Plan is to be used as a tool to reduce reliance on pesticides, to enhance environmental protection, and to maximize the use of integrated pest management techniques.

The Pest Management Plan shall contain pest management requirements, outlines the resources necessary for surveillance and control, and describes the administrative, safety and environmental requirements. The Plan should provide guidance for operating and maintaining an effective pest management program/activities. Pests considering in the Plan may be weeds and other unwanted vegetation, crawling insects and other vertebrate pests. Without control, these pests provoke plants’ deceases. Adherence to the Plan will ensure effective, economical and environmentally acceptable pest management and will maintain compliance with pertinent laws and regulations. The PM should have a strong focus on providing beneficiary farmers with tools, options, training and technical support to encourage them to adopt safer practices and IPM methods, - all these issues have to be

clearly included in the PMP. The recommended structure of a Pest Management Plan is presented in the Annex 7.

6.3.4.6. Ensuring safe application of acaricides.

To reduce the impacts of ticks and other ectoparasites farmers routinely use Acaricides which are applied through, dipping, spraying, spot treatment or hand dressing. Dipping provides a highly effective method of treating animals with Acaricides for the control of ticks. The disadvantage of this method however is the initial construction cost and the cost of Acaricide which make this method unattractive for small scale ranching operations. The method involves immersion of animals in a dipping tub containing solution of chemicals.

The spraying method of tick control is not as efficient as dipping. It involves the use of fluid Acaricides applied to animals by means of a spray. The spraying equipment is portable and needs only small amounts of Acaricides to be mixed for the application. The Acaricides may not be thoroughly applied to all parts of the animal body hence it is less efficient than the dipping method of application. The 2 methods mentioned above, dipping and spraying may not exposed ticks in the inner parts of the ear, under part of the tail, the tail brush and the areas between the teats and the legs in cattle with large udder, to the Acaricides and hence may escape treatment.

The process of applying Acaricides to these areas by hand is termed hand dressing or spot treatment. The advantage here is that the method is more effective and economical in terms of cost of Acaricide as spot treatment is restricted to only selected areas instead of the whole animal. The disadvantage however is that the process is time consuming and laborious.

To reduce inappropriate handling and improve usage of acaricides and anti-helminths at recommended doses, the labeling of parasiticides in the project area should be packaged in suitable containers with instruction in the Turkish, include the use of containers graduated by pictorial symbols or pictograms illustrating animal size and corresponding quantities of the drug required for treatment. Also, biological and integrated parasite management methods should be encouraged and taught to rural farmers to reduce the use of pervasive veterinary parasiticides. Stringent policies and efforts by GT are also required to regulate the importation, distribution and marketing of agro-chemicals.

6.3.5. Specific mitigation measures for enhancing animal health capacity for effective disease surveillance and control and manure management

Ensuring bio-safety and waste management and preventing inadvertent spread of the animal diseases. The Project will finance essential equipment, consumables and reagents, staff training and technical assistance for the veterinary laboratories and veterinary posts to be installed. A focus of the training activities will be on laboratory waste management by basing training and upgrades to laboratory infrastructure and equipment on “International Best Practice in Safety of Research Laboratories” developed by the US National Institutes of Health (see Annex 10). Design of upgrades for veterinary laboratory and posts will include facilities for safe disposal of wastes and contaminated materials. Construction and renovation work associated with rehabilitation of laboratory and veterinary posts will be carried as specified above, ensuring the implementation of all mitigation measures specified in the ESMP Checklist. The ESMP Checklist will be included as part of the construction/rehabilitation contracts. In addition, waste generated in upgraded laboratory facilities will be managed using existing national guidelines that are consistent with international good practice.

Carcass. To prevent infectious illness and odor as well as the generation of vector, it is required to take proper measures to manage and rapidly disposal of carcass. The operator should implement the actual management and disposition system and not recycle carcass as animal feed. It is recommended to reduce mortality by taking proper animal-care and prophylactic measures. Livestock died of disease shall be timely disposed of and not allowed to be casually discarded, sold or reused as feed. While collecting carcass, proper storage is required, if necessary, refrigeration should be taken to prevent decomposition. It is feasible to bury carcass at the site. Landfill site, regardless of its location, should be accessible for excavating equipment. The site with soil stability and low permeability should be equipped with insulation layer strong enough to separate the area from houses and water sources to prevent pollution caused by odor from buried decaying matters or filtered matters.

Animal waste. Livestock excrement collection system: for the ground designed with groove, the livestock excrement should be pushed falling into the underground storage zone; for the ground designed without groove, it is necessary to scrape and wipe the floor and flush with water. For the livestock excrement used for farmland fertilizer, since it contains dangerous chemical and biological elements, it is necessary to make careful analysis of potential impact beforehand. Some treatments to some extent and preparations as well as proper application ratio may be required before utilizing the excrement as fertilizer.

To reduce the pollution of livestock excrement to the surface water, ground water and air as much as possible, it is recommended to select proper feeds according to the nutrient requirement in different production and growth stage of animal; select the feeds low in protein and amino acid; by grinding feeds, to improve absorptivity and reduce the consumption of feed, thus less livestock excretion will be produced (while increasing the livestock yield); select the high-quality and pollution-free feeds (for instance, the content of pesticide and dioxin must be known or not exceed the standard requirement) with content of additives like copper and zinc not exceeding the required amount for animal's healthy growth. It is necessary to regularly collect solid wastes (such as the bedding and excrement) and refrain from leaving the wastes overnight. To reduce the storm runoff in the storage system, the dry livestock excrement or garbage from the farm should be stored in a place with cover or ceiling.

In addition, the following management techniques are recommended to further reduce the impacts of water runoff from livestock operations: reduce water use and spills from animal watering by preventing overflow of watering devices and using calibrated, well-maintained self-watering devices; install vegetative filters to trap sediment; install surface water diversions to direct clean runoff around areas containing waste.

Preventing environmental pollution and ensuring sound manure management. Proper manure management refers to capture, storage, treatment, and utilization of animal manures in an environmentally sustainable manner. It can be retained in various holding facilities. Animal manure (also referred to as animal waste) can occur in a liquid, slurry, or solid form. It is utilized by distribution on fields in amounts that enrich soils without causing water pollution or unacceptably high levels of nutrient enrichment. Manure management is a component of nutrient management. One of the key factors of animal waste management is the design of one or more storage structures (ponds, tanks, and/or dry stacks) that can store the waste generated for time period recommended by the state and local regulatory agency. It is also necessary further reduce the moisture content of dry livestock excreta (e.g. by blowing dry air over it or by conveying ventilation air through the manure pits) and minimize the surface area of manure in storage.

To address all pollution risks associated with manures, slurries and grazing animals, particularly in bathing water catchments, it is essential to apply following approaches, the main individual components of which are as follows:

- minimizing dirty water around the steading;
- better nutrient use;
- a risk assessment for manure and slurry;
- managing water margins.
- avoid spreading close to domestic or public buildings;
- spread livestock slurries and manures when the wind direction is away from public/residential areas and areas designated for their conservation value;
- avoid, where possible, spreading in the hours of darkness.
- locate any field heap of farmyard manure:
- at least 10m away from any clean surface water or field drain or watercourse and at least 50m from any spring, well or borehole; and
- as far away from residential housing as possible.
- spread livestock manures only when field and weather conditions are suitable to prevent water pollution.

Pollution risk can occur at all stages of handling livestock slurry and manures, including collection, storage, transportation and land application. At all times, the quantity of material requiring to be collected, stored and applied to land should be minimized. The risk of pollution occurring is usually higher with liquid systems than with solid based systems. Minimize the unroofed steading areas to which stock have access, or alternatively roof these areas where practical. It is needed always to separate uncontaminated water from dirty water and prevent it from entering the handling system.

Many farms have existing drainage systems to allow run-off from roads and yards to discharge to local watercourses. This drainage can carry silt, chemicals, Fecal Indicator Organisms (FIOs) and other materials, thereby causing a risk of pollution. It may be possible to make use of properly sited and designed ponds to deal with this currently uncollected drainage and minimize pollution risks. Farmers should draw up a Manure Management Plan (also known as Farm Waste Management Plans). Professional advice should be provided from relevant (mandated) agencies. There are also other examples of mitigation measures that can be followed[17].

Implementation of project trainings activities for capacity building and knowledge improvement in area of sound manure management, proper and advanced feeding practices, application of IPM approaches, etc., can also ensure positive environmental impacts on pastures status. Environmental assessments for proposed sub-projects in area of fodder production or animal breeding or other will be conducted which will consider existing pastures which can be potentially affected both negatively or positively, and site-specific environmental and social management plan with mitigation measures will be developed as a part of ESA report. The project would support additional TA activities to strengthen the existing institutional capacities to ensure that effective ESAs are conducted, ESMPs are implemented properly, and monitoring systems are put in place. Involved parties will have responsibilities on implementation of specific ESMP and mandated bodies (persons) will conduct relevant monitoring on regular basis.

[17] http://www.gov.scot/Publications/2005/03/20613/51370

6.3.6. Ensuring Biodiversity conservation

Overall the WB ESS6 on Biodiversity Conservation and Sustainable Management of Living Natural Resources is relevant as the proposed under under Component 2 and 3 there will be financed a series civil works, - for getting access to geothermal energy or building of new greenhouses, including construction of the electricity transmission lines, for construction of a Veterinary Medical Control Center and of manure-energy-biofertilizer facility, which might generate risks and impacts on natural habitats and supporting by them flora and fauna resources. To avoid or mitigate these risks was decided based on the feasibility studies which include also a biodiversity assessment, there will be selected for new constructions only those sites which are located outside of critical habitats as well as avoiding location of these construction in other natural habitats. Respectively, during the initial environmental screening of associated geothermal infrastructure development activities or of new greenhouses, or during the site selection for the construction of the Veterinary center or biofertilizer, these investments that are located in or near to critical or natural habitats or those with significant biodiversity impacts will be excluded from financing. Furthermore, all site specific ESIA and ESMPs for these investments will include a site biodiversity assessment and, as needed, relevant mitigation and monitoring activities. As construction of the electricity transmission lines might cause birds collision, the ESMF requires a special bird surveys in such cases, providing main requirements in this regard, - see next section.

6.3.7. Requirements for avian risk assessment

As specified above, while creating farmers access to geothermal sources of energy it might be required construction of electricity transmission lines. This lines, especially Overhead transmission lines (OHTLs) might cause bird collision and mortality. Respectively, it is required that as part of ESIA for the OHTLs should be carried avian risks site specific assessments, based on what would be possible to identify these risks and propose relevant bird protection measures to be included in the project design (e.g. bird flight diverters, anti-perching/nesting structures etc.).

The scope of this assignment is to identify the mitigation measures, for protection and conservation of all local and migratory birds in the project area, that might potentially affect their habitats, either positively or negatively, directly or indirectly by the construction and operational activities. The assignment will be performed during the design stage for OHTL construction.

The specific objectives of such assessment are:

1) Analyze and assess information availability and quality for the avian risk assessment for proposed OHTL route, especially regarding the reliability of conclusions that can be made based on available information;
2) Collect all information that is accessible without generating new primary design data;
3) Conducting site visits and field observation for at least one migratory season to each of the identified bird habitat sites;
4) Provide preliminary assessment of the avian risk along the OHTL corridor of the proposed project;
5) Provide mitigation measures for all local and migratory birds in the project area for construction and operational stages.

Based on conducted assessment it is necessary to specify whether avian risk (e.g. bird collisions and electrocutions etc.) along the OHTL corridor represents significant concerns (particularly risk of unacceptable impacts on migratory or other protected species), what is the nature of the risks, and

how severe they are, and suggest whether further assessment, monitoring, and management programs are needed for operation stage.

6.3.8. Criteria for applying water balances

As greenhouse construction and modernization may generate a high water demand that can have potentially significant adverse impacts on communities, other users or the environment, all such subprojects site specific ESIAs will include an assessment of current and/or potential use after the project implementation to estimate the amount of water that will be used along with the current water use situation in the area of impact. Furthermore, all such projects will propose opportunities for improvement in water use efficiency, including specific water use (measured by volume of water used per unit production). The proposed new greenhouses will be benchmarked to greenhouse standards of water use efficiency in the relevant region of the country. In the case of potential discrepancies of the water use efficiency of the proposed greenhouse and of potential conflict with other water users and especially potable water users, a detailed water balance will be required to be developed, maintained, monitored and reported periodically.

6.3.9. Chance findings

As some of the proposed project activities include excavation and earthworks, and in particular on developing infrastructure for access to geothermal energy and building new greenhouses, there might be chances of finding some archeological artefacts. In these cases, the Chance Find Procedure will be included in site-specific ESMPs for all earth-moving sub-projects. These procedure and guidelines are presented in the Annex 6 and will be followed in all cases of previously unknown CH encountered during project activities and included in all project's construction contracts that involve excavation, demolition, movement of earth, flooding, and/or any other changes to the physical environment.

6.3.10. Land acquisition

The construction activities to be carried out under Subcomponents 2.2, 3.1b, 3.2b and 3.3b will likely require land acquisition and will inevitably bring along temporary or permanent land use restrictions, rights of easement, impacts on livelihoods or removal of assets and structures from the land. Physical displacement of people is not expected. Apart from the land acquisition needs, the civil works to be carried out will have standard, temporary and site-specific construction impacts.

In accordance with the first principle of mitigation hierarchy, alternative designs for the activities under these subcomponents will be analyzed and considered to avoid any physical/economic displacement of people. If there is no alternative design that enables for the avoidance of land acquisition/restriction or establishment of easement rights, the activities will be planned in order to minimize or reduce the effect of land acquisition/restriction or easement such that, the footprint of the activity will be kept at minimum and the activities will be done at other times than the production cycle, if the land in question is an agricultural land. Also, for temporary land acquisition, attention should be paid to restore the land after the completion of the works. Finally, if the land acquisition or right of easement is not avoidable, the affected persons will be compensated as laid out in the RF prepared for this Project.

6.4. Outline of a program for information dissemination and capacity building activities

As specified above the potential project risks and impacts can be directly mitigated by applying a series of measures, including raising public awareness and providing training on management of environmental problems for all involved parties. In this regard the project would support a series of

training, preparing and disseminating guidebooks and implementing demonstration activities on sector environmental related issues and in particular:

Education of veterinary specialists on managing sector environmental and social impacts. Such training will include the following topics: environmental issues of project activities; prevention of spreading animal diseases; veterinary waste management in accordance with existing national guidelines; "International Best Practice in Safety of Research Laboratories" developed by the US National Institutes of Health; proper and safe handling and storage of contaminated materials; health protection and feeding of animals; issues of diagnostics, treatment and prevention of brucellosis, tuberculosis, echinococcosis, anthrax, foot-and-mouth disease, pox, issues of appropriate disposal of carcasses of dead animals, etc. Veterinary specialists will pass labor safety training course.

Sound manure management. This would include animal waste management systems involve the collection, transport, storage, treatment, and utilization to reduce migration of contaminants to surface water, groundwater, and air; internationally recognized guidance, such as that published by FAO, on land requirements for livestock production for livestock units (LU) per hectare (ha) to ensure an appropriate amount of land for manure deposition; feeding diets for livestock, measures to reduce methane generation and emission follow, other pollution preventive measures and etc..

Promoting Integrated Pest Management in fodder production. Farmers should be trained on following items: adverse environmental impacts and risks of chemical pesticides; Principles of the Integrated Pest Management and alternative pest management strategies; pest control methods; IPM approaches and good management practices; apply pesticides according to planned procedures, while using the necessary protective clothing; what pesticides can be used; application, handling, usage and storage of pesticides; implementation of PMP plans as part of EMPs. Relevant publications, booklets and instructions should be developed and published for further use. Demonstration plots will be applied.

Ensuring safe usage of acaricides in animal health. Farmers should be trained on following items: advanced technics of handlings, application and storage of acaricides; OHS issues; environmental risks and mitigation issues, etc. Relevant publications, booklets and instructions should be developed and published for further use. Demonstration plots will be needed.

6.5. Overall environmental and social risk assessment

As specified above in Section 6, while most of the proposed project activities and associated civil works are well known and will be of small scale, associated environmental risks and impacts will be moderate in scale, in some cases (construction of a biogas installation or of a Veterinary Medical Control Center; construction of large greenhouses or building of infrastructure for getting access to geothermal energy) these can be substantial. Thus, overall, the project environmental risk rating is considered as Substantial.

Generally, the project will generate multiple positive environmental outcomes and impacts by increasing new livelihood opportunities as higher productivity and resource-use efficiencies, making its contribution to reducing vulnerability to climate shocks and increasing climate resilience, reducing GHG emissions and pollution due to more effective agricultural input use. However, it might also generate a series of adverse risks and impacts related to civil works proposed under subcomponents 3.1 on (a) "Modernization of small-scale greenhouse production"; and (b) "Piloting model for clustering greenhouse production around an efficient energy source (geothermal energy)" as well as under subcomponent 3.2 that would support installation of solar panels. These risks and impacts might include: emissions of dust and vehicle exhausts impacting air quality; noise and vibration;

generation of hazardous and non-hazardous waste and soil pollution; OHS-related risks; traffic and road-related risks from increased traffic volume and movement of heavy-duty vehicles; associated community health and safety (CHS); health risks associated with pest management activities in greenhouses; and risks of spreading COVID-19. Under subcomponent 3.3 which will support improving manure management activities as well as construction and equipment to set up the manure-energy-biofertilizer facility, the project may generate in addition exposure to pathogens and vectors due to manure management, technical safety issues, GHGs emissions. The proposed activities under Component 2 targeted at "Enhancing animal health capacity for effective disease surveillance and control" that would support along with upgrades to the institutes' infrastructure to increase the biosafety of veterinary laboratories by investing in critical construction work and equipment needs, biosafety, and biosecurity trainings, and the establishment of a centralized Veterinary Medical Control Center, will also generate in addition a series of biosafety risks. While building infrastructure for getting access to geothermal energy or supporting construction of new greenhouses, there might be some impacts on natural habitats and supporting by them flora and fauna resources. The project substantial risk is also due to limited experience of the client with Bank-financed projects and ESF and its environmental and social standards (ESSs) requirements. Furthermore, the project implementing entities are yet to be created and the E&S staff is to be hired, therefore, capacity building will be necessary to to manage the potential environmental and social risks and impacts. Specific measures in this regard for the PCU, PIs and othe involved parties are specified in the ESMF document.

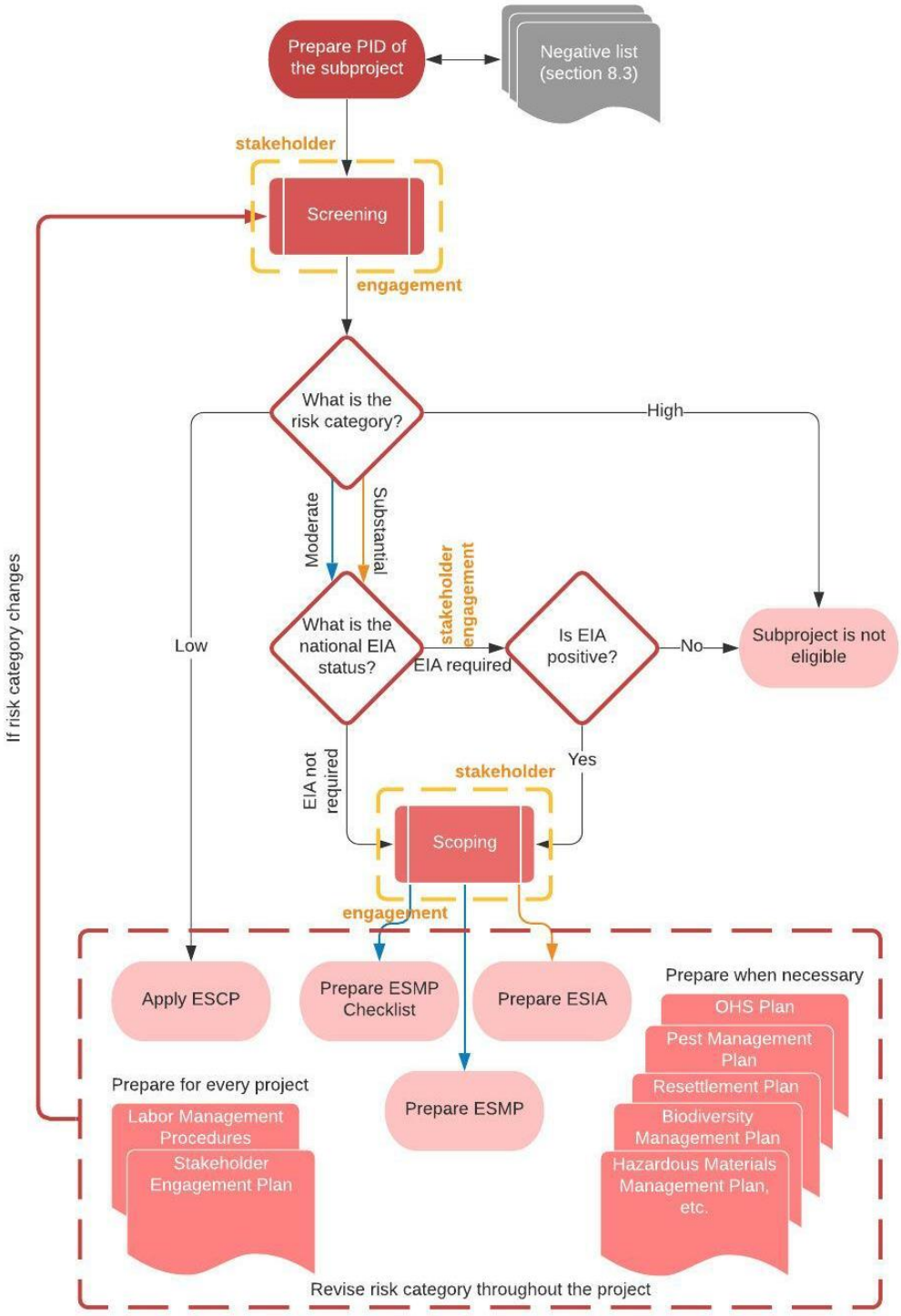
The social risk is also assessed as Moderate, as the majority of the project activities to be financed are composed of technical assistance along with capacity building and information dissemination activities, purchasing and piloting contemporary IT equipment, and only to a limited extend investment activities (building infrastructure for getting access to geothermal energy and subsequently to build new greenhouses). The activities to be carried out under Sub-Component 3.1.a. will include modernization and rehabilitation of small, family-run greenhouse operations and will not finance construction of new greenhouses neither in new locations nor in existing locations. However, it will support small farmers to improve their existing traditional greenhouse infrastructure to improve their farm profitability per unit area, resource-use efficiency, and climate resilience through receiving matching grants which will co-finance the infrastructure investments and technical assistance activities. On the other hand, the activities to be carried out under Sub-Component 3.1.b. aim to finance building basic infrastructure for getting access to geothermal energy, creating opportunities for the private sector to obtain more reliable and clean energy to modernize or build new greenhouses. Although the selection/eligibility criteria (to be discussed during project preparation) will be aiming to prevent land acquisition for the areas to be identified for greenhouse construction, the construction activities to be carried out for the establishment of the basic enabling infrastructure (drilling wells; pumping stations, geothermal energy transmission pipelines; electricity network and backup power lines; water supply and sanitation network; IT infrastructure; etc.) will likely require land acquisition and will inevitably bring along temporary or permanent land use restrictions, rights of easement, impacts on livelihoods or removal of assets and structures from the land. Physical displacement of people is not expected. Apart from the land acquisition needs, the civil works to be carried out will have standard, temporary and site-specific construction impacts. Majority of the activities to be carried out under Subcomponent 3.2., 3.3. and 3.4 will be focusing on provision of technical assistance for a wide range of stakeholders to build their capacity, and also acquisition of software/hardware/equipment required, technical expertise (incubation and coaching support) and field validation of digital solutions. Social risks and impacts are associated with labor and working conditions, occupational health and safety (OHS), community health and safety

(including risks of spreading Covid-19 infections). Turkey has a good OHS legal framework, but enforcement is weak and there is a risk that potential issues may arise during project implementation. The project is not expected to have adverse impacts on vulnerable groups (such as farmers, women, poorer or young/elder farmers, etc.) and will engage them actively in project implementation in line with the SEP, which will include detailed stakeholder program and stakeholder engagement tools, to be prepared for the Project. MoAF has limited experience with the ESF standards, including preparing and implementing a Stakeholder Engagement Plan (SEP), Resettlement Framework (RF) and Labor Management Procedures (LMP). The PIU will be provided with training and support during preparation including TORs for the of ESF instruments, including hiring of subject matter experts. The environmental and social staff in the PIU will be responsible for continuous monitoring of construction works to assure compliance with the ESMF, RF and the LMP, as well as to oversee the implementation of the SEP.

7. Rules and Procedures for Environmental and Social Screening and Assessment of Project Activities

In this section guidelines and procedures for environmental and social screening and assessment of project activities and criteria for categorization is presented. The environmental and social risks and impacts of the subprojects will be assessed proportionate to the potential risks and impacts of the project activities as given in Figure 4.

Figure 4: Flowchart for ESA of project activities and criteria for categorization



The process will begin with the identification of the project taking into consideration of the negative list which is given in Annex 1. Afterwards, in screening and scoping stages, the risk classification of the project and methods for ESA along with the project specific plans will be determined. The process is explained in detail in following sections.

7.1. Screening

The environmental and social assessment of the subproject begins with the **screening** stage. Once it is confirmed that the subproject is not part of the list of non-eligible types of subprojects (see Annex-1), the potential significance and level of environmental and social risks of the project activity will be identified based on the initial information on the type and nature of the project, i.e. it's proposed location, scale and sensitivity, completing the screening checklist presented in Annex 2. This will make it possible to identify the type and scale of potential environmental and social impacts and determine to which risk category the subproject should be attributed. Subsequently, the scale and level of the environmental and social assessment (ESA) required for a subproject will depend on the type and scale of the subproject, its location, sensitivity of environmental and social issues, and the nature and magnitude of potential risks and impacts. The subprojects will be screened by the PIUs, in coordination with PCU and then will be submitted to World Bank for clearance. The information submitted to the World Bank for this purpose will include the proposed screening category including environmental and social assessment requirements and the key environmental and social issues to be analyzed together with information substantiating the category selection. The World Bank will have the opportunity to review and provide its no objection to the screening process, including a social and/or environmental due diligence prior to investments if required.

Type and scale of sub-projects. The outcome of the screening process is to categorize the sub-project in terms of its environmental and social risks. Subprojects that are considered as "High Risk" will not be financed. A "High Risk" rating generally would entail the following impacts (a) significantly impact on human populations, including settlements and local communities (b) alteration of environmentally important areas, including wetlands, native forests, grasslands, and other "critical" natural habitats and ecosystem services; (c) direct pollutant discharges that are large enough to cause degradation of air, water or soil, endangered species and "critical" habitats; (d) largescale physical disturbances of the site and/or surroundings; (e) extraction, consumption or conversion of substantial amounts of forest and other important natural habitats, including above and below ground and water-based ecosystems; (f) measurable modification of hydrologic cycle; (g) hazardous materials in more than incidental quantities; and (h) involuntary displacement of people and other significant social disturbances.

If the subproject is classified as low risk, meaning that the environmental and social risks and impacts of the subproject is so minimal or negligible, there is no need for an ESMP, the application of ESCP and national regulations will be sufficient. In this project only Component 1, Subcomponent 3.2a, Subcomponent 3.3a, Subcomponent 3.4 and Component 4 is classified as low risk.

Outcomes of the Turkish EIA Process is another source to identify the impact significance of the project as well as to identify the sensitivity level of Project Area of the Influence (e.g. presence of natural habitats, projected areas etc.). All potential sub-projects must have undergone an EIA screening according to Turkish Regulation. Furthermore, proposed sub-projects should have a EIA Positive Certificate or EIA not Necessary Decision before sub-project screening process.

Location. There are a number of locations which should be considered while deciding to rate the project as "High Risk": (a) in or near sensitive and valuable ecosystems and "critical" habitats — juniper forests, wetlands, wild lands, vulnerable soils, and particular habitats of endangered rare and

endemic species; (b) in or near areas with archaeological and/or historical sites or existing cultural and social institutions; (c) in densely populated areas, where resettlement may be required or potential pollution impact and other disturbances may significantly affect communities; (d) in regions subject to heavy development activities or where there are conflicts regarding the allocation of natural resources; along watercourses, in aquifer recharge areas or in reservoir catchments used for potable water supply; and on lands or waters containing valuable resources (such as fisheries, minerals, medicinal plants, prime agricultural soils). Subprojects located in the proximity of such areas will be classified as High-Risk projects and will not be considered for support by the Project.

Sensitivity. Sensitive issues may include (but are not limited to): conversion of wetlands, potential adverse effects on endangered species and habitats as well as protected areas or sites, involuntary resettlement, impacts on international waterways and other transboundary issues, and toxic waste disposal.

Magnitude. There are a number of ways in which magnitude can be measured, such as the absolute amount of a resource or ecosystem affected, the amount affected relative to the existing stock of the resource or ecosystem, the intensity of the impact and its timing and duration. In addition, the probability of occurrence for a specific impact and the cumulative impact of the proposed action and other planned or ongoing actions may need to be considered.

7.1.1. Risk Categories of WB

World Bank classifies projects into one of four categories-low, moderate, substantial and high-depending on

- the type, location, sensitivity, and scale of the project, and
- the nature and magnitude of the potential environmental and social risks and impacts.

A subproject will be classified as **High Risk** if:

- the project is likely to generate a wide range of significant adverse risks and impacts on human populations or the environment. This could be because of the complex nature of the project, the scale (large to very large) or the sensitivity of the location(s) of the project. This would take into account whether the potential risks and impacts associated with the project have the any, some, or all of the following characteristics:
    - long term, permanent and/or irreversible (e.g. loss of major natural habitat or conversion of wetland), and impossible to avoid entirely due to the nature of the project
    - high in magnitude and/or in spatial extent (the geographical area or size of the population likely to be affected is large to very large)
    - cumulative and/or trans-boundary in nature
    - a significant probability of serious adverse effects to human health and/or the environment (e.g. due to accidents, toxic waste disposal, etc.)
- the area likely to be affected is of high value and sensitivity, for example sensitive and valuable ecosystems and habitats (protected areas, National Parks, World Heritage Sites, Important Bird Areas), lands or rights of indigenous people or other vulnerable minorities, intensive or complex involuntary resettlement or land acquisition, impacts on cultural heritage or densely populated urban areas;
- some of the significant adverse environmental and social risk and impacts of the project cannot be mitigated or specific mitigation measures require complex and/or unproven

mitigation, compensatory measures or technology, or sophisticated social analysis and implementation;

- there are concerns that the adverse social impacts of the project, including the risk of political capture of project benefits, and the associated mitigation measures, may give rise to significant social conflict;
- there is a history of unrest in the area of the project or the sector, and there may be significant concerns regarding the activities of security or other armed forces;
- the project is being developed in a legal or regulatory environment where there is significant uncertainty or conflict as to jurisdiction of competing agencies, or where the legislation or regulations do not adequately address the risks and impacts of complex projects or changes to applicable legislation are being made, or enforcement is weak;
- the past experience of the Borrower and/or the implementing agencies in developing complex projects project is limited, and their track record regarding environmental and social issues generally is poor;
- stakeholder engagement, especially community participation in the project area, is weak; or
- there are a number of factors outside the control of the project which could have a significant impact on the environmental and social performance and outcomes of the project.

A subproject will be classified as **Substantial Risk** if:

- the project is not as complex as high risk projects, its scale is smaller (large to medium) and the location is not in such a sensitive area. This would take into account whether the potential risks and impacts have the any, some or all of the following characteristics:
    - mostly temporary, predictable and/or reversible, and the nature of the project does not preclude the possibility of avoiding or reversing them (although substantial investment and time may be required);
    - medium in magnitude and/or in spatial extent (the geographical area and size of the population likely to be affected are medium to large);
    - the potential for cumulative and/or trans-boundary impacts may exist, but they are less severe and more readily avoided or mitigated than for High Risk projects;
    - medium to low probability of serious adverse effects to human health and/or the environment (e.g. due to accidents, toxic waste disposal, etc.), and there are known and reliable mechanisms available to prevent or minimize such incidents;
- the effects of the project on areas of high values or sensitivity will be lower than High Risk projects;
- mitigatory and/or compensatory measures that may be designed more readily and be more reliable than those of High Risk projects.

A subproject will be classified as **Moderate Risk** if;

- the potential adverse risks and impacts on human populations and/or the environment are not likely to be significant. This is so because the project is not complex and/or large, does not involve activities that have a high potential for harming people or the environment, and is located away from environmentally or socially sensitive areas. As such, the potential risks and impacts and issues are likely to have the following characteristics:
    - predictable and expected to be temporary and/or reversible;
    - low in magnitude;
    - site-specific, without likelihood of impacts beyond the actual footprint of the project;

- low probability of serious adverse effects to human health and/or the environment (e.g. do not involve use or disposal of toxic materials, routine safety precautions are expected to be sufficient to prevent accidents, etc.); and
- risks and impacts can be easily mitigated in a predictable manner.

A subproject will be classified as **Low Risk** if:

- its potential adverse risks and impacts and issues on human populations and environment are likely to be minimal or negligible and are less than those in projects classified as moderate risk. These projects, with few or no adverse risks and impacts and issues, will not require further environmental and social assessment.

7.2. Scoping

In **scoping** stage potential environmental and social risks and impacts on which the environmental and social assessment should focus, the methods to be used and the level of effort needed to fully understand the risks and impacts and the options for mitigating them will be identified.

Table 4: ESF instruments that will be used in the Project

ESMP Check List is an instrument developed for very limited, well understood and be easily mitigated construction projects to ensure that basic good practice measures that are compatible with World Bank's ESSs are recognized and implemented.
Environmental and Social Management Plan (ESMP) is an instrument that details (i) the measures to be taken during the implementation and operation of a project to eliminate or offset adverse environmental and social impacts, or to reduce them to acceptable levels; and (ii) the actions needed to implement these measures.
Environmental and Social Impact Assessment (ESIA) is an instrument to identify and assess the potential environmental and social impacts of a proposed project, evaluate alternatives, and design appropriate mitigation, management, and monitoring measures.

During ESA special analyses might be conducted such as hazard analysis[18] and where specific features of the project require, specialized methods and tools will be utilized in the Project. A non-exhaustive list of specialized methods and tools that might be used in the Project are given below. These plans can be prepared as standalone documents or included in the ESIA/ESMP.

- OHS Plan
- Pest Management Plan including Integrated Pest Management and/or Integrated Vector Management
- Hazardous Waste (including ACM) and/or Materials Management Plan including their transportation;
- Waste management Plan
- Emergency Response Plan / Emergency Preparedness Plan / Emergency Preparedness and Response Plan / Emergency Management Plan
- Traffic Management Plan
- Labor Influx Plan
- Livelihood Restoration Plan / Livelihood Plan / Livelihood Improvement Plan
- Resettlement Plan

[18] Hazard Identification (HAZID), Hazard and Operability (HAZOP) studies, Process Safety Management (PSM), Quantitative Risk Analysis (QRA), Failure Mode and Effects Analysis (FMEA), Risk Hazard Assessment (RHA)

- Biodiversity Management Plan / Biodiversity Action Plan
- Stakeholder Engagement Plan

For moderate risk projects ESA will be conducted by PIU in close coordination with PCU, and for substantial risk projects ESA will be conducted by PCU with close coordination with PIU. In either case, World Bank will provide clearance on the documents/plans that will be prepared and are prepared through PCU.

The ESA documents will be prepared in accordance with this ESMF and annexed to the bidding documents for construction works along with the LMP and SEP.

7.2.1. Risk Categories of the Project Activities and the ESF instruments to be applied

Based on the general positive and adverse impacts of Project activities on environmental and social issues, overall environmental and social risk category of the Project is substantial.

In Table 6, the risk categories for each subcomponent along with the national EIA status and the recommended ESA methods are given.

Table 5: National EIA category and WB risk category with respective ESA instruments

Subcomponent	**Activity Type**	**Note**	**WB Risk Category**	**National EIA Status**	**Recommended ESF Instruments**
Component 1: Institutional Capacity Strengthening for Climate Smart Agri-food Policy, Planning, and Investments					
Subcomponent 1.1: Narrowing information gaps to enhance soil health and land-use planning/management	All activities	-	Low	N/A	-
Subcomponent 1.2: MoAF digital blueprint for sectoral information collection and management	All activities	-	Low	N/A	-
Component 2: Enhancing Animal Health Capacity for Effective Disease Surveillance and Control					
Subcomponent 2.1: Strengthening the capacity of animal health institutes	Upgrading institutes' infrastructure to increase the biosafety label (BSL) of laboratory units	Civil works	Substantial	N/A	ESIA
	All other activities	-	Low	N/A	-

Subcomponent		Activity Type	Note	WB Risk Category	National EIA Status	Recommended ESF Instruments
Subcomponent 2.2: Strengthening and improving veterinary medical product control		Establishment of a centralized Veterinary Medical Control Center	Civil works Possibility of land acquisition	Substantial	N/A	ESIA and ESMP
Component 3: **Investments for Enhanced Productivity, Resource-Efficiency, and Climate Resilience**						
Subcomponent 3.1: Strengthening climate resilience, productivity, and resource-use efficiency in vegetable value chains	a) Modernization of small-scale greenhouse production	Improvement of existing traditional greenhouse infrastructure	Civil works	Moderate	N/A	ESMP Check List/ ESMP (if any hazardous materials i.e asbestos – than an ESIA and ESMP and the subproject – with substantial risks)
		All other activities	-	Low	N/A	-
	b) Pilot model for clustering greenhouse production around an efficient energy source (geothermal energy)	Geothermal drilling	Civil works Possibility of land acquisition, right of easement	substantial	Subject to Annex I (44) or Annex II (43) according to the capacity of the facility	ESIA and ESMP/
		Energy transmission line and network backup power line			Subject to Annex I (46) or Annex II (44) according to the capacity of the facility	ESIA and ESMP
		Potable and utility water distribution system			N/A	
		All other activities	-	Low		-
Subcomponent 3.2: Promoting the	a) Digital CSA technologies	All activities	-	Low	N/A	-

Subcomponent		Activity Type	Note	WB Risk Category	National EIA Status	Recommended ESF Instruments
adoption of CSA technologies/ practices across relevant crops	b) Solar energy as an alternative power source for pump irrigation systems	Establishment of solar energy systems	Civil works Possibility of land acquisition	Moderate	Subject to Annex I (45) or Subject to Annex II (45) according to the capacity of the facility	ESMP
		All other activities	-	Low	N/A	-
Subcomponent 3.3: Enhancing the productivity and greening profile of cattle production in Turkey	a) Piloting of a PLF program	All activities	-	Low	N/A	-
	b) Reducing cattle production pressures on water pollution and GHG emissions	Manure collection and processing	Civil works Possibility of land acquisition	Moderate	Subject to Annex I (17) or Annex II (29) according to the capacity of the facility	ESMP
		Biogas generation (integrated approach to manure management)		Substantial		ESIA
		All other activities	-	Low	N/A	-
Subcomponent 3.4: Research and innovations to support CSA		All activities	-	Low	N/A	-
Component 4: Project Management, Monitoring, and Evaluation						
Component 4: Project Management, Monitoring, and Evaluation		All activities	-	Low	N/A	-

7.3 ESF instruments to be applied

As specified in table 6, for Substantial Risk subprojects a site-specific Environmental and Social Impact Assessment (ESIA) (see ESIA Report Outline presented in the Annex 5) and an ESMP will be required to identify, evaluate and to prevent potential environmental and social risks and impacts. The mitigation measures for the identified impacts and risks will be incorporated into the project design of the ESMP (see Annex 4 with the format of the ESMP) or ESMP checklist (see Annex 3 with the ESMP Checklist for small scale construction and rehabilitation activities). The site-specific ESIA and ESMPs for Substantial risk subprojects will be prepared by the hired by the subproject beneficiaries Consultants under the supervision of the PIU/PCU, while for moderate and low risk subprojects by the hired by beneficiaries Consultants or the Contractors.

The purpose of the ESMP is to improve the environmental and social aspects of subprojects by minimizing, mitigating or compensating for negative effects. Environmental and Social Management Plan Checklists will be used mostly for Moderate Risk subprojects that are likely to have minor environmental impacts, and that are typical for small scale construction and rehabilitation investments. The ESMP Checklist has three sections: (a) *Part 1* constitutes a descriptive part ("site passport") that describes the project specifics in terms of physical location, the project description and list of permitting or notification procedures with reference to relevant regulations. Attachments for additional information can be supplemented if needed; (b) *Part 2* includes the environmental and social screening in a simple Yes/No EMS format as well as specifies mitigation measures; and (c) *Part 3* is a monitoring plan for activities carried out during the rehabilitation activities.

7.4 ESIA and ESMP disclosure and public consultations

For Substantial and Moderate Risk subprojects it is necessary to disclose the ESA documents (SEP, RP, ESIA/ESMP, etc.) and conduct stakeholder consultations with the project affected people and interested parties. For all projects that would require a site-specific ESIA and ESMP should be organized face to face consultations, - in the context of COVID 19 pandemic this can be done virtually (i.e. using ZOOM platform). For that purpose, it is necessary to disclose in advance the ESA document (about two weeks) on the PIUs and on involved local administration or sub-project beneficiaries websites as well as providing hard copies to local public administrations and key interested parties (including environmental authorities). During the consultations, the subproject applicants will register all comments and suggestions on improving the site-specific ESIA/ESMP documents and will prepare relevant reports to be included in the final version of the EA documents. Furthermore, other specific information related to the project activities and ESA should be also publicly available on-line on the PIUs website. In some cases, the public consultation can be done virtually receiving relevant questions/proposals on-line and taking them into consideration while finalizing the subprojects ESMPs, - such consultations can be done only in the case when the COVID 19 situation is complicated or it is clear no any direct impacts on local population is expected, - mostly when the proposed activities are located far away from the residential areas and will not have adverse impacts on environmentally sensitive areas such wetlands, forests, legally protected areas, etc. Similarly, in the case of ESMP Checklist for rehabilitation of existing facilities, the public consultation can be done virtually.

7.5 ESF documents review and approval

The final approval of proposed subprojects is provided by PIU/PCU– only once all EA documents have been prepared, accepted, and, if needed, preliminary approval is provided by the national/regional

environmen tal authorities. PCU/PIUs and subproject beneficiaries will then sign an agreement which will include statements on compliance with all EA documents.

As explained above, for all subprojects and activities with Substantial and/or Moderate risks a site-specific ESIA will be conducted and/or an ESMPs will be prepared in accordance with the project'sEnvironmental and Social Management Framework (ESMF). These will be the responsibility of beneficiaries, supported by Consultants and Contractors. The ESIA/ESMP and or the ESMP checklist documents must form an annex of bidding and contracts documents for construction works. In addition, the Labor Management Procedures will also form a part of bidding documents for construction works. Implementation of ESMPs on the ground will be the part of the construction contractor's task, however in case of any non-compliance, the subproject beneficiaries will inform the PCU/PIUs which are expected to take corrective action as the primary responsible party.

Distribution of the responsibilities of all parties involved in the project is given in **Table XX**. The ESIA studies and preparation and implementation of ESMPs is expected to cost a relatively small fraction of design and construction cost, as most mitigation measures will be very generic, off-the-shelf, and implementable without specialized skills, experience or equipment. Moreover, it is assumed that most of the cost is covered in the bid proposals. For all substantial risk subprojects and for first three moderate risks subprojects, PCU/PIUs will submit site specific ESMPs to WB for prior review. When the WB is confident that the PCU/PIUs has demonstrated that the process is accurate, WB will transfer this prior review to post review.

Table X: Roles and Responsibilities in the ESA process

Responsible Party	**Responsibilities**
World Bank	Review, acceptance and disclose ESMF, SEP and RAP on WB's official website; Review the site-specific ESMPs and RAPs for all subprojects with substantial risks as well as for first three sub-projects with moderate risks.; Review labor management procedures; Conduct implementation support and supervision missions in order to ensure that the Project is following WB ESS requirements;
MoAF through PCU	Prepare and implement the ESMF and RPF and submit for Bank approval; Disclose the ESMF and RPF on Implementing Agency website; Prepare ESMPs and RAPs according to ESMF and RPF; Submit ESMPs and RAPs to the WB for prior review; Perform the quality control and review of ESMPs and RAPs; Disclose ESMPs and RAPs on the official website of Implementing Agency and incorporate ESMPs and RAPs into bidding documents; Prepare Labor Management procedures; Assign field specialists for the environmental and social monitoring; Perform inspections of the implementation of ESMP by the construction contractor, make recommendations and decide whether additional measures are needed or not; Implement RAPs on site and provide regular reporting on implementation to WB; In case of non-compliance, ensure that the contractor eliminates the

	noncompliance and inform the WB about the noncompliance; Prepare, update and implement a Stakeholder Engagement Plan (SEP) that considers vulnerable groups in addition to paying attention to the gender aspect of the Project; Hold consultation meetings, and prepare and distribute leaflets or other informative documents to inform communities, recruit a community liaison officer on project, and its impacts and construction schedule as well as rights and entitlements of PAPs; Set up a multi-level GRM, monitor and address grievances related to the project under specified timelines; Provide guidance to the construction contractor and engineering supervision firm. Summarize the environmental and social issues related to project implementation to WB in regular progress reports; Be open to comments from affected groups and local environmental authorities regarding environmental aspects of project implementation. Meet with these groups during site visits, as necessary; Coordinate and liaise with WB supervision missions regarding environmental and social safeguard aspects of project implementation; Conduct regular monitoring activities for the implementation of site specific ESMPs and RAPs; and Prepare/design training and tools for Implementing Agency's local (branch level) staff and community representatives.
Supervision Consultant	
Contractor	Implement ESMPs on site, if required can revise the ESMP together with Implementing Agency; Implement labor management procedures; Manage the grievance mechanism at the contractor, communicate grievances to Implementing Agency regularly through ESMP monitoring reports; Monitor site activities on a regular basis (daily, weekly monthly etc.); Prepare the ESMP progress reports for the review of Implementing Agency; and Compensate or fix all damages occurred during construction (i.e. damages to crops, infrastructure) as set out by the ESMP or RAP/RPF.
Beneficiaries/Clients	Ensure that ESMP is implemented correctly and in a timely manner by the contractor; Ensure timely and successful implementation of RAPs; Perform environmental and social monitoring as defined in ESMF and RPF and sub project specific ESMPs and RAPs; and Collect information on environmental and social issues (including completed LC activities) for progress reports submitted to the WB and make sure that these are all compliant with the Bank's requirements.

7.6 ESF instruments supervision, monitoring and reporting

The environmental and social issues included in the ESMP documents will be monitored and supervised by the project beneficiaries, contractors and PIUs. Environmental and social monitoring system starts from the preparation phase of the subproject through the operation phase in order to prevent negative impacts of the project and observe the effectiveness of mitigation measures. This system helps the WB and the PCU/PIUs and subproject beneficiaries to evaluate the success of mitigation as part of project supervision and allows taking an action when needed. The monitoring system provides technical assistance and supervision when needed, early detection of conditions related to mitigation measures, follows up on mitigation results, and provides information of the project progress.

Environmental and social monitoring to be implemented by the PCU/PIU and project beneficiaries must provide information about key environmental and social aspects of the subprojects, particularly the project environmental and social impacts and the effectiveness of taken mitigation measures. Such information enables to evaluate the success of mitigation as part of project supervision and allows corrective action(s) to be implemented, when needed. In this regard the Monitoring Plan identifies monitoring objectives and specifies the type of monitoring, and their link to impacts and mitigation measures. Specifically, the monitoring section of the ESMP provides: (a) a specific description, and technical details, of monitoring measures, including the parameters to be measured, methods to be used, sampling locations, frequency of measurements; and, (b) monitoring and reporting procedures to: (i) ensure early detection of conditions that necessitate particular mitigation measures, and (ii) furnish information on the progress and results of mitigation. A Monitoring Plan Format is presented in the Part C of the ESMP Checklist enclosed in this document in Annex X.

The the subproject beneficiaries, will carry out control over the observance of obligations by Contractors to comply with the ESMP requirements in full, including the submission of monitoring reports on ESMPs' implementation on quarterly basis.

During the project implementation, the subproject beneficiaries and the PCU/PIUs will perform regular inspections of sub-projects with the purpose of confirmation of compliance/non-compliance of measures being performed with the requirements stipulated in ESMP. In case of any inconsistency, the representatives of subproject beneficiaries and the PIUs will determine causes of this non-compliance and propose measures for bringing the project (sub-project) into compliance with these requirements. Notwithstanding regular inspections of the PIUs, and the Bank's experts will also visit the facilities periodically to confirm the compliance with these requirements.

The subproject beneficiaries should prepare and submit detailed reports on the sub-project on a monthly basis to the PIUs, specifying if all ESMP measures have been implemented or not, being more detailed at the initial stage of the subproject implementation and providing, for example, if containers for separate waste collection have been installed at the facility, gutters for waste disposal from higher floors have been equipped or not, water supply and sanitation have been arranged on a contract basis with specialized organizations or not, workers have been instructed on safety measures, rules of action in case of emergency, and use of personal protective equipment, etc.

Subsequent reports can be more concise and can describe only changes (if any) in the measures stated above and later actions (implemented mitigation measures and their efficiency reports on labor safety incidents at a construction site; complaints/appeals of residents; etc. The final report shall present the overall results of the sub-project ESMP implementation compared with the initial conditions (completed works on the sub-project, absence of unauthorized storage of waste at the site, plants have not been damaged or compensatory planting and payments have not been made, etc.). The ESMP and monitoring reports shall contain photo reports and graphic materials on performed works (photographs of the initial conditions and general appearance of the facility before the start of repair works, layout of the facility subject to reconstruction and modernization,

photographs of works being performed, photographs of the results of works, etc. The final report shall be submitted by subproject beneficiaries to the PIUs after the completion of all works at the facility.

Reports on sub-projects' ESMP implementation shall be submitted together with an assessment of compliance with the agreed measures of environmental mitigation in a form of semi-annual reporting to the PCU by PIUs and Contractors. Respectively the subproject beneficiaries and Contractor shall be responsible for the accuracy and timeliness of reporting to the PIUs. The PCU shall compile these reports and submit a half-year summary report on ESMF/ESMPs implementation to the Bank.

8. Institutional Arrangements and Capacity for ESMF Implementation

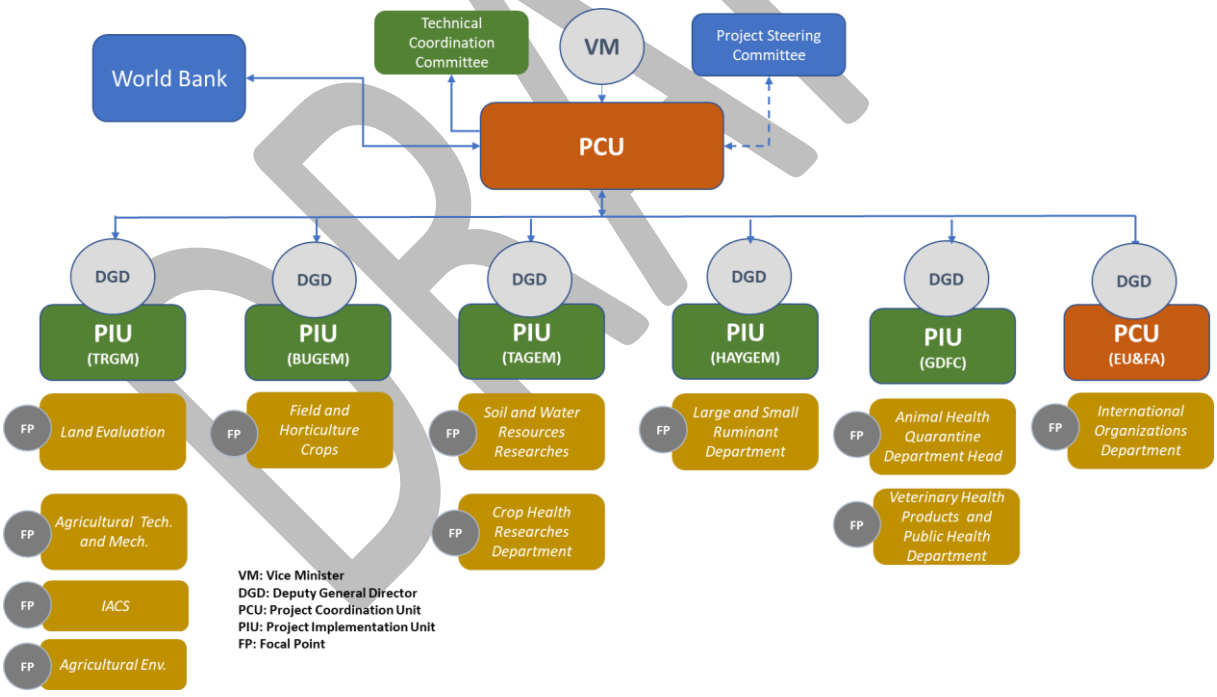
In this section (i) all involved actors in the ESMF implementation, their roles and responsibilities will be described, (ii) institutional capacity for the implementation of the ESMF and supervision and enforcement of ESMPs during construction and operation phases will be reviewed and (iii) a set of concrete capacity building and strengthening of involved institutions to assess, monitor and manage the environmental and social impacts of the potential types of subprojects to comply with existing and proposed legislation and any other requirements will be proposed.

8.1. Institutional Arrangement

The overall responsibility for project implementing, including management and coordination will lie with the Ministry of Agriculture and Forestry (MoAF), through the Project Implementation Units (PIUs). MoAF will manage the Project Designated Account in the Central Bank and be responsible for overall project reporting to the World Bank, through the PCU. Responsibility for day-to-day project management, coordination and supervision will be assigned to a PCU and line Directorate-specific Project Implementation Units (PIUs).

The organogram of the institutional arrangements is given in Figure 5 which is detailed in the following paragraphs.

Figure 5: Proposed project implementation structure



A **Project Steering Committee (PSC)** will be established to ensure effective coordination at a higher level and provide strategic advice. The PSC will have participation of senior leadership of the General Directorates (GDs) leading implementation of the subcomponents, including Deputy General Directors from the relevant GDs (TRGM, BUGEM, HAYGEM, DGFC, TAGEM, DGIT and ABDGM), as well as representatives of the Strategy and Budget Office of the Presidency (SBO) and the Ministry of Treasury and Finance (MoTF). The PSC will be chaired by the line Vice Minister of the MoAF (to which TRGM, BUGEM, DGFC and HAYGEM report to), with the PCU acting as the Secretariat.

The key functions of the PSC will be to

- review the annual workplans and budgets (AWPB),
- monitor implementation progress,
- ensure effective institutional coordination, and
- provide guidance as needed for ensuring the delivery of project outputs and achievement of project outcomes.

A **Project Coordinating Unit (PCU)** responsible for overall project coordination will be established. The location of the PCU will be at the GD of EU and Foreign Relations (ABDGM). PCU's functions will be overseen by the leading Vice-Minister.

The PCU will be responsible for

- overseeing overall implementation and management of the project
    - organize capacity building activities for ESMF implementation
    - establish and ensure effective implementation of the grievance mechanism
- supporting PIUs
    - provide technical assistance for the preparation of ESA documents for low and moderate risk subprojects (ESIA, ESMP, ESMP checklist, SEP, RP, LMP and other relevant plans)
- ensuring proper application of all project-related requirements
    - review and approve the screening of the subprojects conducted by PIUs
    - review and approve the ESA documents prepared by PIUs
    - prepare ESA documents for substantial risk subprojects (ESIA, ESMP, ESMP checklist, SEP, RP, LMP and other relevant plans)
    - ensure that bidding documents prepared by PIUs include project specific ESMPs.
    - ensure the proper implementation of ESA documents
- preparing all project documents to be submitted to the Bank.
    - collect and compile reports from PIUs to be sent to WB

Project implementation Units (PIUs) will be established under each leading GD responsible for specific subcomponents; TRGM for subcomponents 1.1., 3.2 and 3.3b, DGIT for subcomponent 1.2, DGFC for component 2, BUGEM for subcomponent 3.1, HAYGEM for subcomponent 3.3a, and TAGEM for subcomponent 3.4 (Table 6). If more than one department under the relevant GD is responsible for the implementation of project subcomponents, focal points will be appointed in each department (Figure 5), these focal points will report directly to the Deputy General Director and will coordinate implementation closely with the PIU coordinator. The personnel designated as the focal point will also be responsible for following up the activities related to the subcomponent and accepted as the PIU staff.

Table 6: Responsibilities of MoAF General Directorates/Departments in project implementation

General Directorate	**Department**	**Role**	**Component/Subcomponent**
Directorate General of Agricultural Reform (TRGM)	Department of Soil Conservation and Land Evaluation	PIU	Subcomponent 1.1: Narrowing information gaps to enhance soil health and land-use planning/management
	Department of Agricultural Technologies and	PIU	Subcomponent 3.2a: Digital CSA technologies Subcomponent 3.2b: Solar energy as an

General Directorate	Department	Role	Component/Subcomponent
	Mechanization		alternative power source for pump irrigation systems
	Department of Agri-Environment and Conservation of Natural Resources	PIU	Subcomponent 3.3b: Reducing cattle production pressures on water pollution and GHG emissions
Directorate General of Information Technologies (DGIT)		PIU	Subcomponent 1.2: MoAF digital blueprint for sectoral information collection and management
Directorate General of Food and Control (DGFC)	Department of Border Inspection for Animal and Animal Products	PIU	Component 2: Enhancing animal health capacity for effective disease surveillance and control
Directorate General of Plant Production (BUGEM)	Department of Arable and Horticultural Crops	PIU	Subcomponent 3.1: Strengthening climate resilience, productivity, and resource-use efficiency in vegetable value chains
Directorate of General Livestock (HAYGEM)	Department of Large and Small Ruminant Breeding	PIU	Subcomponent 3.3a: Piloting of a PLF program
Directorate General of Agricultural Research and Policies (TAGEM)	Department of Soil and Water Resources Research	PIU	Subcomponent 3.4: Research and innovations to support CSA
Directorate General of European Union and Foreign Relations (ABDGM)	Department of International Organizations	PCU	Component 4: Project Management, Monitoring, and Evaluation

PIUs will be responsible for the

- overseeing project activities under their respective subcomponents
    - perform monthly supervision of the implementation of ESA documents by their respective Provincial Directorates/Field Officers/Research Institutes/Regional laboratories, and document
      performance, recommendations and any further actions
- screening of the subprojects
- preparing ESA documents (ESIA, ESMP, ESMP checklist, SEP, RP, LMP and other relevant plans) for low and moderate risk projects
- ensuring effective engagement with MOAF's units and relevant stakeholders at the Provincial level
- procurement arrangements of their investments,
    - drafting the terms of reference (ToR),
    - technical specifications,
    - bidding documents, and
    - requests for proposals (RFPs),
- conducting the selection of consultants and procurement activities
- signing, paying, and managing contracts
- continuous monitoring of construction works to assure compliance with the ESMF, RF and the LMP, as well as to oversee the implementation of the SEP

- reporting and
- all other procurement-related activities, as specified in the Project Operational Manual (POM).

The environmental and social staff in the PIU will be responsible for, as well as to.

Technical Coordinating Committee (TCM) will be established to ensure close project coordination on a regular basis, and led by the PCU Director, with participation of focal points assigned for each subcomponent and relevant staff at the PIUs level. Committee members will meet periodically to review project progress based on monitoring and evaluation (M&E) results and will revise technical and administrative issues related to implementation. Ad hoc Technical Committees will be established for specific topics where strong alignment among MoAF's departments is required, including participation of departments that have not direct responsibility in the implementation of the project but that are direct beneficiaries of some of the activities or information generated by the project. These ad hoc technical committees can be established for a specific period of time, as required, and will operate under a flexible framework. A M&E technical working group will be established permanently, to further refine the overall M&E strategy for the project and for coordinating its monitoring, including measurement approaches and strategies for data capture, reporting and evaluation. Each General Directorate will assign a focal point (internal or hired externally) responsible of monitoring and evaluation aspects, which will be assigned to this working group.

Regional arrangements. Activities under each subcomponent will be implemented in close coordination with Provincial Directorates (PD), Field Officers (FO) or Research Institutes/Regional Laboratories (for TAGEM and DGFC activities) linked to the respective General Directorates at MoAF headquarters, as follows:

a) TRGM is responsible for the implementation of subcomponents 1.1, 3.2 and 3.3b. Since the activities in subcomponent 1.1 will take place throughout the country, project activities should be carried out in close cooperation with all PDs. Subcomponents 3.2 and 3.3b will be implemented with the support of the PDs, where the subcomponent activities will take place. Geographical targeting, to be detailed in the Project Operational Manual (POM) will consider crop patterns, agricultural structure and expected benefits, within the framework of the assessment to be made at the beginning of the project. Procurement related to the project activities by TRGM, will be made at the central level but the actual realization in the field and approval of the implementation is to be carried by the PDs.
b) DGIT is responsible for the implementation of subcomponent 1.2 which its implementation will be remained only at central level.
c) DGFC is responsible for the execution of Component 2. The upgrade of provincial animal health laboratories and the center of veterinary medicines control will be coordinated at a central level but implemented at the provincial level.
d) BUGEM is responsible for subcomponent 2.1 activities. For the greenhouse modernization activities to be carried out within the scope of this subcomponent, grant programs will be implemented in cooperation with the PDs, in the provinces with high potential for greenhouse potential production in the country. The planning and arrangement of the grant programs will be done at the central level, but the implementation and monitoring of the investments will be done by the PDs.
e) Subcomponent 3.3a to be carried out by HAYGEM. The activities related to the subcomponent will be coordinated at the central level, but the implementation and monitoring of the investments will be done by the PDs.

f) TAGEM is responsible for the execution of the subcomponent 3.4. The difference of TAGEM from other GDs is that field operations will be carried out through research institutes affiliated to TAGEM. In this context, the implementation of activities will be carried out by research institutes spread throughout the country.
g) ABDGM is responsible for Component 4 activities, which will be implemented at the central level.

Overall PDs/ Research Institutes/Regional laboratories will be responsible for

- Implement ESIAs/ESMPs, SEPs, LMPs, RP and GM.
- Carry out regular stakeholder engagements to have the opinions/concerns raised by stakeholders about the implementation of the project and report to PIUs.
- Prepare quarterly monitoring reports to PIUs

Project Operational Manual (POM). MoAF will implement the project based on a POM approved by the Bank. The POM will include:

- detailed description of all project activities and prospective timetable and targets
- detailed implementation arrangements and responsibilities (i.e., composition of and roles and responsibilities of PSC, and ToRs for PCU, PIUs, etc.)
- detailed policies and procedures guiding the selection, implementation, and management of grant support packages (i.e., criteria for the prioritization, screening and selection of subprojects; technical guidelines for the selection and implementation of all grant packages, etc.)
- guidelines and arrangements for environmental and social requirements, including CE strategy
- arrangements and procedures for disbursements and financial management
- applicable procurement rules and plans
- anti-Corruption guidelines
- coordination mechanisms among relevant parties; and
- requirements and procedures for Project monitoring, evaluation, reporting, and communication.

In addition, a Grants Manual, guiding the selection and implementation of grant support packages will be included as an Annex to the POM. It will be will jointly developed by the PCU and PIUs and detail the implementation arrangements for activities under subcomponents 3.1a, 3.2, 3.3 and 3.3a which will be supported through matching grants with targeted beneficiaries. Grants Manual will detail:

- guidelines and criteria for the selection of beneficiaries;
- guidelines and criteria for the selection of specific technologies, to ensure alignment with the PDO;
- strategy for disseminating information, communicating and consulting with participating beneficiaries and relevant stakeholders based on the CE strategy; and
- implementation mechanisms, including cost sharing requirements for the different types of activities, grant application templates and instructions, grant agreement template, grant provision mechanisms, monitoring, evaluation, and reporting.;
- Environmental and Social requirements, as per the project ESMF and applicable standards.

The implementation arrangements outlined in the POM will adopt an adaptative management approach to allow to accommodate changes should the needs arise during implementation.

Implementation modalities for laboratory infrastructure, and small infrastructure pilots/subprojects. Under component 2 the project will support infrastructure work to upgrade laboratories, and new building construction for the establishment of a Veterinary Medicine Center, under subcomponent 3.1b the project will support basic infrastructure works to support greenhouse cluster vegetable production powered with geothermal resources, furthermore, some other infrastructure investments are expected under subcomponent 3.4b around the third-party manure management facility. Prior to undertaken any work, the project will support feasibility analysis and E&S assessment. These investments will only take place if the results of such analysis are appraised and deemed satisfactory per the Bank's requirements.

A Project **Annual Workplan and Budget (AWPB)** will be prepared, consolidated, and finalized by the PCU every year in close coordination with the General Directorates responsible for implementing project components and subcomponents and reviewed during annual project meetings. An advanced draft will be sent to the World Bank and the PSC for comments and information. Once approved, MoAF will then include its respective AWPB in its Annual Investment Program with SBO and the procurement plan of the project. The detailed process for preparing, reviewing, and approving the AWPB will be further specified in the POM.

The **World Bank** will support project implementation in line with its procedures, standards, and requirements. The Bank team will conduct technical due diligence, including reviewing specific investments and feasibility studies and/or planning reports, engineering design, tender packages, and E&S instruments. It is expected that implementation support by the Bank team will be more intense during the first two years of operation. Project Reports will be reviewed periodically by the World Bank as part of project implementation support missions to be carried out at least twice a year.

8.2. Capacity for ESMF Implementation

All ESA documents to be prepared for subprojects will be based on this ESMF, and other ESDF documents (RF, SEF and LMP) that are prepared based on national legislation and World Bank's ESSs. These framework documents are duly identified and referenced in the Project Appraisal Document (PAD). In addition, the main provisions and procedural steps in these documents will be integrated into the Project Operational Manual (POM) and the key elements will be referenced in the Loan Agreements. Therefore, PCU and PIUs are responsible for the full implementation of the provisions and requirements set out in both the framework documents that have been prepared and other documents that will be prepared later on specific to subprojects. The ESMF also requires that subproject-specific ESA documents be prepared and become part of the relevant bidding documents and construction and consultancy contracts, as appropriate.

MoAF has limited experience with the ESF standards, including preparing and implementing a Stakeholder Engagement Plan (SEP), Resettlement Framework (RF) and Labor Management Procedures (LMP). To close the gaps in terms of capacity for ESMF implementation, both the PCU and the PIUs will be provided with training and support during preparation including TORs for the of ESF instruments, including hiring of subject matter experts. Specifically,

- The PCU will host a dedicated multidisciplinary team of specialists with qualifications satisfactory to the World Bank. PCU will consist of

- PCU Coordinator (solid experience implementing internationally funded projects, to be hired externally)
- Project Management Specialist
- Technical Specialist,
- Financial Management Specialist,
- Senior Procurement Specialist (experienced in international procurement practices and contract management)
- Environmental Specialist
- Social Specialist
- M&E specialist

- PIUs will be strengthened with trainings and experts, as needed, either through internal MoAF staff appointed or through hiring external experts familiar with the applicable Bank procedures. PIUs will consist of
  - PIU Coordinator (hired externally or appointed from the internal staff by the respective Deputy General Director)
  - Procurement Specialist (experienced in international procurement practices and contract management)
  - Financial Management Specialist,
  - Social Development Specialist
  - Environmental Specialist
  - Relevant Technical Experts

In addition, World Bank will put in place a task team comprising a diverse skill mix including from different global practices and external consultants, including agriculture and food, environment, water, digital, etc. The skill sets required for continuous effective implementation support include, among others, project management, agriculture and agribusiness development, climate smart agriculture experts, energy specialists, precision agriculture experts, M&E, procurement, financial management, communications, citizen engagement, environmental and social risks management, and legal. Additional global expertise (e.g., FAO or on Precision Livestock Farming) will also be sought to support the technical aspects of implementation.

8.3. Capacity Building Activities

Considering the PCU's limited knowledge of Environmental Social Standards (ESSs), the World Bank will provide an initial training for the PCU prior to the Project effectiveness. The necessary trainings to increase the capacity of PIUs and PDs/FOs/RIs/RLs on ESSs will be provided by the PCU in close cooperation with the World Bank. If needed, the PCU will also be able to engage external consultants with knowledge and experience of ESSs to support trainings to increase the PCU and PIU's awareness of risks and mitigate the negative impacts of the project. PCU will also organize training workshops to familiarize contractors with the World Bank's ESSs and conservation policies. The content, target group, timing and the duration of the training activities are given in Table 7.on social – with resettlement issue…pl

Table 7: Training Program

Category	Content	Target Group	Timing	Duration
Environmental and Social Framework	• Information on ESF and ESSs including preparation of ESIA, ESMP, ESMP Check	PCU	Prior to the Project effectiveness	5 days
		PIUs	Prior to feasibility/tender/design	5 days

Category	Content	Target Group	Timing	Duration
	List, RP, LMP, SEP • Implementation of ESMF, RF, ESIA, ESMP, ESMP Check List, LMP, SEP, GM and RP		of the sub-project	
		Personnel directly related with project activities at PDs/RIs/RLs and FOs	Prior to feasibility/tender/design of the sub-project	5 days
		Personnel of the construction contractors	Immediately after award of the contract	5 days
Occupational Health and Safety	• Workplace risk management • Prevention of accidents at work sites • Use of Personal Protection Equipment's (PPEs) • Health and safety standards • Hazardous waste management • Solid and liquid waste management • Preparedness and response to emergency situation • Awareness on communicable diseases (i.e. Covid-19, HIV/AIDS etc.)	PCU	Prior to Project effectiveness	2 days
		PIUs	Prior to feasibility/tender/design of the sub-project	2 days
		Personnel directly related with project activities at PDs/RIs/RLs and FOs	Prior to feasibility/tender/design of the sub-project	
		Personnel of the construction contractors	Immediately after award of the contract	2 days
Labor and Working Conditions	• Implementation of LMP • Terms and conditions of employment according to national working laws and regulations • Contractor and sub-contractor codes of conduct • Worker's organizations • Child labor and forced labor issues • Workers Grievance Mechanism	PIUs	Prior to feasibility/tender/design of the sub-project	1 day
		Personnel directly related with project activities at PDs/RIs/RLs and FOs	Prior to feasibility/tender/design of the sub-project	1 day
		Personnel of the construction contractors	Immediately after award of the contract. (1 day)	1 day
Grievance	• Implementation of	PIUs	Prior to	1 day

Category	Content	Target Group	Timing	Duration
Mechanism	GM • Registration and processing procedure • Grievance redress procedure • Documenting and processing grievances		feasibility/tender/design of the sub-project	
		Personnel directly related with project activities at PDs/RIs/RLs and FOs	Prior to feasibility/tender/design of the sub-project	1 day
		Personnel of the construction contractors	Immediately after award of the contract	1 day

9. ESMF Supervision, Monitoring, and Reporting Activities

In this section, the reporting requirements for overall ESMF implementation and the specifications for environmental and social supervision and monitoring of its implementation, including the basic environmental and social performance indicators, timeframe, and responsibilities for proposed monitoring activities will be described.

9.1. Supervision

Responsibility for day-to-day project management, coordination and supervision will be assigned to PCU and line Directorate-specific Project Implementation Units (PIUs). During project implementation, the Bank will supervise the project's financial management arrangements. The frequency of these visits will be determined in accordance with the project's risk rating, which will be monitored over its lifetime. The supervision missions will also include site visits to monitor physical progress, compared with the financial information.

It is also expected that some procurements of goods and consulting services for design and supervision will be advertised at the international level.

9.2. Monitoring

The PCU will be responsible for overall M&E of project outputs and results, working closely with PIUs at each directorate leading subcomponent activities, as well as the development and monitoring of annual work plans. A full-time M&E specialist will be appointed for leading the results measurement, with guidance from WB, and for compiling M&E data for consolidation into project progress reports. To ensure coherence and alignment, a M&E technical working group will be established to further refine the overall M&E strategy for the project and monitoring its implementation, including alignment of measurement approaches and strategies for data capture, reporting and evaluation. The M&E working group will be coordinated by the PCU, specialist on M&E. TAGEM will play a key role providing technical support and guidance to TRGM, BUGEM and HAYGEM on the approaches to assess technology impacts. For the activities under Subcomponent 1.1., the project will establish a "Soil Policy Monitoring System" to understand the impacts of the information generated under this subcomponent, guiding policy decisions at the provincial level (through the Soil Protection Board). In addition, M&E capacity building under Component 4 will facilitate understanding of gender dimensions and inequalities in the sector. The project will provide technical assistance to encourage MoAF to introduce the measurement of gender indicators in their M&E system. Indicatively, these could include the development of specific mixed-methods to track gender (surveys, focus groups, specific evaluations), gender-specific evaluations, and use of diagnostics to recognize gender-specific constraints or opportunities and design policy interventions which could address these problems.

Specific M&E activities will be incorporated into the budget of each subcomponent, while the most transversal assessments (i.e mid-term evaluation/studies and final assessments— to be carried out by independent specialists that will be recruited under the proposed project) will be covered under component 4 budget. Semi-annual joint implementation support missions with representatives from WB and GT will ensure compliance with legal covenants and implementation progress.

Given the pilot nature of some of the activities, the M&E system of the project will comprise both performance and impact monitoring. The project's approach to monitoring and evaluation (M&E) compromises three main pillars: (i) monitoring project outcomes (PDO results and intermediate indicators); (ii) stakeholder's-based monitoring approaches to understand adoption of technologies and perceptions of the benefits and tradeoffs of such technologies and associated service provision;

and (iii) impact-based assessment approaches to understand the benefits of the technologies promoted by the project, particularly the most novel ones.

The project will establish an integrated Monitoring Information System (MIS), which will consolidate information needed for the assessment of implementation performance (project management tool), but also to monitor achievement of indicator targets. For the activities under Component 3, under each subcomponent, the project will establish baselines, as the starting point for monitoring improvements; activities under the subcomponents, including online platforms and farm fora will be used to monitor perceptions on the technologies and associated service provision dimensions, complemented with farm-based tools, such as surveys and/or self-assessment tools. This stakeholder-based participatory nature of the monitoring activities will be complemented with a more semi-experimental approach to understand the impacts of the technologies on economic, social and environmental variables.

9.3. Reporting

The units that will report, the frequency of reporting and the content of the reports are given in Table 9.

Table 8: Regular reporting activities

Preparing Unit	**Receiving Unit**	**Name of report**	**Content of the Report**	**Frequency**
PCU	• PSC • World Bank	Progress Report	Consolidation of PIUs progress reports • Analysis of EHS impacts and mitigation measures • Audits carried out in the project area • Analysis of grievances • Minutes of stakeholder engagements • Follow up information from any past issues that are still being resolved • Look ahead to the next period	Semi-annual
PCU	• PSC • World Bank	Annual Work Plan and Budget (AWPB)	AWPB will be prepared in close coordination with PIUs	Annual
PCU	• PSC • World Bank	Mid-term Review (MTR)	• Evaluation of the overall implementation progress focusing on the achievement of project outcomes and impacts. In relation to project impacts, the focus will be particularly on the extend the project is creating conditions for a further scaling-up of technologies and approaches promoted by the project and ensure inclusion (small scale farmers, women, youth)	Three years after the commence of the Project

			• Identification and solution of any key issues affecting implementation	
PCU	• PSC • World Bank	Implementation Completion and Results Report (ICRP)	• Evaluation of the final results, • Assessment of overall performance, and • Capture key lessons	Six months after the project closes
PIU	PCU	Progress Report	• Summary of Contractors' progress reports • Analysis of EHS impacts and mitigation measures • Audits carried out in the project area • Minutes of stakeholder engagements • Analysis of grievances • Follow up information from any past issues that are still being resolved • Look ahead to the next period	Semi-annual
PDs/RIs/RLs and FOs	PIU	Progress Report	• Summary of Contractors' progress reports • Analysis of EHS impacts and mitigation measures • Audits carried out in the project area • Minutes of stakeholder engagements • Analysis of grievances • Follow up information from any past issues that are still being resolved • Look ahead to the next period	Quarterly
Contractor	PIU	Progress Report	• Summary of the completed activities • Analysis of progress against the program • An explanation of the causes of any delays • Photos • Analysis of EHS impacts and mitigation measures ○ Analysis of OHS issues including trainings and incidents • Analysis of grievances • Audits carried out by public institutions and project units • Follow up information from any past issues that are still being	Monthly

			resolved • Look ahead to the next period	

In addition to regular reporting activities stated above, contractors will report incidents and root cause analysis stated as in LMP and chance find reports stated as in the Annex of this document.

10. Stakeholder Engagement and Grievance Mechanism

10.1. Stakeholder Engagement and Consultations

10.2. Grievance Mechanism

The grievances about the Project will be conveyed through existing grievance mechanisms or two new grievance mechanism that will be established specifically for the Project; GM at Project Level and Workers' GM. PCU will be responsible for the GM at Project level and contractors will be responsible for Workers' GM.

10.2.1. Existing GMs

GM at National Level: The general grievance mechanism in Turkey is **CİMER** (Cumhurbaşkanlığı İletişim Merkezi – Presidency Communication Center), which is an electronic public service tool created for the use of the right to petition and the right to information, and to provide resources for policies to be formed by receiving the opinions, complaints and suggestions of citizens about government works, and actions and transactions of the public administration [4]. Citizens of the Republic of Turkey and private law legal entities have right to make application. Foreigners can apply by letter or fax within the framework of reciprocity in accordance with international agreements. The applications can be done via www.cimer.gov.tr, ALO 150, letter-fax, or in person about requests, complaints, denunciations, opinion-suggestions and acquirement of information. It requires identity verification. However, the applicant might prefer to hide her/his identity in denouncements his/her going to make. All applications must be made in Turkish and they are concluded within 30 days.

GM at Ministry Level: In addition to CİMER, MoAF has its own communication center called **TİMER** (Tarım İletişim Merkezi – Agriculture Communication Center) is the communication center of Ministry of Agriculture and Forestry. It can be reached via telephone (Alo 180) and website (https://timer.tarimorman.gov.tr/). The applications to TİMER is received through www.turkiye.gov.tr, and thus requires identity verification. It can be used for requests, recommendations, denunciations, questions, thanks and other things under livestock, agriculture, administration, food, forest and water. If the applicant wanted to be called back, s/he can choose the way for communication (telephone, e-mail, internet). The identity number is not required for the applications done via telephone. Questions/problems that can be answered immediately are answered immediately; Questions/problems that cannot be answered immediately are directed to the relevant units. In line with the information received from the relevant units, feedback is given to complainants. It is possible to make inquiries according to person, province, district, subject or category.

10.2.2. GM at Project Level

In addition to above mentioned grievance mechanisms, the project shall have its own, project specific grievance mechanism announced in its and MoAF's website with contact details. This grievance mechanism will cover all the issues raised in ESSs that are within the coverage of the Project except ESS2. It will have 2 tiers as PIUs and PCU. Following points should be taken into consideration in elaborating the grievance mechanism.

- The stakeholder can make comment/complaint through different channels including website, e-mail, telephone, grievance forms or petitions. The deadline for responses will be clearly stated.
- Petitions will be accepted by the Project focal points in District or Provincial Directorates of MoAF.
- Grievance forms will be available at every consultation meeting and will be delivered upon request.
- Grievances stated verbally in the consultation meetings will also be documented through meeting minutes and they will be processed as written in **Review of Comments** under section **Hata! Başvuru kaynağı bulunamadı.** and in this section.
- If the received comment/complaint is not relevant to Project and if the application is not anonymous, then s/he will be informed back that comment/complaint s/he issued is not relevant to Project.
- If the received comment/complaint is relevant to Project, s/he will be informed back within 30 days with the result unless the application was anonymous.
- The applicant shall have choice to hide his or her identity or anonymously apply.
- The stakeholders will be informed and guided that their first application should be at first tier basis. If the stakeholder is not satisfied with the result s/he gets from the first tier, then s/he will be free to appeal second tier. Or, in cases where the responsible party is the subject of complaint, the complaint can be directly done to second tier. In cases where the second tier is the subject of complaint, the complaints should be made by TİMER or CİMER.
- Grievances will be registered in writing and maintained in a database that can be queried according to
    - Date and the registry number of the grievance
    - Type of the channel where the grievance is made through
    - If available, the specific activity of the subcomponent that is subject to grievance
    - Identity number, name (stakeholders will be free to provide this information)
    - Vulnerability status (including age, disability status, gender, etc. which will be defined specifically for the sub-component)
    - Category of the grievance (specifically defined for the sub-component)
    - Text and the attachments of the grievance (if any)
    - Deadline for the reply and the actual date if the grievance is replied.
    - Name of the authority, that will handle the grievance
    - Proposed solution for the grievance.
    - The satisfaction of the stakeholder from the solution (if can be obtained)
    - Comments of the authority that replied for the grievance (if any)
- In registry and filing of grievances, the provisions of Personal Data Protection Law No. 6698 is should be used as the mainframe, and the stakeholders should be informed precisely about the process of the grievance mechanism and how the data they provided will be stored, used and reported.
- The database should be accessible to authorized personnel in PIUs and PCUs

Finally, if the stakeholder does not satisfy with the results of this grievance mechanism, stakeholder will be notified that s/he can apply national courts.

10.2.3. Worker's GM

Contractors are required to establish a WGM for their workers and their subcontractor's workers. Details of WGM will be presented in the Labor Management Procedure that Contractors will prepare before the commence of the works. The basic principles of the WGM are;

- Workers should be able to make complaints in their preferred language.
- They should have the option to make complaints anonymously and these anonymous grievances should be treated equally.
- The complaints should be evaluated confidentially.
- Continuous training should be given to the personnel who examine the complaints in order to avoid complaints to cause personal problems.
- Employees should have easy access to the grievance mechanism by providing them more than one tool to convey their grievances (text messages, web site, suggestion/complaint boxes, telephones).
- Mechanism should be transparent

The grievance mechanism will be accessible to all direct and contracted workers, taking into account their different characteristics, for example, female workers, migrant workers, or workers with disabilities.

WGM in the Labor Management Procedure will include

- the process of receiving, recording, addressing, tracking grievances and their timeframes
- how the workers will be informed about grievance mechanism
- the methods that the grievances will be conveyed
- name of the department that is responsible from receiving, recording, addressing and tracking the grievances.
- name of the "designated manager" if the subject of the grievance is the supervisor of the worker.
- the methods to store and track back the grievances.

Workers will be free to use other GMs (CIMER, TİMER, Project GM) if they thought that their grievance is not solved through WGM and especially for the following type of grievances;

- Mismanagement, misuse of Project Funds or corrupt practices, and
- Violation of Project policies, guidelines, or procedures, including those related to child labor, health and safety of community/contract workers and gender violence, and environmental issues.

10.2.4. Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH)

The personnel that are receiving and processing grievances should be trained about SEA/SH issues. These grievances will be filed with high confidentiality and in case of such a grievance MoAF and World Bank should be notified immediately.

10.2.5. World Bank Grievance Redress System

Communities and individuals who believe that they are adversely affected by a World Bank (WB) supported project may submit complaints to existing project-level grievance mechanisms or the WB's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the WB's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of WB non-compliance with its policies and procedures. Complaints may

be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate Grievance Redress Service (GRS), please visit http://www.worldbank.org/en/projects-operations/products-and-services/grievance-redress-service.

Project affected communities or individuals can also raise their grievances to the World Bank Independent Inspection Panel (IIP). This panel determines whether the person or communities that made the complaint were harmed because of the breach of one or more of the WB's performance criteria. The panel can directly convey its concerns about the received complaints to the WB. At this stage, WB would have an opportunity to respond to the complaints.

11. Budget

A budget proposal covering the implementation of the ESMF and ESF capacity building for the PCU, PIUs and participating entities, including all involved parties is given in Table 9.

Table 9: Proposed budget for the implementation of the ESMF and ESF capacity building

Description	**Item**	**Average Unit Price**	**Duration (month)**	**Total Cost**
PCU Coordinator	1	$5,000	74	$370,000
Specialists for PCU (Project Management Specialist, Technical Specialist, Financial Management Specialist, Senior Procurement Specialist, Environmental Specialist, Social Specialist, M&E specialist) (if hired externally)	7	$3,000	74	$1,554,000
PIU Coordinator (if hired externally)	1	$4,000	74	$296,000
Specialists for PIU (Procurement Specialist, Financial Management Specialist, Social Development Specialist, Environmental Specialist, Relevant Technical Experts) (if hired externally)	5	$3,000	74	$1,110,000
Capacity Building Trainings for ESMF	-	$500,000	-	$500,000
Preparation of ESMPs, ESIAs, SEPs, LMPs, RPs for subcomponent activities				
Information Disseminations				
Total Cost				**$3.830.000**

12. References

1. 2016. “World Bank Environmental and Social Framework.” World Bank, Washington, DC.
2. 2018. “GUIDANCE NOTE FOR BORROWERS: ESS2: Labor and Working Conditions”
3. 2016. “Managing the Risks of Adverse Impacts on Communities from Temporary Project Induced Labor Influx”

To be Added

TUIK, Address-based population registration system results, 2020

İklimleri de buradan aldım. https://mgm.gov.tr/FILES/iklim/iklim_siniflandirmalari/K%C3%B6ppen-Trewatha.pdf

Yağışları buradan aldım https://mgm.gov.tr/veridegerlendirme/il-ve-ilceler-istatistik.aspx?k=H&m=ADANA

13. Annexes

Annex 1: Exclusion list for subprojects

In general, all subprojects having risk category of "high" is excluded from the project including subprojects that may

- generate significant impacts on biodiversity,
- have activities adjacent or in cultural heritage sites, and
- impact on tangible or intangible cultural heritage sites.
- any sub-projects used to invest in a business which would require the involuntary displacement of existing occupants or economic users of any plot of land, regardless of its current ownership, or loss of or damage to assets including standing crops, kiosks, fences and others;
- any subproject used to invest in businesses involve forced or child labor, reported or potential for gender-based violence and /or sexual harassments;
- purchasing pesticides;

The Project will also not support other types of sub-projects that are specified in the IFC/WB Exclusion List (Table 10).

Table 10: The IFC/WB Exclusion List[19]

☒ Production or trade in any product or activity deemed illegal under host country laws or regulations or international conventions and agreements, or subject to international bans, such as pharmaceuticals, pesticides/herbicides, ozone depleting substances, PCB, wildlife or products regulated under CITES. ☒ Production or trade in weapons and munitions.* ☒ Production or trade in alcoholic beverages (excluding beer and wine).* ☒ Production or trade in tobacco.* ☒ Gambling, casinos and equivalent enterprises.* ☒ Production or trade in radioactive materials. This does not apply to the purchase of medical equipment, quality control (measurement) equipment and any equipment where IFC considers the radioactive source to be trivial and/or adequately shielded. ☒ Production or trade in unbonded asbestos fibers. This does not apply to purchase and use of bonded asbestos cement sheeting where the asbestos content is less than 20%. ☒ Drift net fishing in the marine environment using nets in excess of 2.5 km. in length. ☒ Production or activities involving harmful or exploitative forms of forced labor**/harmful child labor.*** ☒ Production or trade in wood or other forestry products other than from sustainably managed forests. ☒ Production, trade, storage, or transport of significant volumes of hazardous chemicals, or commercial scale usage of hazardous chemicals. Hazardous chemicals include gasoline,

[19] Notes:
* This does not apply to project sponsors who are not substantially involved in these activities. "Not substantially involved" means that the activity concerned is ancillary to a project sponsor's primary operations.
** Forced labor means all work or service, not voluntarily performed, that is extracted from an individual under threat of force or penalty.
*** Harmful child labor means the employment of children that is economically exploitive, or is likely to be hazardous to, or to interfere with, the child's education, or to be harmful to the child's health, or physical, mental, spiritual, moral, or social development.

kerosene, and other petroleum products. ☒ Production or activities that impinge on the lands owned, or claimed under adjudication, by Indigenous Peoples, without full documented consent of such peoples.

Annex 2: Environmental and Social Screening Template[20]

Subproject Information

Subproject Information	
Project Component	
Project Subcomponent	
Subproject Title	
Location (Province/District)	
Date	

Environmental and Social Risk Screening Checklist

ESS 2 - Labor and Working Conditions	**Answer**	**Brief Description**
Would the project potentially involve or lead to: (note: applies to project and contractor workers)		
2.1. use of child labor?	Yes [ ] No [ ]	
2.2 occupational health and safety risks due to physical, chemical, biological and psychosocial hazards (including violence and harassment) throughout the project life-cycle?	Yes [ ] No [ ]	
ESS 3 - Resource Efficiency and Pollution Prevention and Management	**Answer**	**Brief Description**
Would the project potentially involve or lead to:		
3.1. the release of pollutants to the environment due to routine or non-routine circumstances with the potential for adverse local, regional, and/or transboundary impacts?	Yes [ ] No [ ]	
3.2. the generation of waste (both hazardous and non-hazardous)?	Yes [ ]	

[20] Tailored from UNDP, Social and Environmental Screening Template (2021 SESP Template) with information from WB Good Practice Notes

	No [ ]	
3.3. the manufacture, trade, release, and/or use of hazardous materials and/or chemicals?	Yes [ ] No [ ]	
3.4. the use of chemicals or materials subject to international bans or phase-outs? For example, DDT, PCBs and other chemicals listed in international conventions	Yes [ ] No [ ]	
3.5. the application of pesticides that may have a negative effect on the environment or human health?	Yes [ ] No [ ]	
3.6. significant consumption of raw materials, energy, and/or water?	Yes [ ] No [ ]	
ESS 4 - Community Health and Safety	**Answer**	**Brief Description**
Would the project potentially involve or lead to:		
4.1. air pollution, noise, vibration, traffic, injuries, physical hazards, poor surface water quality due to runoff, erosion, sanitation?	Yes [ ] No [ ]	
4.2. harm or losses due to failure of structural elements of the project (e.g. collapse of buildings or infrastructure)?	Yes [ ] No [ ]	
4.3. risks of water-borne or other vector-borne diseases (e.g. temporary breeding habitats), communicable and noncommunicable diseases?	Yes [ ] No [ ]	
4.4. transport, storage, and use and/or disposal of hazardous or dangerous materials (e.g. explosives, fuel and other chemicals during construction and operation)?	Yes [ ] No [ ]	
4.5. adverse impacts on ecosystems and ecosystem services relevant to communities' health (e.g. food, surface water purification, natural buffers from flooding)?	Yes [ ] No [ ]	
4.6. engagement of security personnel to protect facilities and property or to support project activities?	Yes [ ] No [ ]	
Labor Influx		
4.7. Will the project potentially involve an influx of workers to the project	Yes [ ]	

location, and will the influx be considered significant for the local community? • How many workers will be needed for the project, with what skill sets, and for what period of time? • What is the size and skill level of the existing local workforce? • Can the project hire workers from the local workforce? • If the skill level of the local workforce does not match the needs of the project, can they be trained within a reasonable timeframe to meet project requirements? • How will the workers be accommodated? Will they commute or reside on site? If so, what size of camp will be required?	No [ ]	
4.8. Is the project located in a rural or remote area? • What is the size of the local population in the project area? • Is the project located / being carried out in an area that is not usually frequented by outsiders? • What is the frequency and extent of contact between the local community and outsiders? • Are there sensitive environmental or social conditions that need to be considered?	Yes [ ] No [ ]	
4.9. Based on the socioeconomic, cultural, religious and demographic qualities of the local community and the incoming workers, is there a possibility that their presence or interaction with the local community could create adverse impacts? • Is it likely that the incoming workers and the local community come from a shared socio-economic, cultural, religious or demographic background? • What is the adequacy/level of existing public services and natural resources, and will the incoming workers use or create competition for these resources? • What is the expected duration of the incoming workers'	Yes [ ] No [ ]	

presence in the community? • Given the characteristics of the local community, are there any specific adverse impacts that may be anticipated? • Are there specific characteristics that need to be taken into account in the Worker's Code of Conduct for the project, or in the project grievance mechanisms (GMs)?		
ESS 5 - Displacement and Resettlement	**Answer**	**Brief Description**
Would the project potentially involve or lead to:		
5.1. temporary or permanent and full or partial physical displacement (including people without legally recognizable claims to land)?	Yes [ ] No [ ]	
5.2. economic displacement (e.g. loss of assets or access to resources due to land acquisition or access restrictions – even in the absence of physical relocation)?	Yes [ ] No [ ]	
5.3. impacts on or changes to land tenure arrangements and/or community based property rights/customary rights to land, territories and/or resources?	Yes [ ] No [ ]	
5.4. Is the site chosen for the work free from encumbrances and is in possession of the Public/government/community land?		
5.5. Is this sub-project intervention requiring private land acquisitions?		
5.6. If the land parcel has to be acquired, is the actual plot size and ownership status known?		
5.7. If new land is required and the site is privately owned, can this land be purchased through Willing Buyer–Willing Seller agreement?		
5.8. Does the sub-project cause any access restriction to the commuters/pedestrians/ business and trades?		
5.9. Are there any formal / informal users or non-titled people who are utilizing (inhabiting/doing business or using for other purposes etc.) the proposed site/project locations that will be used for civil work? If		

yes, please provide how many and for what purposes.		
5.10. Will there be loss of/damage to productive trees, fruit plants or crops that generate livelihood income for the households?		
5.11. Will people permanently or temporarily lose access to facilities, services, or natural resources?		
ESS 6 - Biodiversity Conservation and Sustainable Management of Living Natural Resources		
Would the project potentially involve or lead to:		
6.1. adverse impacts to habitats (e.g. modified, natural, and critical habitats) and/or ecosystems and ecosystem services? (i.e. *through habitat loss, conversion or degradation, fragmentation, hydrological changes)*	Yes [ ] No [ ]	
6.2. changes to the use of lands and resources that may have adverse impacts on habitats, ecosystems, and/or livelihoods?	Yes [ ] No [ ]	
6.3. risks to endangered species (e.g. reduction, encroachment on habitat)?	Yes [ ] No [ ]	
6.4. introduction of invasive alien species?	Yes [ ] No [ ]	
6.5. adverse impacts on soils?	Yes [ ] No [ ]	
6.6. significant extraction, diversion or containment of surface or ground water?	Yes [ ] No [ ]	
6.7. handling or utilization of genetically modified organisms/living modified organisms?	Yes [ ] No [ ]	
6.8. utilization of genetic resources? (e.g. collection and/or harvesting, commercial development)	Yes [ ] No [ ]	
ESS 8 - Cultural Heritage	**Answer**	**Brief Description**
Would the project potentially involve or lead to:		

8.1. activities adjacent to or within a Cultural Heritage site?	Yes [ ] No [ ]	
8.2. significant excavations, demolitions, movement of earth, flooding or other environmental changes?	Yes [ ] No [ ]	
8.3. adverse impacts to intangible forms of culture?	Yes [ ] No [ ]	
Gender, Disadvantaged/Vulnerable Groups	**Answer**	**Brief Description**
Would the project potentially involve or lead to:		
GDV.1. inequitable or discriminatory impacts on affected populations, particularly people living in poverty or marginalized or excluded individuals or groups, including persons with disabilities?	Yes [ ] No [ ]	
GDV.2. restrictions in availability, quality of and/or access to resources or basic services, in particular to marginalized individuals or groups, including persons with disabilities?	Yes [ ] No [ ]	
GDV.3. adverse impacts on gender equality and/or the situation of women and girls?	Yes [ ] No [ ]	
GDV.4. reproducing discriminations against women based on gender, especially regarding participation in design and implementation or access to opportunities and benefits?	Yes [ ] No [ ]	
GDV.5. limitations on women's ability to use, develop and protect natural resources, taking into account different roles and positions of women and men in accessing environmental goods and services? (i.e. activities that could lead to natural resources degradation or depletion in communities who depend on these resources for their livelihoods and well being)	Yes [ ] No [ ]	
GDV.6. exacerbation of risks of gender-based violence? (i.e. through the influx of workers to a community, changes in community and household power dynamics, increased exposure to unsafe public	Yes [ ] No [ ]	

places and/or transport, etc.)		
GDV.7. exclusion of any potentially affected stakeholders, in particular marginalized groups and excluded individuals (including persons with disabilities), from fully participating in decisions that may affect them?	Yes [ ] No [ ]	
GDV.8. grievances or objections from potentially affected stakeholders?	Yes [ ] No [ ]	

Annex 3: Environmental and Social Management Plan Checklist

(for small scale construction/rehabilitation subprojects)

Part 1: General Project and Site Information

Institutional & Administrative				
Project title / no				
Project component				
Project subcomponent				
Scope of project and activity				
Institutional arrangements (*Name and contacts*)	WB (*Project Team Leader*)	Project Management	Local Counterpart and/or Recipient	
Implementation arrangements (*Name and contacts*)	Safeguard Supervision	Local Counterpart Supervision	Local Inspectorate Supervision	Contractor
Site Description				
Location (Province/District)				
Describe site location			Attachment 1: Site Map [ ] Y [ ] N	
Who owns the land?				
Description of geographic, physical, biological, geological, hydrographic and socio-economic context				
Locations and distance for material sourcing, especially aggregates, water, stones?				
Legislation				
Identify national & local legislation & permits that apply to project activity				
Public Consultation				
Identify when / where the public consultation process took place				

Environmental / Social Screening			
	Activity	**Status**	**Additional References**
Will the site activity include/ involve any of the following??	A. Building rehabilitation	[ ] Yes [ ] No	See Section B below
	B. New construction	[ ] Yes [ ] No	See Section B below
	C. Individual wastewater treatment system	[ ] Yes [ ] No	See Section C below
	D. Historic building(s) and districts	[ ] Yes [ ] No	See Section D below
	E. Acquisition of land[21]	[ ] Yes [ ] No	See Section E below
	F. Hazardous or toxic materials[22]	[ ] Yes [ ] No	See Section F below
	G. Impacts on forests and/or protected areas	[ ] Yes [ ] No	See Section G below
	H. Handling/Management of medical waste	[ ] Yes [ ] No	See Section H below
	I. Traffic and pedestrian safety	[ ] Yes [ ] No	See Section I below

Part 2: Mitigation Measures

Activity	**Parameter**	**Mitigation Measures Checklist**
A. General Conditions	Notification and worker safety	(a) The local construction and environment inspectorates and communities have been notified of upcoming activities. (b) The public has been notified of the works through appropriate notification in the media and/or at publicly accessible sites (including the site of the works). (c) All legally required permits have been acquired for construction and/or rehabilitation. (d) All work will be carried out in a safe and disciplined manner designed to minimize impacts on neighboring residents and environment. (e) Workers will comply with international good practice (always hardhats, as needed masks and safety glasses, harnesses and safety boots). (f) Appropriate signposting of the sites will inform workers of key rules and regulations to follow.
B. General Rehabilitation and /or Construction Activities	Air quality	(a) During interior demolition use debris-chutes above the first floor. (b) Keep demolition debris in controlled area and spray with water mist to reduce dust. (c) Suppress dust during pneumatic drilling/wall destruction by ongoing water spraying and/or installing dust screen enclosures at site. (d) Keep surrounding environment (sidewalks, roads) free of debris to minimize dust. (e) There will be no open burning of construction / waste material at the site. (f) There will be no excessive idling of construction vehicles at sites.
	Noise	(a) Construction noise will be limited to restricted times agreed to in the permit. (b) During operations the engine covers of generators, air compressors and other powered mechanical equipment shall be closed, and equipment placed as far away from residential areas as possible.
	Water quality	(a) The site will establish appropriate erosion and sediment control measures

[21] The project will support construction of new buildings only in the case when land acquisition is not necessary and there are no any resettlement issues; for such cases the investor should have the landownership title as well as has to prove the land at the moment of sub-projects application is not occupied or used even illegally.

[22] Toxic / hazardous material includes but is not limited to asbestos, toxic paints, noxious solvents, removal of lead paint, etc.

		such as e.g. hay bales and / or silt fences to prevent sediment from moving off site and causing excessive turbidity in canalization and nearby streams and rivers.
	Waste management	(a) Waste collection and disposal pathways and sites will be identified for all major waste types expected from excavation, demolition and construction activities. (b) Mineral construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers. (c) Construction waste will be collected and disposed properly by licensed collectors. (d) The records of waste disposal will be maintained as proof for proper management as designed. (e) Whenever feasible contractor will reuse and recycle appropriate and viable materials (except asbestos).
C. Individual Wastewater Treatment System	Water quality	(a) The approach to handling sanitary wastes and wastewater from building sites (installation or reconstruction) must be approved by the local authorities. (b) Before being discharged into receiving waters, effluents from individual wastewater systems must be treated in order to meet the minimal quality criteria set out by national guidelines on effluent quality and wastewater treatment. (c) Monitoring of new wastewater systems (before/after) will be carried out.
D. Historic Building(s)	Cultural heritage	(a) If the building is a designated historic structure, very close to such a structure, or located in a designated historic district, notify and obtain approval/permits from local authorities and address all construction activities in line with local and national legislation. (b) Ensure that provisions are put in place so that artifacts or other possible "chance finds" encountered in excavation or construction are noted, officials contacted, and works activities delayed or modified to account for such finds.
E. Acquisition of Land	Land acquisition plan/ framework	(a) If expropriation of land was not expected and is required, or if loss of access to income or damage to assets of legal or illegal users of land was not expected but may occur, that the bank Task Team Leader is consulted. (b) The approved by the Bank Land Acquisition Plan (if required by the project) will be implemented prior to start of project works.
F. Toxic Materials	Asbestos management	(a) If asbestos is located on the project site, mark clearly as hazardous material. (b) When possible, the asbestos will be appropriately contained and sealed to minimize exposure. (c) The asbestos prior to removal (if removal is necessary) will be treated with a wetting agent to minimize asbestos dust. (d) Asbestos will be handled and disposed by skilled & experienced professionals. (e) If asbestos material is be stored temporarily, the wastes should be securely enclosed inside closed containments and marked appropriately. (f) The removed asbestos will not be reused.
	Toxic / hazardous waste management	(a) Temporarily storage on site of all hazardous or toxic substances will be in safe containers labeled with details of composition, properties and handling information. (b) The containers of hazardous substances should be placed in an leak-proof container to prevent spillage and leaching. (c) The wastes are transported by specially licensed carriers and disposed in a licensed facility. (d) Paints with toxic ingredients or solvents or lead-based paints will not be

		used.
G. Affected Forests and/or Protected Areas	Protection	(a) All recognized natural habitats and protected areas in the immediate vicinity of the activity will not be damaged or exploited, all staff will be strictly prohibited from hunting, foraging, logging or other damaging activities. (b) For large trees in the vicinity of the activity, mark and cordon off with a fence large tress and protect root system and avoid any damage to the trees. (c) Adjacent wetlands and streams will be protected, from construction site run-off, with appropriate erosion and sediment control feature to include by not limited to hay bales, silt fences. (d) There will be no unlicensed borrow pits, quarries or waste dumps in adjacent areas, especially not in protected areas.
H. Disposal of Medical Waste	Infrastructure for medical waste management	(a) In compliance with national regulations the contractor will insure that newly constructed and/or rehabilitated health care facilities include sufficient infrastructure for medical waste handling and disposal; this includes and not limited to: • Special facilities for segregated healthcare waste (including soiled instruments "sharps", and human tissue or fluids) from other waste disposal; and • Appropriate storage facilities for medical waste are in place; and • If the activity includes facility-based treatment, appropriate disposal options are in place and operational.
I. Traffic and Pedestrian Safety	Direct or indirect hazards to public traffic and pedestrians by construction activities	(a) In compliance with national regulations the contractor will insure that the construction site is properly secured and construction related traffic regulated. This includes but is not limited to • Signposting, warning signs, barriers and traffic diversions: site will be clearly visible and the public warned of all potential hazards. • Traffic management system and staff training, especially for site access and near-site heavy traffic. Provision of safe passages and crossings for pedestrians where construction traffic interferes. • Adjustment of working hours to local traffic patterns, e.g. avoiding major transport activities during rush hours or times of livestock movement . • Active traffic management by trained and visible staff at the site, if required for safe and convenient passage for the public. • Ensuring safe and continuous access to office facilities, shops and residences during renovation activities, if the buildings stay open for the public.

Part 4: Monitoring Plan

Phase	**What** *is the parameter to be monitored?*	**Where** *is the parameter to be monitored?*	**How** *is the parameter to be monitored?*	**When***? Define the frequency / or continuous?*	**Why** *is the parameter being monitored?*	**Cost***, if not included in project budget.*	**Who** *is responsible for monitoring?*
During activity **preparation**							
During activity **implementation**							
During activity **supervision**							

Annex 4: Indicative Outline of ESMP

An ESMP consists of the set of mitigation, monitoring, and institutional measures to be taken during implementation and operation of a project to eliminate adverse environmental and social risks and impacts, offset them, or reduce them to acceptable levels. The ESMP also includes the measures and actions needed to implement these measures. The Borrower will (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; and (c) describe the means for meeting those requirements. The content of the ESMP will include the following:

- **Mitigation**
  The ESMP identifies measures and actions in accordance with the mitigation hierarchy that reduce potentially adverse environmental and social impacts to acceptable levels. The plan will include compensatory measures, if applicable. Specifically, the ESMP;
    - Identify and summarize all anticipated adverse environmental and social impacts (including those involving indigenous people or involuntary resettlement);
    - Describe—with technical details—each mitigation measure, including the type of impact to which it relates and the conditions under which it is required (e.g., continuously or in the event of contingencies), together with designs, equipment descriptions, and operating procedures, as appropriate;
    - Estimate any potential environmental and social impacts of these measures; and
    - Take into account, and is consistent with, other mitigation plans required for the project (e.g., for involuntary resettlement, or cultural heritage).
- **Monitoring**
  Monitoring during project implementation provides information about key environmental and social aspects of the project, particularly the environmental and social impacts of the project and the effectiveness of mitigation measures. Such information enables the evaluation of the success of the mitigation as part of project supervision, and allows corrective action to be taken when needed. Specifically, the monitoring section of the ESMP provides:
    - a specific description, and technical details, of monitoring measures, including the parameters to be measured, methods to be used, sampling locations, frequency of measurements, detection limits (where appropriate), and definition of thresholds that will signal the need for corrective actions; and
    - monitoring and reporting procedures to
        - ensure early detection of conditions that necessitate particular mitigation measures, and
        - furnish information on the progress and results of mitigation.
- **Capacity development and training**
    - To support timely and effective implementation of environmental and social project components and mitigation measures, the ESMP draws on the environmental and social assessment of the existence, role, and capability of responsible parties on site or at the agency and ministry level. Specifically,
    - provide a specific description of institutional arrangements, identifying which party is responsible for carrying out the mitigation and monitoring measures (e.g., for operation, supervision, enforcement, monitoring of implementation, remedial action, financing, reporting, and staff training).
    - recommend the establishment or expansion of the parties responsible, the training of staff, and any additional measures that may be necessary to support implementation of mitigation measures and any other recommendations of the environmental and social

assessment, and to strengthen the environmental and social management capability in the agencies responsible for implementation.

- **Implementation schedule and cost estimates**
    - For all three aspects (mitigation, monitoring, and capacity development), the ESMP provides; 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
    - the capital and recurrent cost estimates and sources of funds for implementing the ESMP, which are also integrated into the total project cost tables
- **Appendices**
  Contractor's Environmental and Social Management Plan

Annex 5: Indicative Outline of ESIA

- **Executive summary**
  Concisely discuss significant findings and recommended actions.
- **Legal and institutional framework**
  - Analyze the legal and institutional framework for the project, within which the environmental and social assessment is carried out including
    - the country's applicable policy framework, national laws and regulations, and institutional capabilities (including implementation) relating to environment and social issues; variations in country conditions and project context; country environmental or social studies; national environmental or social action plans; and obligations of the country directly applicable to the project under relevant international treaties and agreements;
    - applicable requirements under the ESSs; and
    - the EHSGs, and other relevant GIIP.
  - Compare the Borrower's existing environmental and social framework and the ESSs and identifies the gaps between them.
- **Project description**
  - Concisely describe the proposed project and its geographic, environmental, social, and temporal context, including any offsite investments that may be required (e.g., dedicated pipelines, access roads, power supply, water supply, housing, and raw material and product storage facilities), as well as the project's primary suppliers.
  - Through consideration of the details of the project, indicate the need for any plan to meet the requirements of ESS1 through 10.
  - Include a map of sufficient detail, showing the project site and the area that may be affected by the project's direct, indirect, and cumulative impacts.
- **Baseline data**
  - Set out in detail the baseline data that is relevant to decisions about project location, design, operation, or mitigation measures. This should include a discussion of the accuracy, reliability, and sources of the data, as well as information about dates surrounding project identification, planning, and implementation.
  - Identify and estimate the extent and quality of available data, key data gaps, and uncertainties associated with predictions.
  - Based on current information, assess the scope of the area to be studied and describe relevant physical, biological, and socioeconomic conditions, including any changes anticipated before the project commences.
  - Take into account current and proposed development activities within the project area but not directly connected to the project.
- **Environmental and social risks and impacts**
  - Take into account all relevant environmental and social risks and impacts of the project. This will include the environmental and social risks and impacts specifically identified in ESSs2–8, and any other environmental and social risks and impacts arising as a consequence of the specific nature and context of the project, including
    - environmental risks and impacts
      - those defined by the EHSGs;
      - those related to community safety (including safe use of pesticides);
      - those related to climate change and other transboundary or global risks and impacts;

        - any material threat to the protection, conservation, maintenance, and restoration of natural habitats and biodiversity; and
        - those related to ecosystem services and the use of living natural resources, such as fisheries and forests
    - social risks and impacts,
        - threats to human security through the escalation of personal, communal, or interstate conflict, crime, or violence;
        - risks that project impacts fall disproportionately on individuals and groups who, because of their particular circumstances, may be disadvantaged or vulnerable;
        - any prejudice or discrimination toward individuals or groups in providing access to development resources and project benefits, particularly in the case of those who may be disadvantaged or vulnerable;
        - negative economic and social impacts relating to the involuntary taking of land or restrictions on land use;
        - risks or impacts associated with land and natural resource tenure and use, including (as relevant) potential project impacts on local land use patterns and tenurial arrangements, land access and availability, food security and land values, and any corresponding risks related to conflict or contestation over land and natural resources;
        - impacts on the health, safety, and well-being of workers and project-affected communities; and
        - risks to cultural heritage.
- **Mitigation measures**
    - Identify mitigation measures and significant residual negative impacts that cannot be mitigated and, to the extent possible, assess the acceptability of those residual negative impacts.
    - Identify differentiated measures so that adverse impacts do not fall disproportionately on the disadvantaged or vulnerable.
    - Assess the feasibility of mitigating the environmental and social impacts; the capital and recurrent costs of proposed mitigation measures, and their suitability under local conditions; the institutional, training, and monitoring requirements for the proposed mitigation measures.
    - Specify issues that do not require further attention, providing the basis for this determination.
- **Analysis of alternatives**
    - Systematically compare feasible alternatives to the proposed project site, technology, design, and operation—including the "without project" situation—in terms of their potential environmental and social impacts;
    - Assess the alternatives' feasibility of mitigating the environmental and social impacts; the capital and recurrent costs of alternative mitigation measures, and their suitability under local conditions; the institutional, training, and monitoring requirements for the alternative mitigation measures.
    - For each of the alternatives, quantify the environmental and social impacts to the extent possible, and attaches economic values where feasible.
- **Design measures**

Set out the basis for selecting the particular project design proposed and specifies the applicable EHSGs, or if the ESHGs are determined to be inapplicable, justifies recommended emission levels and approaches to pollution prevention and abatement that are consistent with GIIP.

- **References**
  Set out the written materials, both published and unpublished, that have been used.
- **Appendices**
  - List of the individuals or organizations that prepared or contributed to the environmental and social assessment.
  - Record of meetings, consultations, and surveys with stakeholders, including those with affected people and other interested parties. The record specifies the means of such stakeholder engagement that were used to obtain the views of affected people and other interested parties.
  - Tables presenting the relevant data referred to or summarized in the main text.
  - List of associated reports or plans.

Annex 6: Chance Find Procedure

This procedure has been prepared in accordance with the Protection of Cultural and Natural Assets Law (No: 2863).

1. Definition of Cultural and Natural Heritages

Cultural assets: All movable and immovable assets above ground, underground or underwater, which are related to science, culture, religion and fine arts belonging to prehistoric and historical periods, or which have been the subject of social life in prehistoric or historical periods, having scientific and cultural original value.

Natural assets: Values above ground, underground or underwater that belong to geological periods, prehistoric and historical periods and need to be preserved in terms of their rarity or their characteristics and beauties.

2. Ownership

All movable and immovable cultural and natural assets that are found are State property.

3. Recognition

All project workers that work in excavation works will be informed about this chance find procedure and they will be obliged to inform resident engineer upon any unusual find. In addition, although, subproject activities within cultural or natural heritage sites will not be financed, for subproject activities within the 1 km radius of the registered cultural and natural heritage sites, a specialist will be hired to accompany excavation works.

4. Procedure upon Discovery

The procedures that will be followed upon the finding of a cultural or natural heritage during the execution of the works are;

- the worker will inform the resident engineer immediately
- the resident engineer will immediately stop all the work in the project area, inform the subcontractor/contractor, and take the necessary measures for protection and safety of the heritages.
- the subcontractor/contractor will inform the nearest museum directorate or the village headman or the local administrators, and the PIU within three days at the latest.
- Resident engineer will prepare a chance find report including
    - date and time of discovery;
    - location of the discovery;
    - description of the heritage;
    - photographs and videos;
    - temporary protection implemented.

  and submit it to Subcontractor/contractor which then will submit to PIU.
- and all work is suspended until the competent authorities give permission to continue the work.

Annex 7: Indicative Outline of Pest Management Plan

1. **Background**

   outline:

   i) the purpose of the Plan,

   ii) indicate pest management authorities, and

   iii) pest management program objective.

2. **Responsibilities of individuals**

   e.g., of Program Director, Health Chair, Pest Management Coordinator, Pest Management Personnel, etc.

3. **General Information**

   Provide data on land use and soil, in the area where the pesticides are applied; climate, geo-morphology, settlements in the area of concern, population, surface water, etc. as well as inventory of land use and layout of facilities.

4. **Priority of Pest Management**

   e.g., undesirable vegetation, vertebrate pests, etc.

5. **Integrated Pest Management**

   5.1. *Principles of the Integrated Pest Management* are:

   a) *Mechanical and Physical Control.* This type of control alters the environment in which a pest lives, traps, and removes pests where they are not wanted, or excludes pests. Examples of this type of control include harborage elimination through caulking or filling voids, screening, etc.

   b) *Cultural Control.* Strategies in this method involve manipulating environmental conditions to suppress or eliminate pests. For example, spreading manure from stables onto fields to dry prevents fly breeding. Elimination of food and water for pests through good sanitary practices may prevent pest populations from becoming established or from increasing beyond a certain size.

   c) *Biological Control.* In this control strategy, predators, parasites, or disease organisms are used to control pest populations. Sterile flies may be released to lower reproductivity. Viruses and bacteria may be used which control growth or otherwise kill insects. Parasitic wasps may be introduced to kill eggs, larvae, or other life stages. Biological control may be effective in and of it but is often used in conjunction with other types of control.

   d) *Chemical Control.* Pesticides kill living organisms, whether they be plants or animals. At one time, chemicals were considered to be the most effective control available, but pest resistance rendered many pesticides ineffective. The trend is to use pesticides which have limited residual action. While this has reduced human exposure and lessened environmental impact, the cost of chemical control has risen due to requirements for more frequent application. Since personal protection and special handling and storage requirements are necessary with the use of chemicals, the overall cost of using chemicals as a sole means of control can be quite costly when compared with nonchemical control methods.

   5.2. *Integrated Pest Management Outlines*

   Address each major pest or category of similar pests by site, in separate outlines.

   5.3. *Annual Workload for Surveillance, Prevention, and Control*

   Indicate the number of man-hours for surveillance, prevention, and control of pests.

6. **Health and Safety**

   This chapter should contain health and safety requirements as follows:

   6.1. *Medical Surveillance of Pest Management Personnel*. All personnel who apply pesticides should be included in a medical surveillance program.

6.2. *Hazard Communication*. Pest management personnel should be given hazard communication training, including hazardous materials in the workplace. Additional training should be given to new employees or when new hazardous materials are introduced into the workplace.

6.3. *Personal Protective Equipment*. Describe approved masks, respirators, chemical resistant gloves and boots, and protective clothing (as specified by applicable laws, regulations and/or the pesticide label) that will be provided to pesticide applicators. These items will be used during the mixing and application of pesticides as required. Pesticide-contaminated protective clothing should not be laundered at home but commercially. Severely contaminated clothing should not be laundered but considered a pesticide-related waste and disposed, as applicable for hazardous waste.

6.4. *Fire Protection*. The fire safety protection requirements have to be established; the pest management coordinator has to control the implementation of measures to prevent fire.

7. Environmental Considerations.

7.1. *Protection of the Public.* Precautions should be taken during pesticide application to protect the public, on and off the installation. Pesticides should not be applied outdoors when the wind speed exceeds 155 m/min. Whenever pesticides are applied outdoors, care is taken to make sure that any spray drift is kept away from individuals, including the applicator. Pesticide application indoors is accomplished by individuals wearing the proper personal protective clothing and equipment. At no time are personnel permitted in a treatment area during pesticide application unless they have met the medical monitoring standards and are appropriately protected.

7.2. *Sensitive Areas.* No pesticides are applied directly to wetlands or water areas (lakes, rivers, etc.) unless use in such sites is specifically approved.

7.3. *Endangered/Protected Species and Critical Habitats.* Protected migratory birds which periodically occur on the installation cannot be controlled without a permit. The Pest Management Coordinator periodically evaluates ongoing pest control operations and evaluates all new pest control operations to ensure compliance with the list of endangered species No pest management operations are conducted that are likely to have a negative impact on endangered or protected species or their habitats without prior approval from environmental authorities.

7.4. *Environmental Documentation.* An environmental assessment which specifically addresses the pesticide use program on the installation has been prepared. This plan is referenced in the assessment as documentation of pesticide use.

Annex 8: COVID-19 Considerations in Construction/Civil Works

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

1. INTRODUCTION

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

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

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

2. CHALLENGES WITH CONSTRUCTION/CIVIL WORKS

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

permanently present on site, carrying out different activities, each with their own dedicated workers. Supply chains may involve international, regional and national suppliers facilitating the regular flow of goods and services to the project (including supplies essential to the project such as fuel, food, and

water). As such there will also be regular flow of parties entering and exiting the site; support services, such as catering, cleaning services, equipment, material and supply deliveries, and specialist sub-contractors, brought in to deliver specific elements of the works.

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

3. DOES THE CONSTRUCTION CONTRACT COVER THIS SITUATION?

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

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

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

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

- to provide health and safety training for Contractor's Personnel (which include project workers and all personnel that the Contractor uses on site, including staff and other employees of the Contractor and Subcontractors and any other personnel assisting the Contractor in carrying out project activities)

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

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

4. WHAT PLANNING SHOULD THE BORROWER BE DOING?

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

- The PIU, either directly or through the Supervising Engineer, should request details in writing from the main Contractor of the measures being taken to address the risks. As stated in Section 3, the construction contract should include health and safety requirements, and these can be used as the basis for identification of, and requirements to implement, COVID-19 specific measures. The measures may be presented as a contingency plan, as an extension of the existing project emergency and preparedness plan or as standalone procedures. The measures may be reflected in revisions to the project's health and safety manual. This request should be made in writing (following any relevant procedure set out in the contract between the Borrower and the contractor).
- In making the request, it may be helpful for the PIU to specify the areas that should be covered. This should include the items set out in Section 5 below and take into account current and relevant guidance provided by national authorities, WHO and other organizations. See the list of references in the Annex to this note.
- The PIU should require the Contractor to convene regular meetings with the project health and safety specialists and medical staff (and where appropriate the local health authorities), and to take their advice in designing and implementing the agreed measures.
- Where possible, a senior person should be identified as a focal point to deal with COVID-19 issues. This can be a work supervisor or a health and safety specialist. This person can be responsible for coordinating preparation of the site and making sure that the measures taken

are communicated to the workers, those entering the site and the local community. It is also advisable to designate at least one back-up person, in case the focal point becomes ill; that person should be aware of the arrangements that are in place.

- On sites where there are a number of contractors and therefore (in effect) different work forces, the request should emphasize the importance of coordination and communication between the different parties. Where necessary, the PIU should request the main contractor to put in place a protocol for regular meetings of the different contractors, requiring each to appoint a designated staff member (with back up) to attend such meetings. If meetings cannot be held in person, they should be conducted using whatever IT is available. The effectiveness of mitigation measures will depend on the weakest implementation, and therefore it is important that all contractors and sub-contractors understand the risks and the procedure to be followed.
- The PIU, either directly or through the Supervising Engineer, may provide support to projects in identifying appropriate mitigation measures, particularly where these will involve interface with local services, in particular health and emergency services. In many cases, the PIU can play a valuable role in connecting project representatives with local Government agencies, and helping coordinate a strategic response, which takes into account the availability of resources. To be most effective, projects should consult and coordinate with relevant Government agencies and other projects in the vicinity.
- Workers should be encouraged to use the existing project grievance mechanism to report concerns relating to COVID-19, preparations being made by the project to address COVID-19 related issues, how procedures are being implemented, and concerns about the health of their co-workers and other staff.

5. WHAT SHOULD THE CONTRACTOR COVER?

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

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

(a) ASSESSING WORKFORCE CHARACTERISTICS

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

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

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

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

- Establishing a system for controlling entry/exit to the site, securing the boundaries of the site, and establishing designating entry/exit points (if they do not already exist). Entry/exit to the site should be documented.
- Training security staff on the (enhanced) system that has been put in place for securing the site and controlling entry and exit, the behaviors required of them in enforcing such system and any COVID -19 specific considerations.
- Training staff who will be monitoring entry to the site, providing them with the resources they need to document entry of workers, conducting temperature checks and recording details of any worker that is denied entry.
- Confirming that workers are fit for work before they enter the site or start work. While procedures should already be in place for this, special attention should be paid to workers with underlying health issues or who may be otherwise at risk. Consideration should be given to demobilization of staff with underlying health issues.
- Checking and recording temperatures of workers and other people entering the site or requiring self-reporting prior to or on entering the site.

- Providing daily briefings to workers prior to commencing work, focusing on COVID-19 specific considerations including cough etiquette, hand hygiene and distancing measures, using demonstrations and participatory methods.
- During the daily briefings, reminding workers to self-monitor for possible symptoms (fever, cough) and to report to their supervisor or the COVID-19 focal point if they have symptoms or are feeling unwell.
- Preventing a worker from an affected area or who has been in contact with an infected person from returning to the site for 14 days or (if that is not possible) isolating such worker for 14 days.
- Preventing a sick worker from entering the site, referring them to local health facilities if necessary or requiring them to isolate at home for 14 days.

(c) GENERAL HYGIENE

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

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

(d) CLEANING AND WASTE DISPOSAL

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

- Providing cleaning staff with adequate cleaning equipment, materials and disinfectant.
- Review general cleaning systems, training cleaning staff on appropriate cleaning procedures and appropriate frequency in high use or high-risk areas.
- Where it is anticipated that cleaners will be required to clean areas that have been or are suspected to have been contaminated with COVID-19, providing them with appropriate PPE: gowns or aprons, gloves, eye protection (masks, goggles or face screens) and boots or closed work shoes. If appropriate PPE is not available, cleaners should be provided with best available alternatives.
- Training cleaners in proper hygiene (including handwashing) prior to, during and after conducting cleaning activities; how to safely use PPE (where required); in waste control (including for used PPE and cleaning materials).

- Any medical waste produced during the care of ill workers should be collected safely in designated containers or bags and treated and disposed of following relevant requirements (e.g., national, WHO). If open burning and incineration of medical wastes is necessary, this should be for as limited a duration as possible. Waste should be reduced and segregated, so that only the smallest amount of waste is incinerated (for further information see WHO interim guidance on water, sanitation and waste management for COVID-19).

(e) ADJUSTING WORK PRACTICES

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

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

(f) PROJECT MEDICAL SERVICES

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

- Expanding medical infrastructure and preparing areas where patients can be isolated. Guidance on setting up isolation facilities is set out in WHO interim guidance on considerations for quarantine of individuals in the context of containment for COVID-19). Isolation facilities should be located away from worker accommodation and ongoing work activities. Where possible, workers should be provided with a single well-ventilated room (open windows and door). Where this is not possible, isolation facilities should allow at least 1 meter between workers in the same room, separating workers with curtains, if possible. Sick workers should limit their movements, avoiding common areas and facilities and not be

allowed visitors until they have been clear of symptoms for 14 days. If they need to use common areas and facilities (e.g. kitchens or canteens), they should only do so when unaffected workers are not present and the area/facilities should be cleaned prior to and after such use.

- Training medical staff, which should include current WHO advice on COVID-19 and recommendations on the specifics of COVID-19. Where COVID-19 infection is suspected, medical providers on site should follow WHO interim guidance on infection prevention and control during health care when novel coronavirus (nCoV) infection is suspected.
- Training medical staff in testing, if testing is available.
- Assessing the current stock of equipment, supplies and medicines on site, and obtaining additional stock, where required and possible. This could include medical PPE, such as gowns, aprons, medical masks, gloves, and eye protection. Refer to WHO guidance as to what is advised (for further information see WHO interim guidance on rational use of personal protective equipment (PPE) for COVID-19).
- If PPE items are unavailable due to world-wide shortages, medical staff on the project should agree on alternatives and try to procure them. Alternatives that may commonly be found on constructions sites include dust masks, construction gloves and eye goggles. While these items are not recommended, they should be used as a last resort if no medical PPE is available.
- Ventilators will not normally be available on work sites, and in any event, intubation should only be conducted by experienced medical staff. If a worker is extremely ill and unable to breathe properly on his or her own, they should be referred immediately to the local hospital (see (g) below).
- Review existing methods for dealing with medical waste, including systems for storage and disposal (for further information see WHO interim guidance on water, sanitation and waste management for COVID-19, and WHO guidance on safe management of wastes from health-care activities).

(g) LOCAL MEDICAL AND OTHER SERVICES

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

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

continue to apply, COVID-19 may raise other issues because of the infectious nature of the disease. The project should liaise with the relevant local authorities to coordinate what should be done, including any reporting or other requirements under national law.

(h) INSTANCES OR SPREAD OF THE VIRUS

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

- If a worker has symptoms of COVID-19 (e.g. fever, dry cough, fatigue) the worker should be removed immediately from work activities and isolated on site.
- If testing is available on site, the worker should be tested on site. If a test is not available at site, the worker should be transported to the local health facilities to be tested (if testing is available).
- If the test is positive for COVID-19 or no testing is available, the worker should continue to be isolated. This will either be at the work site or at home. If at home, the worker should be transported to their home in transportation provided by the project.
- Extensive cleaning procedures with high-alcohol content disinfectant should be undertaken in the area where the worker was present, prior to any further work being undertaken in that area. Tools used by the worker should be cleaned using disinfectant and PPE disposed of.
- Co-workers (i.e. workers with whom the sick worker was in close contact) should be required to stop work, and be required to quarantine themselves for 14 days, even if they have no symptoms.
- Family and other close contacts of the worker should be required to quarantine themselves for 14 days, even if they have no symptoms.
- If a case of COVID-19 is confirmed in a worker on the site, visitors should be restricted from entering the site and worker groups should be isolated from each other as much as possible.
- If workers live at home and has a family member who has a confirmed or suspected case of COVID-19, the worker should quarantine themselves and not be allowed on the project site for 14 days, even if they have no symptoms.
- Workers should continue to be paid throughout periods of illness, isolation or quarantine, or if they are required to stop work, in accordance with national law.
- Medical care (whether on site or in a local hospital or clinic) required by a worker should be paid for by the employer.

(i) CONTINUITY OF SUPPLIES AND PROJECT ACTIVITIES

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

- Identify back-up individuals, in case key people within the project management team (PIU, Supervising Engineer, Contractor, sub-contractors) become ill, and communicate who these are so that people are aware of the arrangements that have been put in place.

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

(j) TRAINING AND COMMUNICATION WITH WORKERS

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

- It is important to be aware that in communities close to the site and amongst workers without access to project management, social media is likely to be a major source of information. This raises the importance of regular information and engagement with workers (e.g. through training, town halls, tool boxes) that emphasizes what management is doing to deal with the risks of COVID-19. Allaying fear is an important aspect of work force peace of mind and business continuity. Workers should be given an opportunity to ask questions, express their concerns, and make suggestions.
- Training of workers should be conducted regularly, as discussed in the sections above, providing workers with a clear understanding of how they are expected to behave and carry out their work duties.
- Training should address issues of discrimination or prejudice if a worker becomes ill and provide an understanding of the trajectory of the virus, where workers return to work.
- Training should cover all issues that would normally be required on the work site, including use of safety procedures, use of construction PPE, occupational health and safety issues, and code of conduct, taking into account that work practices may have been adjusted.
- Communications should be clear, based on fact and designed to be easily understood by workers, for example by displaying posters on handwashing and social distancing, and what to do if a worker displays symptoms.

(k) COMMUNICATION AND CONTACT WITH THE COMMUNITY

Relations with the community should be carefully managed, with a focus on measures that are being implemented to safeguard both workers and the community. The community may be concerned about the presence of non-local workers, or the risks posed to the community by local workers presence on the project site. The project should set out risk-based procedures to be followed, which may reflect WHO guidance (for further information see WHO Risk Communication and Community

Engagement (RCCE) Action Plan Guidance COVID-19 Preparedness and Response). The following good practice should be considered:

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

6. EMERGENCY POWERS AND LEGISLATION

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

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

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

Annex 9: COVID-19 Preparedness Report Template

COVID-19 Response Report should follow the template format provided below. Make sure to provide breakdown between different subprojects, construction sites and/or contractors. Analyse discrepancies and assess their causes, as well as necessary adjustments.

Refer to guidance documents provided previously – COVID-19 Considerations on Construction Civil Works documents (Guidance for Borrower and Guidance for Contractor), Advisory Note on Contingency Planning for existing operations – for examples of mitigation measures/practices for COVID-19 spread prevention/containment etc.

GENERAL INFORMATION
Name of the project/subproject, Date of the report
Provide identifying information
Requirements/guidance on COVID-19 protection issued by the state authority of all levels
Provide information of legal framework on the issue, the date it became effective, both on national, regional and local (community) level
Brief description of activities/subprojects which are active, stalled or partially active
Describe level of activity for each project/subproject (PIU is operational in Client's premises; ongoing civil works on sites, etc.), as well as types of civil works (if ongoing) and number of workers on each site separately and for each subproject/contractor collectively

ASSESSING WORKFORCE CHARACTERISTICS
Information on workers accommodation
For each subproject/contractor, provide information on how many workers live in workers camps, how many live in residential accommodations, hotels, etc.; how many live in their own private residences.
Transportation to/from work sites and for other work-related reasons
If workers need to commute to/from work sites from the place of residence, specify the type of transportation (public transport, own vehicle, arranged transportation by the Employer, etc.)

COVID-19 PREPAREDNESS/RESPONSE MEASURES
(a) Entry/exit to the work site and checks on commencement of work
Describe measures taken to secure entrance procedure and medical checks.
(b) General hygiene
Describe what are requirements on general hygiene applied for project-related workforce (both PIU and project workers) and how these requirements are communicated
(c) Cleaning and waste disposal
Provide review of cleaning protocols (including disinfection) for all site facilities, including offices, accommodation, canteens, common spaces, as well as key construction equipment.
(d) Adjusting work practices
Describe what changes to work processes and timings have been done to reduce or minimize contact between workers
(e) Project medical services
Provide assessment whether existing project medical services on site are adequate, taking into account existing infrastructure (size of medical post, number of beds, isolation facilities), medical staff, equipment and supplies, procedures and training. If not, describe what measures have been taken to upgrade.
(f) Local medical and other services

Provide overview of resources and capacity of local medical services, what procedure is established for the event of ill workers needing to be referred. Availability of health facility nearby to refer the patient and agreement between the Contractor and the facility.
(g) Instances or spread of the virus
Describe what is planned to be done to treat a person who becomes sick or displays symptoms that could be associated with the COVID-19 virus
(h) Continuity of supplies and project activities
Assess if COVID-19 restriction will impact supply chains and what arrangement are in place to secure continuity of operation. Specify critical supplies.

CONTINGENCY PLANNING FOR AN OUTBREAK
Measures to address COVID-19 may be presented in different ways – as a contingency plan, as an extension of the existing project emergency and preparedness plan or as standalone procedures. Describe, how such measures are presented for each individual subproject/contractor and when such plan/procedures came into force.

AWARENESS AND COMMUNICATION
(a) Training and communication with workers
Workers should be made aware of the procedures that have been put in place by the project, and their own responsibilities in implementing those prosedures. Provide description of awareness/preparedness building exercises (issue of specific work instructions, public announcements on medical check-ins procedures, access to health care center, etc.) for workforce.
(b) Communication and contact with the community
The community may be concerned about the presence of non-local workers, or the risks posed to the community by local workers presence on the project site. Describe risk-based procedures to be followed for communication with local community stakeholders.
(c) Grievance Redress Mechanism
Project-related GRM log needs to include additional column monitoring COVID-19 related complains/reports/grievances. Provide an update on number of COVID-related GRM log entries since last regular report.

COVID-19 REPORTING
(a) Number of COVID-19 cases – confirmed and suspected/under investigation
Provide information on project-related employees who are confirmed or suspected of being infected with COVID-19 virus: number, date of isolation, severity of the case. No private information should be provided!
(b) Reporting arrangements
ESIRT requires outbreaks of diseases to be reported. PIU/Contractor should report an outbreak following the guidance in ESIRT for a 'Serious' incident. Borrower informed of any concerns or problems associated with providing care to infected workers on project sites, particularly if infection rate is approaching 50% of the workforce. Confirm, that these reporting requirements are accepted by the relevant/responsible staff within PIU/Contractor's organizational structure.

Annex 10: International Best Practice in Safety of Research Laboratories[23]

Procurement / Transport

- Minimize acquisition / quantity of hazardous materials, minimize storage time needed
- Identify mechanism of waste disposal before acquisition
- For chemicals, have Material Safety Data Sheets (MSDSs) accessible/confine deliveries to areas that are equipped to handle them (and train relevant personnel)
- Ensure container is intact and appropriately labeled (US regulations detail how hazardous materials have to be identified, packaged, marked, labeled, documented and placarded) Transport in appropriate (secondary) containers
- Use triple packaging system for infectious and potentially infectious substances
- Adhere to international air transport regulations

Storage / Management

- Inventory should have name as printed on the container
- For chemicals: include molecular formula for further identification and to provide a simple means of searching chemicals; include CAS (Chemical Abstract Service) registry number for unambiguous identification of chemicals despite the use of different naming conventions
- Source
- Size of container
- Hazard classification, as a guide to safe storage, handling, and disposal
- Date of acquisition, to ensure that unstable chemicals are not stored beyond their useful life, and Storage location

Procedures

- Dispose of materials anticipated to not be needed within a reasonable time frame
- Use approved containers; make sure storage containers remain intact and sealed
- Dispose of chemicals prior to expiration date, monitor reactive chemicals
- Replace deteriorating labels before information is obscured or lost
- Follow regulations for safe storage in stockroom or lab
- Avoid storing chemicals on bench tops or lab hoods
- Store volatile chemicals in ventilated cabinet (near hood)
- If ventilation is not required, store in closable cabinet or on shelf with lip to prevent sliding
- Do not expose stored chemicals to heat or direct sunlight
- Observe all precautions regarding the storage of incompatible chemicals
- Provide vented cabinets beneath hoods for storing hazardous materials
- Use chemical storage refrigerators for storing chemicals
- Have fire protection system (sprinklers)
- Follow storage limits for flammable and combustible liquids
- Restrict access to storage facility

Protocols / Facilities for Use in Research

- Wear and use appropriate personal protection materials to minimize exposure
- Wash hands
- Reduce the possibility of creating splashes or aerosols
- Contain in biological safety cabinets operations that generate aerosols
- Use good housekeeping
- Use mechanical pipetting devices
- Promptly decontaminate work surfaces
- Never eat, ring, smoke, handle contact lenses, apply cosmetics, or take medicine in the lab
- Take special care when using sharps
- Keep lab doors closed when experiments are in progress
- Use secondary leak-proof containers to move or transfer cultures
- Decontaminate infectious waste before disposal

[23] US National Institutes of Health

- Post appropriate warning signs
- Mark emergency equipment, maintain it, inspect it; list telephone numbers to call in case of accident
- Control access

For Radioisotopes

- Use only in designated areas
- Allow the presence of essential staff only
- Use personal protective equipment
- Monitor personal radiation exposures
- Use spill trays lined with disposable absorbent materials
- Limit radionuclide quantities
- Shield radiation sources
- Mark radiation containers with the radiation symbol, including radionuclide identity, activity, and assay date
- Use radiation meters to monitor working areas, protective clothing, and hands after completion of work
- Use appropriately shielded transport containers
- Remove radioactive waste frequently from the working area
- Maintain accurate records of use and disposal of radioactive materials
- Screen dosimetry records for materials exceeding the dose limits
- Establish and regularly exercise emergency response plans
- In emergencies, assist injured persons first
- Clean contaminated areas thoroughly
- Write and keep incident reports

For Animal laboratories

- Require good microbiological techniques
- Establish policies and protocols for all operations and for access to vivarium
- Establish appropriate medical surveillance program and supervision for staff
- Prepare and adopt safety or operations manual
- Post warning signs
- Decontaminate work surfaces after use
- Use appropriate biological safety cabinets or isolator cages; handle and decontaminate animal bedding and waste materials appropriately
- Transport material for autoclaving or incineration safely, in closed containers
- Treat, report, and record injuries

Training of Personnel

Employer develops Chemical Hygiene Plan containing (models available from U.S. government and from some professional societies)

- Employee information and training about the hazards of chemicals in the work area:
    - How to detect their presence or release
    - Work practices and how to use protective equipment
    - Emergency response procedures
- Circumstances under which a lab operation requires prior approval from the institution
- Standard operating procedures for work with hazardous chemicals
- Criteria for use of control measures
- Measures to ensure proper operation of fume hoods and other protective equipment
- Provisions for additional employee protection for work with select carcinogens and toxins
- Provisions for medical consultations and examinations for employees
- Labs should establish their own safety groups at the department level (include students and support staff)
- Labs should provide training in safety and waste management for all lab workers, including students in laboratory classes
- Labs should incorporate institutionally supported lab and equipment inspection programs into their overall health and safety programs
- Review exit / evacuation routes

- Know how to report fire, injury, chemical spill, or summon emergency response
- Know first aid
- Know location and use of emergency equipment such as safety showers and eyewashes
- Know location and use of fire extinguishers and spill control equipment (have appropriate kits readily available)
- Lab personnel should establish ongoing relationships and clear lines of communication with emergency response teams
- Include information on safe methods for highly hazardous procedures commonly encountered by lab personnel that involve:
    - Inhalation risks
    - Ingestion risks
    - Risks of percutaneous exposures
    - Bites and scratches when handling animals
    - Handling of blood and other potentially hazardous pathological materials
    - Decontamination and disposal of infectious material

Segregation / Triage of Waste

Multi-hazardous waste – goal is reduction of waste to a waste that presents a single hazard.

- Consider frequency and amount of waste generated; assess risk
- Identify / characterize waste:
    - Physical description
    - Water reactivity
    - Water solubility
    - pH and possibly neutralization information
    - ignitability / flammability
    - presence of oxidizer
    - presence of sulfides / cyanides
    - presence of halogens
    - presence of radioactive materials
    - presence of biohazardous materials
    - presence of toxic constituents
- Minimize waste's hazards
- Determine options for management of hazards
- If appropriate, take steps to neutralize waste or render it non-hazardous
- When possible, select a single management option
- Establish procedures for dealing with unstable waste, or waste that requires special storage or handling
- Store safely:
    - Designated room or facility modified to contain the waste (with ventilation and effluent trapping)
    - Protect workers
    - Minimize risk of fire or spill
    - Minimize radiation levels outside of area
    - Consider compatibility of materials being accumulated (e.g., aqueous and non-aqueous waste should be separated)
- Give particular attention to the handling or cleaning of radioactive laboratory ware, and to the proper disposal of sharps.
    - Non-contaminated (non-infectious) waste can be reused or recycled or disposed of as general waste
    - Contaminated (infectious) sharps – collect in puncture-proof containers fitted with covers and treated as infectious; autoclave if appropriate
    - Contaminated material for decontamination by autoclaving and thereafter washing and reuse or recycling
    - Contaminated material for direct incineration

Disposal

No activity should begin unless a plan for the disposal of hazardous waste has been formulated

- Use appropriate disposal method for each category of waste
- Use appropriate containers
- Label and securely close waste containers
- Separate wastes as appropriate

For low level radioactive waste, options include

- Storage time for decay and indefinite on site storage,
- Burial at a low-level radioactive waste site,
- Incineration, or
- Sanitary sewer disposal

For biological waste, options include

- Disinfection
- Autoclaving
- For liquids, disposal in sanitary sewer; putrescible waste disposed of by incineration; needles and sharps require destruction, typically by incineration or grinding

Collection and storage of waste

- At satellite area near lab:
    - should be clearly identified, ventilated if necessary
    - determine whether to recycle, reuse, or dispose
    - hold here for less than one year; when containment volume limits reached, move to central accumulation area – package appropriately
- At central accumulation area:
    - separate according to compatibility, commingle solvents when appropriate
    - label clearly, store in appropriate containers
    - limit storage time to 90 days
    - ensure that employees are trained to handle waste materials as well as contingency planning for emergencies
    - When transporting, make provisions for spill control in case of accident; have internal tracking system to follow movement of waste
    - Ensure that all necessary records have been generated (Quantities and identification of waste generated and shipped; Documentation and analyses of unknown materials; Manifests for waste shipping as well as verification of waste disposal; Any other information required to ensure compliance and safety from long-term liability)
- Disposal options:
    - Incineration – is method of choice for most wastes, but is most expensive
    - Normal trash – only where appropriate, must be clearly identified and appropriately labeled
    - Sanitary sewer – not commonly used; solutions must be aqueous and biodegradable, or low toxicity inorganics – make sure sewer doesn't drain into water supply inappropriate for waste disposal, and make sure waste is highly diluted
    - Release to the atmosphere – not acceptable; fume hoods must have trapping devices to prevent discharge to atmosphere
- If hazardous and non-hazardous wastes are mixed, entire waste volume must be treated as hazardous
- Preparation for transport to a treatment, storage, and disposal facility (TSDF)
- Waste generator must obtain assurance (in terms of documentation, permits, records) that provider is reliable

For infectious material

- Decontaminate, autoclave, or incinerate in lab
- Package appropriately (for incineration or for transfer to another facility for incineration)
- Protect against hazards to others to those who might come in contact with discarded items

Annex 11: Brief Summary of Stakeholder Consultations on the Draft ESMF

Date: March 21st, 2014

Objective:

Venue: Ministry of Agriculture, (virtually via zoom) On-line, web-platform

Invitees	Participants	Summary, conclusions and comments

Annex 12: Potential risks and mitigation measures for construction and decommissioning activities[24]

Risk category	Risk subcategory	Risk identification	Mitigation measures
Labor and Working Conditions	Over-exertion	Over-exertion, and ergonomic injuries and illnesses, such as repetitive motion, over-exertion, and manual handling, are among the most common causes of injuries in construction and decommissioning sites.	• Train workers in lifting and materials handling techniques in construction and decommissioning projects, including the placement of weight limits above which mechanical assists or two-person lifts are necessary • Plan work site layout to minimize the need for manual transfer of heavy loads • Select tools and designing workstations that reduce force requirements and holding times, and which promote improved postures, including, where applicable, user adjustable workstations • Implement administrative controls into work processes, such as job rotations and rest or stretch breaks
	Slips and Falls	Slips and falls on the same elevation associated with poor housekeeping, such as excessive waste debris, loose construction materials, liquid spills, and uncontrolled use of electrical cords and ropes on the ground, are also among the most frequent cause of lost time accidents at construction and decommissioning sites.	• Implement good house-keeping practices, such as the sorting and placing loose construction materials or demolition debris in established areas away from foot paths • Clean up excessive waste debris and liquid spills regularly • Locate electrical cords and ropes in common areas and marked corridors • Use of slip retardant footwear
	Work in Heights	Falls from elevation associated with working with ladders, scaffolding, and partially built or demolished structures are among the most common cause of fatal or permanent disabling injury at construction or decommissioning sites.	• Train and use of temporary fall prevention devices, such as rails or other barriers able to support a weight of 91 kg, when working at heights equal or greater than 2 m or at any height if the risk includes falling into operating machinery, into water or other liquid, into hazardous substances, or through an opening in a work surface • Train and use of personal fall arrest systems, such as full body harnesses and energy absorbing lanyards able to support 2268 kg, as well as fall rescue procedures to deal with workers whose fall has been successfully arrested. The tie in point of the fall arresting system should also be able to support 2268 kg • Use control zones and safety monitoring systems to warn workers of their proximity to fall hazard zones, as well as securing, marking, and labeling covers for openings in floors, roofs, or walking surfaces
	Struck By Objects	Construction and demolition activities may pose significant hazards related to the potential fall of materials or tools, as well as ejection of solid particles from abrasive or other types of power tools which can result in injury to the head, eyes, and extremities.	• Use a designated and restricted waste drop or discharge zones, and/or a chute for safe movement of wastes from upper to lower levels • Conduct sawing, cutting, grinding, sanding, chipping or chiseling with proper guards and anchoring as applicable • Maintain clear traffic ways to avoid driving of heavy equipment over loose scrap • Use temporary fall protection measures in scaffolds and out edges of elevated work surfaces, such as handrails and toe boards to prevent materials from being dislodged • Evacuate work areas during blasting operations, and using blast mats or other means of deflection to minimize fly rock or ejection of demolition debris if work is conducted in proximity to people or structures • Wear appropriate PPE, such as safety glasses with side shields, face shields, hard hats, and safety shoes
	Moving Machinery	Vehicle traffic and use of lifting equipment in the movement of machinery and materials on a construction site may pose temporary hazards, such as physical contact, spills, dust, emissions,	• Plan and segregate the location of vehicle traffic, machine operation, and walking areas, and controlling vehicle traffic through the use of one-way traffic routes, establishment of speed limits, and on-site trained flag-people wearing high-visibility vests or outer clothing covering to direct traffic

[24] This section is based on the World Bank Group Environmental, Health, and Safety General Guidelines, 2007

Risk category	Risk subcategory	Risk identification	Mitigation measures
		and noise. Heavy equipment operators have limited fields of view close to their equipment and may not see pedestrians close to the vehicle. Center-articulated vehicles create a significant impact or crush hazard zone on the outboard side of a turn while moving.	• Ensure the visibility of personnel through their use of high visibility vests when working in or walking through heavy equipment operating areas, and training of workers to verify eye contact with equipment operators before approaching the operating vehicle • Ensure moving equipment is outfitted with audible back-up alarms • Use inspected and well-maintained lifting devices that are appropriate for the load, such as cranes, and securing loads when lifting them to higher job-site elevations.
	Dust		• Implement dust suppression techniques, such as applying water or non-toxic chemicals to minimize dust from vehicle movements • Use PPE, such as dusk masks, where dust levels are excessive
	Confined Spaces and Excavations	Examples of confined spaces that may be present in construction or demolition sites include: silos, vats, hoppers, utility vaults, tanks, sewers, pipes, and access shafts. Ditches and trenches may also be considered a confined space when access or egress is limited.	• Control site-specific factors which may contribute to excavation slope instability including, for example, the use of excavation dewatering, sidewalls support, and slope gradient adjustments that eliminate or minimize the risk of collapse, entrapment, or drowning • Provide safe means of access and egress from excavations, such as graded slopes, graded access route, or stairs and ladders • Avoid the operation of combustion equipment for prolonged periods inside excavations areas where other workers are required to enter unless the area is actively ventilated
	Other Site Hazards	Construction and decommissioning sites may pose a risk of exposure to dust, chemicals, hazardous or flammable materials, and wastes in a combination of liquid, solid, or gaseous forms.	• Use specially trained personnel to identify and remove waste materials from tanks, vessels, processing equipment or contaminated land as a first step in decommissioning activities to allow for safe excavation, construction, dismantling or demolition • Use specially trained personnel to identify and selectively remove potentially hazardous materials in building elements prior to dismantling or demolition including, for example, insulation or structural elements containing asbestos and Polychlorinated Biphenyls (PCBs), electrical components containing mercury • Use waste-specific PPE based on the results of an occupational health and safety assessment, including respirators, clothing/protective suits, gloves and eye protection
Environment	Noise Vibration	The operation of pile drivers, earth moving and excavation equipment, concrete mixers, cranes and the transportation of equipment, materials and people might cause noise.	• Plan activities in consultation with local communities so that activities with the greatest potential to generate noise are planned during periods of the day that will result in least disturbance • Use noise control devices, such as temporary noise barriers and deflectors for impact and blasting activities, and exhaust muffling devices for combustion engines. • Avoid or minimize project transportation through community areas

	Soil erosion	During site clearing, earth moving, and excavation activities, soil surfaces might be exposed to rain and wind.	Sediment mobilization and transport;
			• Reduce or prevent erosion by:
			  ○ Avoid construction activities at heavy rainfall periods to the extent practical
			  ○ Contour and minimize length and steepness of slopes
			  ○ Mulch to stabilize exposed areas
			  ○ Re-vegetate areas promptly
			  ○ Design channels and ditches for post-construction flows
			  ○ Line steep channel and slopes (e.g. use jute matting)
			• Reduce or prevent off-site sediment transport through use of settlement ponds, silt fences, and water treatment, and modifying or suspending activities during extreme rainfall and high winds to the extent practical.

	Water system management	The quality of natural water systems and the biological systems that use these waters might be affected by the sedimentation which is caused by soil erosion.	

Risk category	Risk subcategory	Risk identification	Mitigation measures
			Clean runoff management; • Segregate or divert clean water runoff to prevent it mixing with water containing a high solids content, to minimize the volume of water to be treated prior to release Road design • Limit access road gradients to reduce runoff-induced erosion • Provide adequate road drainage based on road width, surface material, compaction, and maintenance Disturbance to water bodies • Depending on the potential for adverse impacts, install free-spanning structures (e.g., single span bridges) for road watercourse crossings • Restrict the duration and timing of in-stream activities to lower low periods, and avoiding periods critical to biological cycles of valued flora and fauna (e.g., migration, spawning, etc.) • For in-stream works, use isolation techniques such as berming or diversion during construction to limit the exposure of disturbed sediments to moving water • Consider using trenchless technology for pipeline crossings (e.g., suspended crossings) or installation by directional drilling Structural (slope) stability • Provide effective short-term measures for slope stabilization, sediment control and subsidence control until long term measures for the operational phase can be implemented • Provide adequate drainage systems to minimize and control infiltration
	Air Quality /Dust	On-site excavation and movement of earth materials, contact of construction machinery with bare soil, and exposure of bare soil and soil piles to wind might cause dust	• Minimize dust from material handling sources, such as conveyors and bins, by using covers and/or control equipment (water suppression, bag house, or cyclone) • Minimize dust from open area sources, including storage piles, by using control measures such as installing enclosures and covers, and increasing the moisture content • Implement dust suppression techniques, such as applying water or non-toxic chemicals to minimize dust from vehicle movements • Selectively remove potential hazardous air pollutants, such as asbestos, from existing infrastructure prior to demolition
	Air Quality / Exhaust	Diesel engines of earth moving equipment and open burning of solid waste on-site might generate exhaust.	• Implement manufacturer recommended engine maintenance programs· Regardless of the size or type of vehicle • Instruct drivers on the benefits of driving practices that reduce both the risk of accidents and fuel consumption, including measured acceleration and driving within safe speed limits; • Avoid open burning of solid waste
	Non-hazardous Solid Waste / Excess fill materials	Grading and excavation activities, scrap wood and metals, and small concrete spills might generate excess fill materials.	Waste Management Planning • Review new waste sources during planning, siting, and design activities, including during equipment modifications and process alterations, to identify expected waste generation, pollution prevention opportunities, and necessary treatment, storage, and disposal infrastructure • Collect data and information about the process and waste streams in existing facilities, including characterization of waste streams by type, quantities, and potential use/disposition • Establish priorities based on a risk analysis that takes into account the potential EHS risks during the waste cycle and the availability of infrastructure to manage the waste in an environmentally sound
	Non-hazardous Solid Waste / Office, kitchen, and dormitory	Generation of non-hazardous solid waste in varying quantities depending on the number of workers involved	

Risk category	Risk subcategory	Risk identification	Mitigation measures
	wastes		manner • Define opportunities for source reduction, as well as reuse and recycling • Define procedures and operational controls for onsite storage • Define options / procedures / operational controls for treatment and final disposal Waste Prevention • Substitute raw materials or inputs with less hazardous or toxic materials, or with those where processing generates lower waste volumes • Apply manufacturing process that convert materials efficiently, providing higher product output yields, including modification of design of the production process, operating conditions, and process controls • Institute good housekeeping and operating practices, including inventory control to reduce the amount of waste resulting from materials that are out-of-date, off-specification, contaminated, damaged, or excess to plant needs • Institute procurement measures that recognize opportunities to return usable materials such as containers and which prevents the over ordering of materials • Minimize hazardous waste generation by implementing stringent waste segregation to prevent the commingling of non-hazardous and hazardous waste to be managed Recycling and Reuse • Evaluate waste production processes and identify potentially recyclable materials • Identify and recycle products that can be reintroduced into the manufacturing process or industry activity at the site • Investigate external markets for recycling by other industrial processing operations located in the neighborhood or region of the facility (e.g., waste exchange) • Establish recycling objectives and formal tracking of waste generation and recycling rates • Provide training and incentives to employees in order to meet objectives Treatment and Disposal • On-site or off-site biological, chemical, or physical treatment of the waste material to render it nonhazardous prior to final disposal • Treat or dispose at permitted facilities specially designed to receive the waste. Examples include: composting operations for organic non-hazardous wastes; properly designed, permitted and operated landfills or incinerators designed for the respective type of waste; or other methods known to be effective in the safe, final disposal of waste materials such as bioremediation.
	Hazardous Solid Waste /		Waste Storage • Waste is stored in a manner that prevents the commingling or contact between incompatible wastes, and allows for inspection between containers to monitor leaks or spills. Examples include sufficient space between incompatibles or physical separation such as walls or containment curbs • Store in closed containers away from direct sunlight, wind and rain • Construct secondary containment systems with materials appropriate for the wastes being contained and adequate to prevent loss to the environment • Include secondary containment wherever liquid wastes are stored in volumes greater than 220 liters. The available volume of secondary containment should be at least 110% of the largest storage container, or 25% of the total storage capacity (whichever is greater), in that specific location • Provide adequate ventilation where volatile wastes are stored.

Risk category	Risk subcategory	Risk identification	Mitigation measures
			Transportation • Properly label the containers, including the identity and quantity of the contents, hazards, and shipper contact information • Provide a shipping document (e.g. shipping manifest) that describes the contents of the load and its associated hazards in addition to the labeling of the containers. The shipping document should establish a chain-of-custody using multiple signed copies to show that the waste was properly shipped, transported and received by the recycling or treatment/disposal facility • Ensure that the volume, nature, integrity and protection of packaging and containers used for transport are appropriate for the type and quantity of hazardous material and modes of transport involved • Ensure adequate transport vehicle specifications • Train employees involved in the transportation of hazardous materials regarding proper shipping procedures and emergency procedures • Use labeling and placarding (external signs on transport vehicles), as required • Provide necessary means for emergency response on call 24 hours/day • Prepare Hazardous Materials Transportation Plan where necessary Treatment and Disposal • Same as the non-hazardous solid waste
	Hazardous Materials / Petroleum-based products	Lubricants, hydraulic fluids, or fuels during their storage, transfer, or use in equipment might release petroleum-based products	• Provide adequate secondary containment for fuel storage tanks and for the temporary storage of other fluids such as lubricating oils and hydraulic fluids, • Use impervious surfaces for refueling areas and other fluid transfer areas • Train workers on the correct transfer and handling of fuels and chemicals and the response to spills • Provide portable spill containment and cleanup equipment on site and training in the equipment deployment • Assess the contents of hazardous materials and petroleum-based products in building systems (e.g. PCB containing electrical equipment, asbestos-containing building materials) and process equipment and remove them prior to initiation of decommissioning activities, and manage their treatment and disposal according Hazardous Materials and Hazardous Waste Management, respectively • Assess the presence of hazardous substances in or on building materials (e.g., polychlorinated biphenyls, asbestos containing flooring or insulation) and decontaminating or properly managing contaminated building materials
	Wastewater discharges	Generation of sanitary wastewater discharges in varying quantities depending on the number of workers involved Contamination of water bodies due to foundation drainage discharges	• Segregate wastewater streams to ensure compatibility with selected treatment option (e.g. septic system which can only accept domestic sewage); • Segregate and pretreat oil and grease containing effluents (e.g. use of a grease trap) prior to discharge into sewer systems; • If sewage from the industrial facility is to be discharged to surface water, treat to meet national or local standards for sanitary wastewater discharges or EHSG criteria • If sewage from the industrial facility is to be discharged to either a septic system, or where land is used as part of the treatment system, treat to meet applicable national or local standards for sanitary wastewater discharges. • Dispose sludge of sanitary wastewater treatment systems in compliance with local regulatory requirements. • Provide necessary equipment for pumping the foundation drainage during the construction

Risk category	Risk subcategory	Risk identification	Mitigation measures
			• Ensure the that the subsurface/ foundation drainage systems is discharged to a separate collector as it might be contaminated or carry nitrate • Connect the foundation drainage discharge collector to wastewater system in case of a contamination risk
	Contaminated land	Contaminated land, which could potentially be encountered on-site due to previous land use activities, or small amounts of machinery maintenance materials, such as oily rags, used oil filters, and used oil, as well as spill cleanup materials from oil and fuel spills.	• Manage contaminated media with the objective of protecting the safety and health of occupants of the site, the surrounding community, and the environment post construction or post decommissioning • Understand the historical use of the land with regard to the potential presence of hazardous materials or oil prior to initiation of construction or decommissioning activities • Prepare plans and procedures to respond to the discovery of contaminated media to minimize or reduce the risk to health, safety, and the environment consistent with EHSG. • Prepare a management plan to manage obsolete, abandoned, hazardous materials or oil consistent with the approach to hazardous solid waste management. • Successful implementation of any management strategy may require identification and cooperation with whoever is responsible and liable for the contamination.
Environment	Biodiversity and habitats	The project interventions may lead to the modifications in some of the natural habitats. Some activities may occur as a result of the expansion of the land onto the existing natural habitat. Also, some of the landscape characteristics may change due to the change of the plant varieties, cultivation technics, etc. Additionally, it is important to stress that the excess use of chemicals and biocides may lead to the loss of flora and/or fauna	• Storage of topsoil in designated storage areas for further site restoration works. • Prevention of storage areas from the accumulation of storm water with drainage system. • Prevention of deed growth in stockpiles of topsoil and seeding the stockpiles if required. • Usage of existing access roads for project purposes and off-road driving should be prohibited. • Limitation of Project activities in the construction areas and construction sites should be surrounded with fences to prevent wild animals' intrusion to the site. • Prohibition of hunting or collection of animals within the Project area. • Awareness raising among all construction workers about the fauna species. If these species, are observed, they will be translocated to undisturbed but similar areas.
Community Health and Safety	General Site Hazards	Risks may arise from inadvertent or intentional trespassing, including potential contact with hazardous materials, contaminated soils and other environmental media, buildings that are vacant or under construction, or excavations and structures which may pose falling and entrapment hazards.	• Restrict access to the site, through a combination of institutional and administrative controls, with a focus on high-risk structures or areas depending on site-specific situations, including fencing, signage, and communication of risks to the local community • Remove hazardous conditions on construction sites that cannot be controlled affectively with site access restrictions, such as covering openings to small, confined spaces, ensuring means of escape for larger openings such as trenches or excavations, or locked storage of hazardous materials

	Disease prevention	Increased incidence of communicable and vector-borne diseases attributable to construction activities represents a potentially serious health threat to project personnel and residents of local communities.	Communicable Diseases
			• Provide surveillance and active screening and treatment of workers
			• Prevent illness among workers in local communities by:
			  ○ Undertaking health awareness and education initiatives,
			  ○ Providing health services
			• Provide treatment through standard case management in on-site or community health care facilities. Ensure ready access to medical treatment, confidentiality and appropriate care, particularly with respect to migrant workers
			• Promote collaboration with local authorities to enhance access of workers families and the community to public health services and promote immunization

	Traffic safety	Construction activities may result in a significant increase in movement of heavy vehicles for the transport of construction	• Adopt best transport safety practices across all aspects of project operations with the goal of preventing traffic accidents and minimizing injuries suffered by project personnel and the public.

Risk category	Risk subcategory	Risk identification	Mitigation measures
		materials and equipment increasing the risk of traffic-related accidents and injuries to workers and local communities	○ Emphasize safety aspects among drivers ○ Improve driving skills ○ Adopt limits for trip duration and arrange driver rosters to avoid overtiredness ○ Avoid dangerous routes and times of day to reduce the risk of accidents ○ Use speed control devices (governors) on trucks, and remote monitoring of driver actions • Regular maintenance of vehicles and use of manufacturer approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure. Where the project may contribute to a significant increase in traffic along existing roads, or where road transport is a significant component of a project, recommended measures include: • Minimize pedestrian interaction with construction vehicles • Collaborate with local communities and responsible authorities to improve signage, visibility and overall safety of roads, particularly along stretches located near schools or other locations where children may be present. Collaborate with local communities on education about traffic and pedestrian safety (e.g. school education campaigns) • Coordinate with emergency responders to ensure that appropriate first aid is provided in the event of accidents • Use locally sourced materials, whenever possible, to minimize transport distances. Locate associated facilities such as worker camps close to project sites and arrange worker bus transport to minimizing external traffic • Employ safe traffic control measures, including road signs and flag persons to warn of dangerous conditions
	Labor influx	Adverse social impacts of labor influx [3]: • risk of social conflict • increased risk of illicit behavior and crime • influx of additional population (“followers”) • impacts on community dynamics • increased burden on and competition for public service provision • increased risk of communicable diseases and burden on local health services • gender-based violence • child labor and school dropout • local inflation of prices • increased pressure on accommodations and rents • increase in traffic and related accidents	• Provision of cultural sensitization training for workers regarding engagement with local community. • Sourcing of local workforce; • Regular engagement with local communities to understand their concerns, raise awareness of risks and opportunities, and identify solutions to issues relating to labor influx • Prepare and implement Code of Conduct for workers which includes not only the rules workers must obey within the construction site but also the during the interaction and communication with local residents in the region outside the site. • Provision of health awareness training to the workers, during induction and periodically throughout their employment • Vaccination of workers against common and locally prevalent diseases • Provision of trainings to the Project workers on the traffic safety rules, speed limits and possible risks for communities

Annex 13: Potential risks and mitigation measures for BSL3 laboratory units[25]

Risk category	Risk subcategory	Risk identification	Mitigation measure
Labor and Working Conditions	Heat	The use of large volumes of pressurized steam and hot water are typically associated with fermentation and with compounding operations representing potential for burns due to exposure to steam or direct contact with hot surfaces as well as heat exhaustion.	• Insulate, mark and regularly inspect steam and thermal fluid pipelines • Direct away steam vents and pressure release valves from areas where workers have access; • Screen high temperature areas of presses to prevent ingress of body parts.
	Chemicals	The most common types of chemicals and exposure routes is the inhalation of volatile organic compounds (VOCs) from recovery, isolation, and extraction activities; from handling of wet cakes in drying operations; during wet granulation, compounding, and coating operations; from uncontained filtration equipment; and from fugitive emissions for leaking pumps, valves, and manifold stations (e.g. during extraction and purification steps). Additional sources of inhalation exposures include chemical synthesis and extraction operations and sterilization activities (e.g. germicides such as formaldehyde and glutaraldehyde, and sterilization gases such as ethylene oxide) as well as exposure to synthetic hormones and other endocrine disrupters. In secondary pharmaceuticals manufacturing, workers may be exposed to airborne dusts during dispensing, drying, milling, and mixing operations.	• Use general protection measures including ○ worker training, ○ work permit systems, ○ use of personal protective equipment (PPE), and ○ toxic gas detection systems with alarms. • Use of partitioned workplace areas with good dilution ventilation and / or differential air pressures; • Install laminar ventilation hoods or isolation devices when toxic materials are handled, • Equip manufacturing areas with suitable heating ventilation and air conditioning (HVAC) systems designed according to current Good Manufacturing Practice (cGMP) protocols, including use of high efficiency particulate air (HEPA) filters in ventilation systems, particularly in sterile product manufacturing areas; • Use gravity charging from enclosed containers and vacuum, pressure, and pumping systems during charging and discharging operations to minimize fugitive emissions; • Use local exhaust ventilation (LEV) with flanged inlets to capture fugitive dusts and vapors released at open transfer points; • Conduct liquid transfer, liquid separation, solid and liquid filtration, granulation, drying, milling, blending, and compression in work areas with good dilution and LEV; • Enclose granulators, dryers, mills, and blenders, and venting to air-control devices; • Use dust and solvent containment systems in tablet presses, tablet-coating equipment, and capsule-filling machines. Tablet-coating equipment should be vented to VOC emission control devices; • Select less hazardous agents whenever possible, in all processes (e.g. alcohols and ammonium compounds in sterilization processes); • Locate sterilization vessels in separate areas with remote instrument and control systems, non-recirculated air, and LEV to extract toxic gas emissions. Gas sterilization chambers should be evacuated under vacuum and purged with air to minimize fugitive workplace emissions before sterilized goods are removed; • Use vacuuming equipment with HEPA filters and wet mopping instead of dry sweeping and blowing of solids with compressed air.
	Pathogenic and Biological Hazards	Exposure to pathogens may occur during isolation and growth of micro-organisms in laboratory and in fermentation processes. Biological agents represent potential for illness or injury due to single acute exposure or chronic repetitive exposure	• If the nature of the activity permits, avoid use of any harmful biological agents should be d and replaced with an agent that, under normal conditions of use, is not dangerous or less dangerous to workers. If use of harmful agents cannot be avoided, precautions should be taken to keep the risk of exposure as low as possible and maintained in internationally established and recognized exposure limits. • Design, maintain and operate work processes, engineering, and administrative controls to avoid or

[25] This section is based on the World Bank Group Environmental, Health, and Safety General Guidelines for Pharmaceuticals and Biotechnology Manufacturing, 2007

Risk category	Risk subcategory	Risk identification	Mitigation measure
			minimize release of biological agents into the working environment. The number of employees exposed or likely to become exposed should be kept at a minimum. • Review and assess known and suspected presence of biological agents at the place of work and implement appropriate safety measures, monitoring, training, and training verification programs. • Design, maintain and implement measures to eliminate and control hazards from known and suspected biological agents at the place of work in close co-operation with the local health authorities and according to recognized international standards. • Restrict work involving agents in BSL 3 only to those persons who have received specific verifiable training in working with and controlling such materials. • Design areas used for the handling of BSL 3 biological agents to enable their full segregation and isolation in emergency circumstances, include independent ventilation systems, and be subject to SOPs requiring routine disinfection and sterilization of the work surfaces. • Equip HVAC systems serving areas handling BSL 3 biological agents with High Efficiency Particulate Air (HEPA) filtration systems. Equipment should readily enable their disinfection and sterilization, and maintained and operated so as to prevent growth and spreading of disease agents, amplification of the biological agents, or breeding of vectors e.g. mosquitoes and flies of public health concern.
	Radiological Hazards	Research and development operations may include the use of radiological materials which should be managed to prevent and control worker exposures according to licensing requirements. Radiation exposure can lead to potential discomfort, injury or serious illness to workers.	• Establish and operate places of work involving occupational and/or natural exposure to ionizing radiation in accordance with recognized international safety standards and guidelines. • Control exposure to non-ionizing radiation (including static magnetic fields; sub-radio frequency magnetic fields; static electric fields; radio frequency and microwave radiation; light and near-infrared radiation; and ultraviolet radiation) to internationally recommended limits. • In the case of both ionizing and non-ionizing radiation, the preferred method for controlling exposure is shielding and limiting the radiation source. Personal protective equipment is supplemental only or for emergency use. Personal protective equipment for near-infrared, visible and ultraviolet range radiation can include appropriate sun block creams, with or without appropriate screening clothing.
	Noise	High noise levels may be reached in some pharmaceuticals and biotechnology manufacturing areas (e.g. chemical synthesis facilities). High sound levels may be generated by manufacturing equipment and utilities (e.g. compressed air, vacuum sources, and ventilation systems). Industry-specific hazards are related to the typical enclosed design of pharmaceutical and biotechnology workplace modules, where personnel are often operating close to equipment during manufacturing and packaging operations.	• Select equipment with lower sound power levels • Install silencers for fans • Install suitable mufflers on engine exhausts and compressor components • Install acoustic enclosures for equipment casing radiating noise • Improve acoustic performance of constructed buildings, apply sound insulation • Install acoustic barriers without gaps and with a continuous minimum surface density of 10 kg/m2 in order to minimize the transmission of sound through the barrier. Barriers should be located as close to the source or to the receptor location to be effective • Install vibration isolation for mechanical equipment
	Process Safety	Process safety programs should be implemented, due to industry-specific characteristics, including complex chemical reactions, use of hazardous materials (e.g., toxic and reactive materials, and flammable or explosive compounds) and multistep reactions.	Apply process safety management • Physical hazard testing of materials and reactions; • Hazard analysis studies to review the process chemistry and engineering practices, including thermodynamics and kinetics; • Examination of preventive maintenance and mechanical integrity of the process equipment and utilities; • Worker training; and • Development of operating instructions and emergency response procedures.
Environmental	Air Emissions /	Chemical synthesis and extraction are the manufacturing	• Reduce or substitute the use of solvents and other materials which have a high VOC content, and

Risk category	Risk subcategory	Risk identification	Mitigation measure
	VOC	phases responsible for significant emissions of volatile organic compounds (VOCs). In primary pharmaceutical manufacturing, VOC emissions are generated from reactor vents, filtering systems in the separation process, solvent vapors from purification tanks and dryers (including loading and unloading operations), fugitive emissions from valves, tanks, pumps, and other equipment (e.g., centrifuges), solvents and other VOCs related to extraction chemicals in natural product extraction, pre-fermentation and fermentation solvents, and wastewater collection and treatment units. VOC emissions from secondary pharmaceutical manufacturing may be generated from mixing, compounding, granulation, and formulation (e.g. use of ethanol or isopropyl alcohol), from operations involving the use of solvents (e.g. granulation) or alcoholic solutions (e.g. tablet coating), and from aerosol manufacturing processes.	substitution with products that have lower volatilities, and switching to aqueous-based coating films and aqueous-based cleaning solutions; • Implement VOC leak prevention and control strategies from operating equipment • Implementation of VOC loss prevention and control strategies in open vats and mixing processes, including installation of process condensers after the process equipment to support a vapor-to-liquid phase change and to recover solvents. Process condensers include distillation and reflux condensers, condensers before vacuum sources, and condensers used in stripping and flashing operations; • Reduce equipment operating temperatures, where possible; • For drying operations, adopt closed circuits under a nitrogen atmosphere; • Use closed-loop liquid and gas collection equipment for cleaning of reactors and other equipment.
	Air Emissions / Particulate Matter	Particulates consisting of manufactured or in-process product can be emitted from bulk (e.g. fermentation) and secondary manufacturing. The most common sources of particulates include milling, mixing, compounding, formulation, tableting, and packaging.	• Collect with air filtration units and recycle particulate matter into the formulation process (e.g. tablet dust), depending on batch record requirements and on process characteristics; • Install dedicated filtration systems (sometimes double stages of filtration) in granulation equipment. Provide an abatement room where the particulate is removed from the air, decreasing flow speed; • Install high efficiency particulate air (HEPA) filters in the heating, ventilating and air conditioning (HVAC) systems to control particulate matter emissions internally and externally as well as to prevent indoor cross-contamination. • Segregate air ducts to prevent air cross-contamination from different processes and to ease the air stream treatment; • Collect particulates through air filtration units, typically baghouse / fabric filters; • Consider, additional particulate emissions control methods depending on the volume of emissions and prevailing size of particulate matter, such as wet scrubbing and wet electrostatic precipitators, especially after combustion / thermal oxidation treatments.
	Air Emissions / Odors	The main source of odor emissions is typically associated with fermentation activities	• Consider the location of new facilities, taking into account proper distances to neighbors and the propagation of odors; • Post-combustion of venting gases; • Use exhaust stack heights • Use of wet scrubbers to remove odors with a high affinity to water; • Condensate vapors combined with scrubbers.
	Wastewater / Industrial Process Wastewater	Wastewater streams in pharmaceuticals and biotechnology manufacturing depend on the specific process and may include: chemical reactions streams; product wash water; spent acid and caustic streams; condensed steam from sterilization and strippers; air pollution control scrubber blowdowns; equipment and facility wash water; and clean-in-place wastewater. The main conventional pollutants of concern in these	• Material substitution, especially adoption of biodegradable water-based materials for organic solvent based materials (e.g. in tablet coating); • Condensation and separation processes to recover used solvents and aqueous ammonia, including: ○ Low-boiling compounds from wastewater stream by fractioned distillation ○ Volatile compounds from wastewater stream by inert gas stripping and condensation ○ Solvent extraction of organic compounds (e.g. high or refractory halogenated compounds and high COD loads) • Combination of solvent waste streams to optimize treatment.

Risk category	Risk subcategory	Risk identification	Mitigation measure
		wastewater streams from primary manufacturing (e.g. fermentation, chemical synthesis, crystallization, purification, and biological / natural extraction) are parameters such as biochemical oxygen demand (BOD), chemical oxygen demand (COD), total suspended solids (TSS), ammonia, toxicity, biodegradability, and pH. Other chemical compounds may also be present including, but not limited to, solvents (e.g. methanol, ethanol, acetone, isopropanol, and methyl-ethyl ketone), organic acids (e.g. acetic acid, formic acid), organic halides, inorganic acids, ammonia, cyanide, toluene, and active pharmaceutical ingredients (API).	For effective treatment of industrial process wastewater; • Segregate source, and • Pretreat concentrated wastewater through ○ grease traps, skimmers, dissolved air floatation or oil water separators for separation of oils and floatable solids; ○ filtration for separation of filterable solids; ○ flow and load equalization; ○ sedimentation for suspended solids reduction using clarifiers; ○ biological treatment, typically aerobic treatment, for reduction of soluble organic matter (BOD); ○ biological nutrient removal for reduction in nitrogen and phosphorus; ○ chlorination of effluent when disinfection is required; ○ dewatering and disposal of residuals in designated hazardous waste landfills. • Use additional engineering controls when required for ○ containment and treatment of volatile organics stripped from various unit operations in the wastewater treatment system, ○ advanced metals removal using membrane filtration or other physical/chemical treatment technologies, ○ removal of recalcitrant organics and active ingredients using activated carbon or advanced chemical oxidation, ○ residual color removal using adsorption or chemical oxidation, ○ reduction in effluent toxicity using appropriate technology (such as reverse osmosis, ion exchange, activated carbon, etc.), ○ reduction in TDS in the effluent using reverse osmosis or evaporation, and ○ containment and neutralization of nuisance odors.
	Hazardous Wastes	Bulk manufacturing processes in the pharmaceutical industry are typically characterized by a low ratio of finished products to raw material resulting in significant quantities of residual waste, especially during fermentation and natural product extraction. Chemical synthesis processing generates wastes containing spent solvents, reactants, spent acids, bases, aqueous or solvent liquors, still bottoms, cyanides and metal wastes in liquid or slurry form, as well as filter cakes which may contain inorganic salts, organic by-products and metal complexes. Fermentation processes may generate spent solids, intermediates, residual products and filter cakes containing mycelia, filter media, and small amounts of nutrients. Other sources of hazardous or potentially hazardous wastes may include raw materials packaging waste, used air filter media, off-spec and expired products, laboratory wastes, sludge from the wastewater treatment process, and collected particulate from air pollution control systems.	• Reduce waste by material substitution (e.g. use of water based solvents, etc.); • Process modifications (e.g. continuous rather than batch operations to reduce spillage and other material losses); • Spent solvent recycling and reuse, through distillation, evaporation, decantation, centrifugation and filtration; • Investigate other potential recovery options, including inorganic salts recovery from chemical liquors produced during organic synthesis operations, high organic matter materials from biological extraction, and filter cakes from fermentation5; • Inactivate potentially pathogenic waste from biotechnology manufacturing through sterilization or chemical treatment before final disposal.
	Hazardous	Pharmaceutical and biotechnology manufacturing plants	• Conduct a Hazard Assessment considering accident history in the last five years, worst case scenario, and

Risk category	Risk subcategory	Risk identification	Mitigation measure
	Materials Management	should assess the risks associated with the use and handling of hazardous materials and implement practices to prevent and minimize such risks.	alternative release analysis; • Identify and implement management procedures including process safety, training, management of change, incident investigation, employee participation, contractor training and oversight; • Implement prevention measures including process hazard analysis, operating procedures, mechanical integrity, prestart review, work permit, and compliance audits; • Develop and implement an Emergency Response Program including emergency response procedures, emergency equipment, training, review and updates.
	Threats to Biodiversity/ Biosafety	Production, handling, storage, transport, and use of living modified organisms may include threats to biological diversity due to the controlled or uncontrolled release of the organism into the environment.	• Develop a risk-based approach to the identification of key control points in the process cycle, including in-plant handling, off-site transport, and use of modified organisms. The assessment should cover the processes used and potential releases (including living modified organisms as discussed in Annex III of the Cartagena Protocol on Biosafety to the Convention on Biological Diversity) on the conservation and sustainable use of biological diversity, taking also into account risks to human health; • Implement in-plant and transport safety measures including specialized training of personnel, primary containment (e.g. containment barriers) and secondary containment (e.g. airlocks, differential pressure, exhaust air filters and treatment of contaminated material and wastes)12, and equipment and personnel decontamination procedures; • Prepare and implement Transportation Safety Plans specific to the type of organism being handled and consistent with the objectives of applicable international conventions and treaties; • Implement risk-management measures for controlled releases applicable to the specific organism including, as appropriate, training of those involved, monitoring of the activity, controlling access to the site, and application of isolation methods.
	Bioethics	The ethical issues faced by the pharmaceutical or biotechnology industry are potentially complex and depend significantly on the activity of the company. These issues may include the development of genetically modified foods; gene therapy experiments and stem cell research; human participant trials; animal testing; handling of genetic information; sale of genetic and biological samples; and the creation of transgenic animals, among others	• Well established ethics mechanisms including management commitment; dedicated internal ethics personnel; access and use of external expertise (e.g. consultants and advisory boards); internal training and accountability mechanisms; communications programs to engage with suppliers and external stakeholders; and evaluation and reporting mechanisms; • Adherence to internationally accepted ethical principles applicable to genetic research, clinical trials involving human participants, and any other activities with critical bioethical issues; • The use of animals for experimental and scientific purposes should be conducted according to industry good practice which includes reduction of the numbers of animals used in each study to the absolute minimum necessary to obtain valid results and refinement of the use of research animals to use less painful or the least invasive procedures whenever possible. Animal breeding, husbandry, and care facilities of the company or its suppliers should be designed and operated according to internationally certifiable methodologies.
Community Health and Safety	Major Hazards	The most significant community health and safety hazards associated with pharmaceutical and biotechnology manufacturing facilities occur during the operation phase and may include the threat from major accidents related to the aforementioned fires and explosions at the facility and potential accidental releases of finished products during their transport outside of the processing facility.	• Facility-wide risk analysis, including a detailed consequence analysis for events with a likelihood above 10^{-6}/year (e.g. HAZOP, HAZID, or QRA); • Employee training on operational hazards; • Procedures for management of change in operations, process hazard analysis, maintenance of mechanical integrity, pre-start review, hot work permits, and other essential aspects of process safety • Safety Transportation Management System, if the project includes a transportation component for raw or processed materials • Procedures for handling and storage of hazardous materials; • Emergency planning, which should include, at a minimum, the preparation and implementation of an Emergency Management Plan prepared with the participation of local authorities and potentially affected

Risk category	Risk subcategory	Risk identification	Mitigation measure
			communities.

Annex 14: Potential risks and mitigation measures for geothermal power generation[26]

Risk category	Risk subcategory	Risk identification	Mitigation measure
Environment	Effluents / Drilling Fluids and Cuttings	Steam production and re-injection wells may be installed during exploration, development, and operational activities. Drilling fluids employed during drilling activities may be water- or oil based and may contain chemical additives to assist in controlling pressure differentials in the drill hole and to act against viscosity breakdown. Cuttings from oil-based mud are of particular concern due to the content of oil-related contaminants and may necessitate special on-site or off-site treatment and disposal.	• Recover and store oil-based drilling fluids and cuttings in dedicated storage tanks or sumps, lined with an impervious membrane, prior to treatment (e.g. washing), recycling, and / or final treatment and disposal; • Reuse drilling fluid, where feasible; • Remove tanks or sumps to avoid the present or future release of oil-related materials into soil and water resources and treatment / disposal of contents as a hazardous on non-hazardous waste depending on its characteristics • Dispose water-based drilling fluids into the bore hole following toxicity assessment. Water-based cuttings are typically reused if they are non-toxic (e.g. as construction fill) or disposed of in a landfill facility; • During acid treatment of wells, use leak-proof well casings to a depth appropriate to the geological formation in order to avoid leakage of acidic fluids to groundwater.
	Effluents / Spent Geothermal Fluids	Spent geothermal fluids consist of the reject water from steam separators (rejected water is water that initially accompanies the steam from the geothermal reservoir), and condensate derived from spent steam condensation following power generation. Facilities that use water cooling towers in an evaporative process typically direct geothermal condensate into the cooling cycle. Geothermal condensate may be characterized by high temperature, low pH, and heavy metals content. Reject waters from the separators are often pH neutral and may contain heavy metals. Formation steam and water quality varies depending on the characteristics of the geothermal resource.	• Carefully evaluate potential environmental impacts of geothermal fluid discharges depending on the selected cooling system; • If facilities do not re-inject all geothermal fluids underground, effluent discharge quality should be consistent with the receiving water body use. This may include adjusting effluent temperature according to local regulations or a site-specific standard based on potential impacts to the receiving water body. If elevated heavy metal concentrations are found in geothermal fluids, due diligence has to be exercised for their discharge into natural water bodies which may necessitate construction and operation of complex and costly treatment facilities; • Where reinjection is the selected alternative, potential for contamination of groundwater should be minimized by installation of leak-proof well casings in the injection wells to a depth to the geological formation hosting the geothermal reservoir; • Opportunities for reuse of reject geothermal fluids should be considered, including: ○ Use of binary power generation technology; ○ Use in downstream industrial processes if reject water quality (including levels of total and dissolved heavy metals) is consistent with the quality requirements of the intended use. Examples of downstream uses include heating applications such as greenhouses, aquaculture, space heating, food / fruit processing, and recreational use for hotels / spas, among others. ○ Final discharge of used fluids according to the treatment and discharge requirements of the applicable activity, if any, and consistent with the receiving water body use,
	Air Emissions	Geothermal power plant emissions are negligible compared to those of fossil fuel combustion-based power plants. Hydrogen sulfide and mercury are the main potential air pollutants	• Consider technological options that include total or partial re-injection of gases with geothermal fluids within the context of potential environmental impacts from alternative generating technologies together with other primary factors, such as the fit of the technology to the geologic resource and

[26] This section is based on the World Bank Group Environmental, Health, and Safety General Guidelines for Geothermal Power Generation, 2007

Risk category	Risk subcategory	Risk identification	Mitigation measure
		associated with geothermal power generation employing flash or dry steam technologies. Carbon dioxide is present in the steam although its emission is also considered negligible compared to fossil fuel combustion sources. The presence and concentration of potential air pollutants may vary depending on the characteristics of the geothermal resource. Emissions may occur during well drilling and flow testing activities, and via the open contact condenser / cooling tower systems unless pumped out of the condenser and re-injected into the reservoir along with reject geothermal fluids. Well-field and plant-site vent mufflers can also be potential sources of hydrogen sulfide emissions, primarily during upset operating conditions when venting is required. Binary and combined flash / binary technologies (with non-contact condensing technology) have close to zero emissions of hydrogen sulfide or mercury to the atmosphere because of reinjection of all geothermal fluids and gases.	economic considerations (e.g. capital and operation / maintenance costs); • When total re-injection is not feasible, venting of hydrogen sulfide and non-condensable volatile mercury if, based on an assessment of potential impact to ambient concentrations, pollutant levels will not exceed applicable safety and health standards; • If necessary, use abatement systems to remove hydrogen sulfide and mercury emissions from non-condensable gases. Examples of hydrogen sulfide controls can include wet or dry scrubber systems or a liquid phase reduction / oxidation system, while mercury emissions controls may include gas stream condensation with further separation or adsorption methods;
	Solid Waste	Geothermal technologies do not produce a substantial amount of solid waste. Sulfur, silica, and carbonate precipitates are typically collected from cooling towers, air scrubber systems, turbines, and steam separators. This sludge may be classified as hazardous depending on the concentration and potential for leaching of silica compounds, chlorides, arsenic, mercury, vanadium, nickel, and other heavy metals	• Proper on-site storage and containment before final treatment and disposal at an appropriate waste facility. • If the sludge is of acceptable quality without significant leachable metals content (i.e. is a nonhazardous • waste), on-site or off-site reuse as backfill may be considered as a potential disposal option. Recoverable solids such as sulfur cake should be recycled by third parties to the extent feasible. • The disposal pathways will have to be determined initially by appropriate chemical analyses of the precipitates, which should be periodically (e.g. annually) repeated to accommodate for potential geochemical variations and resulting impacts on waste quality.
	Well Blowouts and Pipeline Failures	Although very rare, well blowouts and pipeline failures may occur during well drilling or facility operations. Such failures can result in the release of toxic drilling additives and fluids, as well as hydrogen sulfide gases from underground formations. Pipeline ruptures may also result in the surface release of geothermal fluids and steam containing heavy metals, acids, mineral deposits, and other pollutants.	• Regular maintenance of wellheads and geothermal fluid pipelines, including corrosion control and inspection; pressure monitoring; and use of blowout prevention equipment such as shutoff valves; and • Design of emergency response for well blowout and pipeline rupture, including measures for containment of geothermal fluid spills.
	Water Consumption and Extraction	Surface water extraction is necessary for a variety of geothermal power generation activities, including well drilling, injectivity testing of subsurface formations and for use in cooling systems. Surface water used for non-contact single pass cooling is typically returned to the source with some increase in heat content, but no overall change in water quality.	• Assess hydrological records for short and long-term variability of streams serving as source water, and ensuring critical flows are maintained during low flow periods so as to not obstruct passage of fish or negatively impact aquatic biota; • Monitor temperature differential of effluent and receiving water bodies to comply with local regulations respecting thermal discharge or, in the absence of such regulations, as previously noted in this document.
Occupational Health and Safety	Geothermal Gases	Occupational exposure to geothermal gases, mainly hydrogen sulfide gas, may occur during non-routine release of geothermal fluids (for example, pipeline failures) and maintenance work in confined spaces such as pipelines, turbines, and condensers. The significance of the hydrogen sulfide hazard may vary depending	• Install hydrogen sulfide monitoring and warning systems. The number and location of monitors should be determined based on an assessment of plant locations prone to hydrogen sulfide emission and occupational exposure; • Develop a contingency plan for hydrogen sulfide release events, including all necessary aspects from evacuation to resumption of normal operations;

Risk category	Risk subcategory	Risk identification	Mitigation measure
		on the location and geological formation particular to the facility.	• Provide facility emergency response teams, and workers in locations with high risk of exposure, with personal hydrogen sulfide monitors, self-contained breathing apparatus and emergency oxygen supplies, and training in their safe and effective use; • Provide adequate ventilation of occupied buildings to avoid accumulation of hydrogen sulfide gas; • Develop and implement a confined space entry program for areas designated as 'Confined Spaces' • Provide workers with a fact sheet or other readily available information about the chemical composition of liquid and gaseous phases with an explanation of potential implications for human health and safety.
	Confined Spaces	Confined space hazards in this and any other industry sector are potentially fatal. Confined space entry by workers and the potential for accidents may vary among geothermal facilities depending on design, on-site equipment, and presence of groundwater or geothermal fluids. Specific and unique areas for confined space entry may include the turbine, condenser, and cooling water tower (during maintenance activities), monitoring equipment sheds (during sampling), and the well hole "cellar" (a subsurface depression created for drilling purposes).	• Geothermal power facilities should develop and implement confined space entry procedures in their OHS plans
	Heat	Occupational exposure to heat occurs during construction activities, and during operation and maintenance of pipes, wells, and related hot equipment. Non-routine exposures include potential blowout accidents during drilling as well as malfunctions of the steam containments and transport installations.	• Reduce the time required for work in elevated temperature environments and ensuring access to drinking water; • Shield surfaces where workers come in close contact with hot equipment, including generating equipment, pipes etc. • Use PPE as appropriate, including insulated gloves and shoes; • Implement appropriate safety procedures during the exploratory drilling process.
	Noise	Noise sources in geothermal facilities are mainly related to well drilling, steam flashing and venting. Other sources include equipment related to pumping facilities, turbines, and temporary pipe flushing activities. Temporary noise levels may exceed 100 dBA during certain drilling and steam venting activities	• Noise abatement technology includes the use of rock mufflers, sound insulation, and barriers during drilling, in addition to silencers on equipment in the steam processing facility. • Use appropriate PPE,
Community Health and Safety	Hydrogen Sulfide	The potential for exposures to members of the community should be carefully considered during the planning process and the necessary precautions implemented	• Site potential significant emissions sources with consideration of hydrogen sulfide gas exposure to nearby communities (considering key environmental factors such as proximity, morphology and prevailing wind directions); • Install a hydrogen sulfide gas monitoring network with the number and location of monitoring stations determined through air dispersion modeling, taking into account the location of emissions sources and areas of community use and habitation; • Continuous operation of the hydrogen sulfide gas monitoring systems to facilitate early detection and warning; • Emergency planning involving community input to allow for effective response to monitoring system warnings.
	Infrastructure Safety	Communities may be exposed to physical hazards associated with the wells and related pipeline networks. Hazards may result from contact with hot components, equipment failure, or the presence of active and abandoned well infrastructure which may generate confined space or falling hazards	• Place access deterrents, such as fences and warning signs, to prevent access and warn of existing hazards; • Minimize the length of necessary pipeline systems; • Considerate the feasibility of subsurface pipelines or heat shields to prevent public contact with hot geothermal pipelines;

Risk category	Risk subcategory	Risk identification	Mitigation measure
			• Manage closure of infrastructure such as pipelines and access roads, including: cleaning, disassembly, and removal of equipment; analysis of soil quality with cleanup where warranted; re-vegetation of site and blockade; and reclamation of access roads where necessary; • Manage closure of well heads including sealing well with cement, removing the well head, and backfilling depression around the well head, as necessary
	Impacts on Water Resources	The extraction, reinjection, and discharge of geothermal fluids may affect the quality and quantity of surface and groundwater resources. Examples of specific impacts include the inadvertent introduction of geothermal fluids into shallower productive aquifers during extraction and reinjection activities or a reduction in the flow of hot thermal springs due to withdrawal activities.	• Elaborate a comprehensive geological and hydrogeological model including overall geological, structural and tectonic architecture, reservoir size, boundaries, geotechnical and hydraulic host rock properties; • Complete a hydrogeologic and water balance assessment during the project planning stage to identify hydraulic interconnections between the geothermal extraction and reinjection points and any sources of potable water or surface water features; • Isolate steam producing sources from shallower hydrologic formations which may be used as sources of potable water through careful site selection and properly designed and installed well casing systems; • Avoid negative impacts on surface water by introducing strict discharge criteria and appropriate means to bring water quality and temperature to acceptable standards.

Annex 15: Potential risks and mitigation measures for electric power transmission and distribution[27]

Risk category	Risk subcategory	Risk identification	Mitigation measure
Environmental	Terrestrial habitat alteration / Construction of Right-of-Way	Right-of-way construction activities may transform habitats, depending on the characteristics of existing vegetation, topographic features, and installed height of the transmission lines. Examples of habitat alteration from these activities includes fragmentation of forested habitat; loss of wildlife habitat, including for nesting; establishment of non-native invasive plant species; and visual and auditory disturbance due to the presence of machinery, construction workers, transmission towers, and associated equipment.	• Site transmission and distribution rights-of-way, access roads, lines, towers, and substations to avoid critical habitat through use of existing utility and transport corridors or transmission and distribution, and existing roads and tracks for access roads, whenever possible; • Install transmission lines above existing vegetation to avoid land clearing; • Avoid construction activities during the breeding season and other sensitive seasons or times of day; • Revegetate disturbed areas with native plant species; • Remove invasive plant species during routine vegetation maintenance
	Terrestrial habitat alteration / Right-of-Way Maintenance	Regular maintenance of vegetation within the rights-of-way is necessary to avoid disruption to overhead power lines and towers. Unchecked growth of tall trees and accumulation of vegetation within rights-of-way may result in a number of impacts, including power outages through contact of branches and trees with transmission lines and towers; ignition of forest and brush fires; corrosion of steel equipment; blocking of equipment access; and interference with critical grounding equipment. Regular maintenance of rights-of-way to control vegetation may involve the use of mechanical methods, such as mowing or pruning machinery that may disrupt wildlife and their habitats, in addition to manual hand clearing and herbicide use. Vegetation management should not eradicate all vegetation but aim to maintain trees and plant growth that may negatively affect infrastructure at a level that is under an economically damaging threshold. Excessive vegetation maintenance may remove unnecessary amounts of vegetation resulting in the continual replacement of successional species and an increased likelihood of the establishment of invasive species.	• Implement an integrated vegetation management approach (IVM). The selective removal of tall-growing tree species and the encouragement of low-growing grasses and shrubs is the common approach to vegetation management in transmission line rights-of-way. Alternative vegetation management techniques should be selected based on environmental and site considerations including potential impacts to non-target, endangered and threatened species;5 • Remove invasive plant species, whenever possible, cultivating native plant species; • Schedule activities to avoid breeding and nesting seasons for any critically endangered or endangered wildlife species; • Observe manufacturer machinery and equipment guidelines, procedures with regard to noise, and oil spill prevention and emergency response; • Avoid clearing in riparian areas; • Avoid use of machinery in the vicinity of watercourses.
	Terrestrial habitat alteration / Forest Fires	If underlying growth is left unchecked, or slash from routine maintenance is left to accumulate within right-of-way boundaries, sufficient fuel can accumulate that may promote forest fires.	• Monitor right-of-way vegetation according to fire risk; • Remove blowdown and other high-hazard fuel accumulations; • Time thinning, slashing, and other maintenance activities to avoid forest fire seasons; • Dispose maintenance slash by truck or controlled burning. Controlled burning should adhere to applicable burning regulations, fire suppression equipment requirements, and typically must be monitored by a fire watcher; • Plant and manage fire resistant species (e.g. hardwoods) within, and adjacent to, rights-of-way; • Establish a network of fuel breaks of less flammable materials or cleared land to slow progress of fires and allow firefighting access.

[27] This section is based on the World Bank Group Environmental, Health, and Safety General Guidelines for Electric Power Transmission and Distribution, 2007

Risk category	Risk subcategory	Risk identification	Mitigation measure
	Terrestrial habitat alteration / Avian and Bat Collisions and Electrocutions	The combination of the height of transmission towers and distribution poles and the electricity carried by transmission and distribution lines can pose potentially fatal risk to birds and bats through collisions and electrocutions. Avian collisions with power lines can occur in large numbers if located within daily flyways or migration corridors, or if groups are traveling at night or during low light conditions (e.g. dense fog). In addition, bird and bat collisions with power lines may result in power outages and fires.	• Align transmission corridors to avoid critical habitats (e.g. nesting grounds, heronries, rookeries, bat foraging corridors, and migration corridors); • Maintain 1.5 m spacing between energized components and grounded hardware or, where spacing is not feasible, covering energized parts and hardware; • Retrofit existing transmission or distribution systems by installing elevated perches, insulating jumper loops, placing obstructive perch deterrents (e.g. insulated "V's"), changing the location of conductors, and / or using raptor hoods; • Consider the installation of underground transmission and distribution lines in sensitive areas (e.g. critical natural habitats); • Install visibility enhancement objects such as marker balls, bird deterrents, or diverters.
	Aquatic Habitat Alteration	Power transmission and distribution lines, and associated access roads and facilities, may require construction of corridors crossing aquatic habitats that may disrupt watercourses and wetlands, and require the removal of riparian vegetation. In addition, sediment and erosion from construction activities and storm water runoff may increase turbidity of surface watercourses.	• Site power transmission towers and substations to avoid critical aquatic habitat (e.g. watercourses, wetlands, and riparian areas), as well as fish spawning habitat, and critical fish over-wintering habitat; • Maintain fish access when road crossings of watercourses are unavoidable by utilizing clear span bridges, open-bottom culverts, or other approved methods; • Minimize clearing and disruption to riparian vegetation;
	Electric and Magnetic Fields	Electric and magnetic fields (EMF) are invisible lines of force emitted by and surrounding any electrical device (e.g. power lines and electrical equipment). Electric fields are produced by voltage and increase in strength as the voltage increases. Electric field strength is measured in volts per meter (V/m). Magnetic fields result from the flow of electric current and increase in strength as the current increases. Magnetic fields are measured in units of gauss (G) or tesla (T), where 1T equals 10,000G. Electric fields are shielded by materials that conduct electricity, and other materials, such as trees and building materials. Magnetic fields pass through most materials and are difficult to shield. Both electric and magnetic fields decrease rapidly with distance. Power frequency EMF typically has a frequency in the range of 50 – 60 Hertz (Hz) and is considered Extremely Low Frequency (ELF). Although there is public and scientific concern over the potential health effects associated with exposure to EMF (not only high-voltage power lines and substations, but also from everyday household uses of electricity), there is no empirical data demonstrating adverse health effects from exposure to typical EMF levels from power transmissions lines and equipment. However, while the evidence of adverse health risks is weak, it is still sufficient to warrant limited concern.	• Evaluate potential exposure to the public against the reference levels developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). Average and peak exposure levels should remain below the ICNIRP recommendation for General Public Exposure; • Consider siting new facilities so as to avoid or minimize exposure to the public. Installation of transmission lines or other high voltage equipment above or adjacent to residential properties or other locations intended for highly frequent human occupancy, (e.g. schools or offices), should be avoided; • If EMF levels are confirmed or expected to be above the recommended exposure limits, consider the application of below engineering techniques to reduce the EMF produced by power lines, substations, or transformers: ○ Shielding with specific metal alloys ○ Burying transmission lines ○ Increasing height of transmission towers ○ Modifications to size, spacing, and configuration of conductors
	Hazardous Materials / Insulating Oils and	Polychlorinated Biphenyls (PCB) were widely used as a dielectric fluid to provide electrical insulation, although their use has been largely discontinued due to potential harmful effects on human	• Replace existing transformers and other electrical equipment containing PCB, and ensuring appropriate storage, decontamination, and disposal of contaminated units; • Prior to final disposal, store retired transformers and equipment containing PCB on a concrete pad

Risk category	Risk subcategory	Risk identification	Mitigation measure
	Fuels	health and the environment.	with curbs sufficient to contain the liquid contents of these containers should they be spilled or leaked. The storage area should also have a roof to prevent precipitation from collecting in the storage area. Disposal should involve facilities capable of safely transporting and disposing of hazardous waste containing PCB; • Surround soil exposed to PCB leakage from equipment should be assessed, and appropriate removal and / or remediation measures should be implemented.
	Hazardous Materials / Wood Preservatives	The majority of wooden utility poles are treated with pesticide preservatives to protect against insects, bacteria, and fungi, and to prevent rot. The preservatives most commonly used for power poles are oil-based pesticides such as creosote, pentachlorophenol (PCP), and chromated copper arsenate (CCA). Use of these preservatives is being limited in some countries due to their toxic effects on the environment. While in use, poles may leach preservatives into soils and groundwater, however, levels are highest directly beside poles and decrease to within normal levels at approximately 30 centimeters (cm) distance from the pole. The most significant potential environmental impacts occur at specialized wood treatment facilities if not managed appropriately.	• Evaluate the cost and benefit of using alternative pole materials (e.g. steel, concrete, and fiberglass); • Consider use of alternative preservatives (e.g. copper azote); • Undertake appropriate disposal of used poles. Landfill facilities should be capable of handling wastes that may have chemical leaching properties. Disposal through incineration or through recycling should consider associated air emissions and secondary product residues of preservative chemicals.
	Hazardous Materials / Pesticides		Establish pesticide use as part of an Integrated Pest Management (IPM) strategy and a documented Pest Management Plan (PMP). The following stages should be considered when designing and implementing an IPM strategy, giving preference to alternative pest management strategies, with the use of synthetic chemical pesticides as a last option. • Alternatives to Pesticide Application - following alternatives to pesticides should be considered: ○ Provide those responsible for deciding on pesticides application with training in pest identification, weed identification, and field scouting; ○ Use mechanical weed control and / or thermal weeding; ○ Support and use beneficial organisms, such as insects, birds, mites, and microbial agents, to perform biological control of pests; ○ Protect natural enemies of pests by providing a favorable habitat, such as bushes for nesting sites and other original vegetation that can house pest predators; ○ Use animals to graze areas and manage plant coverage; ○ Use mechanical controls such as traps, barriers, light, and sound to kill, relocate, or repel pests. • Pesticide Application - If pesticide application is warranted, users should take the following precautions: ○ Train personnel to apply pesticides and ensure that personnel have received applicable certifications or equivalent training where such certifications are not required; ○ Review the manufacturer's directions on maximum recommended dosage or treatment, as well as published reports on using the reduced rate of pesticide application without loss of effect, and apply the minimum effective dose; ○ Apply pesticides based on criteria (e.g. field observations, weather data, time of treatment, and dosage) and maintain a pesticide logbook to record such information; ○ Avoid the use of pesticides that fall under the World Health Organization Recommended Classification of Pesticides by Hazard Classes 1a and 1b;

Risk category	Risk subcategory	Risk identification	Mitigation measure
			○ Avoid the use of pesticides that fall under the World Health Organization Recommended Classification of Pesticides by Hazard Class II if the project host country lacks restrictions on distribution and use of these chemicals, or if they are likely to be accessible to personnel without proper training, equipment, and facilities to handle, store, apply, and dispose of these products properly; ○ Avoid the use of pesticides listed in Annexes A and B of the Stockholm Convention, except under the conditions noted in the convention; ○ Use only pesticides that are manufactured under license and registered and approved by the appropriate authority and in accordance with the Food and Agriculture Organization's (FAO) International Code of Conduct on the Distribution and Use of Pesticides; ○ Use only pesticides that are labeled in accordance with international standards and norms, such as the FAO Revised Guidelines for Good Labeling Practice for Pesticides; ○ Select application technologies and practices designed to reduce unintentional drift or runoff only as indicated in an IPM program, and under controlled conditions; ○ Maintain and calibrate pesticide application equipment in accordance with manufacturer's recommendations; ○ Establish untreated buffer zones or strips along water sources, rivers, streams, ponds, lakes, and ditches to help protect water resources. • Pesticide Handling and Storage - Contamination of soils, groundwater, or surface water resources, due to accidental spills during transfer, mixing, and storage of pesticides should be prevented by following the hazardous materials storage and handling recommendations presented in the General EHS Guidelines. Additional recommendations include the following: ○ Store pesticides in their original packaging, in a dedicated, dry, cool, frost-free, and well aerated location that can be locked and properly identified with signs, with access limited to authorized people. No human or animal food may be stored in this location. The storeroom should also be designed with spill containment measures and sited in consideration of potential for contamination of soil and water resources; ○ Mixing and transfer of pesticides should be undertaken by trained personnel in ventilated and well-lit areas, using containers designed and dedicated for this purpose. ○ Containers should not be used for any other purpose (e.g. drinking water). Contaminated containers should be handled as hazardous waste, and should be treated accordingly. Disposal of containers contaminated with pesticides should be done in a manner consistent with FAO guidelines and with manufacturer's directions; ○ Purchase and store no more pesticide than needed and rotate stock using a "first-in, first-out" principle so that pesticides do not become obsolete. Additionally, the use of obsolete pesticides should be avoided under all circumstances; A management plan that includes measures for the containment, storage and ultimate destruction of all obsolete stocks should be prepared in accordance to guidelines by FAO and consistent with country commitments under the Stockholm, Rotterdam and Basel Conventions. ○ Collect rinse water from equipment cleaning for reuse (such as for the dilution of identical pesticides to concentrations used for application); ○ Ensure that protective clothing worn during pesticide application is either cleaned or disposed of in an environmentally responsible manner ○ Implement groundwater supply wellhead setbacks for pesticide application and storage

Risk category	Risk subcategory	Risk identification	Mitigation measure
			○ Maintain records of pesticide use and effectiveness.
Occupational Health and Safety	Live Power Lines	Workers may be exposed to occupational hazards from contact with live power lines during construction, maintenance, and operation activities.	• Allow only trained and certified workers to install, maintain, or repair electrical equipment; • Deactivate and properly ground live power distribution lines before work is performed on, or in close proximity, to the lines; • Ensure that live-wire work is conducted by trained workers with strict adherence to specific safety and insulation standards. Qualified or trained employees working on transmission or distribution systems should be able to achieve the following: ○ Distinguish live parts from other parts of the electrical system ○ Determine the voltage of live parts ○ Understand the minimum approach distances outlined for specific live line voltages ○ Ensure proper use of special safety equipment and procedures when working near or on exposed energized parts of an electrical system • ·Workers should not approach an exposed energized or conductive part even if properly trained unless: ○ The worker is properly insulated from the energized part with gloves or other approved insulation; or, ○ The energized part is properly insulated from the worker and any other conductive object; or, ○ The worker is properly isolated and insulated from any other conductive object (live-line work). • Where maintenance and operation is required, define within minimum setback distances, specific training, safety measures, personal safety devices, and other precautions in a health and safety plan. • Workers not directly associated with power transmission and distribution activities who are operating around power lines or power substations should adhere to local legislation, standards, and guidelines relating to minimum approach distances for excavations, tools, vehicles, pruning, and other activities; • Minimum hot stick distances may only be reduced provided that the distance remaining is greater than the distance between the energized part and a grounded surface.
	Working at height on poles and structures	Workers may be exposed to occupational hazards when working at elevation during construction, maintenance, and operation activities	• Test structures for integrity prior to undertaking work; • Implement a fall protection program that includes training in climbing techniques and use of fall protection measures; inspection, maintenance, and replacement of fall protection equipment; and rescue of fall-arrested workers, among others; • Establish criteria for use of 100% fall protection (typically when working over 2 m above the working surface, but sometimes extended to 7 m, depending on the activity). The fall protection system should be appropriate for the tower structure and necessary movements, including ascent, descent, and moving from point to point; • Install fixtures on tower components to facilitate the use of fall protection systems; • Provide an adequate work-positioning device system for workers. Connectors on positioning systems should be compatible with the tower components to which they are attached; • Hoisting equipment should be properly rated and maintained and hoist operators properly trained; • Safety belts should be of not less than 16 mm two-in-one nylon or material of equivalent strength. Rope safety belts should be replaced before signs of aging or fraying of fibers become evident; • When operating power tools at height, workers should use a second (backup) safety strap; • Signs and other obstructions should be removed from poles or structures prior to undertaking work; • An approved tool bag should be used for raising or lowering tools or materials to workers on structures.

Risk category	Risk subcategory	Risk identification	Mitigation measure
	Electric and magnetic fields	Electric utility workers typically have a higher exposure to EMF than the general public due to working in proximity to electric power lines	• Identify potential exposure levels in the workplace, including surveys of exposure levels in new projects and the use of personal monitors during working activities; • Train workers in the identification of occupational EMF levels and hazards; • Establish and identify safety zones to differentiate between work areas with expected elevated EMF levels compared to those acceptable for public exposure, limiting access to properly trained workers; • Implement action plans to address potential or confirmed exposure levels that exceed reference occupational exposure levels developed by international organizations such as the International Commission on Non-Ionizing Radiation Protection (ICNIRP), and the Institute of Electrical and Electronics Engineers (IEEE). • Personal exposure monitoring equipment should be set to warn of exposure levels that are below occupational exposure reference levels (e.g. 50 percent). Action plans to address occupational exposure may include limiting exposure time through work rotation, increasing the distance between the source and the worker, when feasible, or the use of shielding materials.
	Exposure to chemicals / Pesticides	Potential exposures to pesticides include dermal contact and inhalation during their storage, preparation and application. The effect of such impacts may be increased by climatic conditions such as wind, which may increase the chance of unintended drift, or high temperatures, which may deter the use of personal protective equipment (PPE).	• Train personnel to apply pesticides and ensure that personnel have received the necessary certifications, or equivalent training where such certifications are not required; • Respect post-treatment intervals to avoid operator exposure during reentry to crops with residues of pesticides; • Ensure hygiene practices are followed (in accordance to FAO and PMP) to avoid exposure of family members to pesticides residues.
	Exposure to chemicals / PCBs	Maintenance shops and other facilities, and activities may involve potential contact with PCB or PCB-contaminated machinery.	• Establish hazardous materials management priorities based on hazard analysis of risky operations identified through Social and Environmental Assessment; • Where practicable, avoiding or minimizing the use of PCBs. • Prevent uncontrolled releases of hazardous materials to the environment or uncontrolled reactions that might result in fire or explosion; • Use engineering controls commensurate with the nature of hazard; • Implement management controls to address residual risks that have not been prevented or controlled through engineering measures.
Community Health and Safety	Electrocution	Hazards most directly related to power transmission and distribution lines and facilities occur as a result of electrocution from direct contact with high-voltage electricity or from contact with tools, vehicles, ladders, or other devices that are in contact with high-voltage electricity	• Use signs, barriers (e.g. locks on doors, use of gates, use of steel posts surrounding transmission towers, particularly in urban areas), and education / public outreach to prevent public contact with potentially dangerous equipment; • Ground conducting objects (e.g. fences or other metallic structures) installed near power lines, to prevent shock.
	Electromagnetic Interference	The corona of overhead transmission line conductors and high-frequency currents of overhead transmission lines may result in the creation of radio noise. Typically, transmission line rights-of-way and conductor bundles are created to ensure radio reception at the outside limits remains normal. However, periods of rain, sleet or freezing rain sharply increases the streaming corona on conductors and may affect radio reception in residential areas near transmission lines.	• Locate rights-of-way away from human receptors to the extent possible
	Visual Amenity	Power transmission and distribution are necessary to transport energy from power facilities to residential communities, but may be	• Extensive public consultation during the planning of power line and power line right-of-way locations; • Accurate assessment of changes in property values due to power line proximity;

Risk category	Risk subcategory	Risk identification	Mitigation measure
		visually intrusive and undesirable to local residents	• Site power lines, and design substations, with due consideration to landscape views and important environmental and community features; • Locate high-voltage transmission and distribution lines in less populated areas, where possible; • Bury transmission or distribution lines when power must be transported through dense residential or commercial areas.
	Aircraft Navigation Safety	Power transmission towers, if located near an airport or known flight paths, can impact aircraft safety directly through collision or indirectly through radar interference.	• Avoid siting of transmission lines and towers close to airports and outside of known flight path envelopes; • Consult with regulatory air traffic authorities prior to installation; • Adhere to regional or national air traffic safety regulations; • Use buried lines when installation is required in flight sensitive areas.

Annex 16: Potential risks and mitigation measures for potable and utility water distribution system [28]

Risk category	Risk subcategory	Risk identification	Mitigation measure
Environment	Water withdrawal	Development of water resources often involves balancing competing qualitative and quantitative human needs with the rest of the environment.	• Evaluate potential adverse effects of surface water withdrawal on the downstream ecosystems and use appropriate environmental flow assessment3 to determine acceptable withdrawal rates • Design structures related to surface water withdrawal, including water intake structures, to minimize impacts on aquatic life. • Avoid construction of water supply wells and water intake structures in sensitive ecosystems; • Evaluate potential adverse effects of groundwater withdrawal, including modeling of groundwater level changes and resulting impacts to surface water flows, potential land subsidence, contaminant mobilization and saltwater intrusion. Modify extraction rates and locations as necessary to prevent unacceptable adverse current and future impacts, considering realistic future increases in demand.
	Water system leaks and loss of pressure	Water system leaks can reduce the pressure of the water system compromising its integrity and ability to protect water quality (by allowing contaminated water to leak into the system) and increasing the demands on the source water supply, the quantity of chemicals, and the amount of power used for pumping and treatment. Leaks in the distribution system can result from improper installation or maintenance, inadequate corrosion protection, settlement, stress from traffic and vibrations, frost loads, overloading, and other factors.	• Ensure construction meets applicable standards and industry practices • Conduct regular inspection and maintenance; • Implement a leak detection and repair program (including records of past leaks and unaccounted- for water to identify potential problem areas); • Consider replacing mains with a history of leaks of with a greater potential for leaks because of their location, pressure stresses, and other risk factors.
	Water discharges	Water lines may be periodically flushed to remove accumulated sediments or other impurities that have accumulated in the pipe. Flushing is performed by isolating sections of the distribution system and opening flushing valves or, more commonly, fire hydrants to cause a large volume of flow to pass through the isolated pipeline and suspend the settled sediment. The major environmental aspect of water pipe flushing is the discharge of flushed water, which may be high in suspended solids, residual chlorine, and other contaminants that can harm surface water bodies.	• Discharge the flush water into a municipal sewerage system with adequate capacity. • Discharge the flush water into a separate storm sewer system with storm water management measures such as a detention pond, where solids can settle, and residual chlorine consumed before the water is discharged; • Minimize erosion during flushing, for example by avoiding discharge areas that are susceptible to erosion and spreading the flow to reduce flow velocities.
Occupational Health and Safety	Accidents and injuries	Work at water and sanitation facilities is often physically demanding and may involve hazards such as open water, trenches, slippery walkways, working at heights, energized circuits, and heavy equipment. Work at water and sanitation facilities may also involve entry into confined spaces, including manholes, sewers, pipelines, storage tanks, wet wells and pump stations.	• Install railing around all process tanks and pits. Require use of a lifeline and personal flotation device (PFD) when workers are inside the railing, and ensure rescue buoys and throw bags are readily available; • Use PFDs when working near waterways; • Implement a confined spaces entry program that is consistent with applicable national requirements and internationally accepted standards. Valves to tanks should be locked to prevent accidental flooding during maintenance; • Use fall protection equipment when working at heights; • Maintain work areas to minimize slipping and tripping hazards;

[28] This section is based on the World Bank Group Environmental, Health, and Safety General Guidelines for Water and Sanitation, 2007

			• Use proper techniques for trenching and shoring;
			• Implement fire and explosion prevention measures in accordance with internationally accepted standards
			• When installing or repairing mains adjacent to roadways, implement procedures and traffic controls,
			  ○ Establishment of work zones so as to separate workers from traffic and from equipment as much as possible
			  ○ Reduction of allowed vehicle speeds in work zones;
			  ○ Use of high-visibility safety apparel for workers in the vicinity of traffic
			  ○ For night work, provision of proper illumination for the workspace, while controlling glare so as not to blind workers and passing motorists
			• Locate all underground utilities before digging.

	Noise	High noise levels can be present in the vicinity of operating machinery and flowing water utilities.	Impacts and mitigation measures are similar to those at other industrial facilities and are addressed in the General EHS Guidelines.
Community Health and Safety	Water Intake (Water Supply Protection)	Both surface water and groundwater supplies can become contaminated with potentially toxic substances of natural and anthropogenic origins, including pathogens, toxic metals (e.g., arsenic), anions (e.g., nitrate), and organic compounds. Such contamination might result from natural sources, actions or releases that are routine (e.g., discharges within permit limits), accidental (e.g., from a spill), or intentional (e.g., sabotage).	• Determine the area that contributes water to the source (e.g. watershed of a stream or recharge area for groundwater), identify potential sources of contamination with the area, and collaborate with public authorities in the implementation of management approaches to protect the source water quality • Evaluate the vulnerability of the water source to disruption or natural events, and implement appropriate security measures as necessary
	Water Distribution	The water distribution system is a critical component in delivery of safe potable water. Even if water is effectively treated to remove contaminants and destroy pathogens, waterborne diseases outbreaks can occur because of deficiencies in the water distribution system	• Construct, operate, and manage the water distribution system in accordance with applicable national requirements and internationally accepted standard • Construct and maintain the distribution system so that it act as a barrier and prevents external contamination from entering the water system. • Maintain adequate water pressure and flow throughout the system, • Prevent introduction of contamination from the distribution system itself,

Annex 17: Potential risks and mitigation measures for solar energy[29]

Risk category	Risk subcategory	Risk identification	Mitigation measure
Environment	Soil Loss	Permanent soil loss if the vegetable topsoil is not reused	• Store removed vegetable soil separately from other materials to reuse for restoration and landscaping purposes and to preserve the organic content (irrigation etc.), • Prevent soil compaction through limitation of the areas where construction equipment, vehicles and pedestrians can move by preparing a site use plan;
	Land Contamination	Spillage of chemicals stored onsite for maintenance purposes and leaching into the soil. There are several dangerous substances used in condensed power systems: synthetic and organic heat transfer fluids, biphenyl - biphenyl ether mixtures, etc. When these materials are spilled, they cause soil pollution. Contaminated soil must be disposed of as hazardous waste and the area of spillage must be restored.	• Establish a drainage system to prevent possible contamination onsite and in surface waters nearby by precipitation, • Prevent contamination risk by storing solid and liquid wastes and chemicals in accordance with the regulations; preparation of onsite waste management plan and hazardous material management plan; • Avoid fuel filling activities onsite and taking measures against leakage and spillage under the Emergency Preparedness and Response Plan where necessary
	Solid waste	Since there is no chemical use during the operation phase and maintenance is limited, limited amount of electrical and electronic equipment waste, waste batteries and accumulators and waste oils may be generated during maintenance activities, apart from the low amount of municipal waste generated by the personnel working in the field	• Domestic wastes, including the organic wastes such as biodegradable food wastes must be temporarily collected inside containers with closed tops separated from other wastes, and it must be ensured that they are regularly collected by the related municipalities and disposed of in the regular storage areas; • Non-hazardous packaging wastes arising from the materials, parts and equipment should be collected separate from the other wastes at a temporary storage area reserved within the site, and should be picked by the licensed organizations or firms authorized by the MoEUCC in compliance with the provisions of the Regulation on Packaging Wastes Control. • Limited amount of wastes that are considered as hazardous according to the annexes of the Regulations on Waste Management must be collected in temporary storage areas segregated onsite separate from the non-hazardous wastes, and it must be ensured that they are collected by authorized vehicles, and recovered or disposed of in authorized plants in compliance with the provisions of the Regulation on Waste Management. Limited amount of electrical and electronic equipment wastes that may be generated in maintenance activities during the operational phase; measures to be taken for waste batteries and accumulators and waste oils: • The wastes covered by the Regulation on Waste Electrical and Electronic Equipment Control must be first stored separately from other wastes in the temporary storage area onsite and must be received by vehicles with the transportation license to be evaluated in licensed treatment plants of the MoEUCC in accordance with the provisions of the regulation; • Waste batteries and accumulators must be first stored separately from other wastes in the temporary storage area onsite and must be received from the facility by vehicles with the transportation license in accordance with the provisions of the Regulation on Waste Battery and Accumulator Control; • Waste oils which may arise as a result of oil change in the areas where oil type transformers are used should be determined by analyses to be carried out in the laboratories authorized under the

[29] This section is based on the Industrial Guidelines prepared by MoEUCC within the "Technical Assistance for Strengthening the Capacity of the Ministry of Environment and Urbanization on Environmental Impact Assessment" in 2017

			Regulation on Waste Oil Control and temporarily stored in specially reserved tanks/containers in the temporary storage area onsite separately from other wastes according to their categories, and removed from the site by vehicles with transportation license as indicated by their categories in accordance with the provisions of the related regulation and put to use in licensed recovery facilities or, where this is not possible, in licensed hazardous waste disposal facilities;
	Reflection and Glare Effect	An effect of the solar power plants is the reflection and glare effect that occurs on the panels as a result of an image or light caused by the direct sunlight or a bright sky. The intensity of the reflection and glare effect depends mainly on the time of the year and on the geographical location of the plant, but also on potential variables such as potential points of impact (settlements in the area, transportation routes, airports, etc.). As the photovoltaic panel absorbs the sunlight, the effect of reflection and glare on PV type systems is lower than other solar power technologies.	• Against possible reflection and glare effects, points of reflection risk should be determined and vegetative or artificial visual barriers may be placed onto necessary points in accordance with the complaints that may arise from visual surveys and nearby settlements in the first year of the operation. • If there are bird areas such as wetlands in the reflection area, the effects should be monitored and necessary precautions should be taken if significant effects are detected.

Annex 18: Potential risks and mitigation measures for manure management[30]

Risk category	Risk subcategory	Risk identification	Mitigation measure
Occupational Health and Safety	Physical Hazards	Many occupational safety and health hazards injuries associated with equipment and vehicle operation and repair, trip and fall hazards, confined spaces and lifting heavy weights, are common to other industries	• Apply mitigation measures in EHS General Guidelines • Ensure that all underground manure storage tanks and lagoons are properly covered and fenced off at a sufficient height; • Store liquid manure (e.g., in barn pits, pumping stations, storage tanks, and application tankers) to minimize release of dangerous gases (e.g., hydrogen sulfide);
	Air quality	Manure storage areas (e.g. in pits within the barns, and in pumping stations, storage tanks, and application tankers) may release dangerous gases such as hydrogen sulfide.	• Repairing and/or decommissioning facilities for liquid manure should be carried out by experts with relevant training and qualifications following strict confined space entry procedures, including the use of personal protective equipment such as air-supplied breathing apparatuses.
	Biological Agents	Workers may be exposed to disease-agents such as bacteria, fungi, mites, and viruses transmitted from live animals, manure, animal carcasses, and parasites and ticks (zoonoses).	• Inform workers of potential risks of exposure to biological agents and provide training in recognizing and mitigating those risks; • Provide personal protective equipment to reduce contact with materials potentially containing pathogens; • Ensure that those who have developed allergic reactions to biological agents are not working with these substances.
Environment	Waste Management / Animal Waste	Manure contains nitrogen, phosphorus, and other excreted substances which may result in air emissions of ammonia and other gases and may pose a potential risk of contamination to surface or groundwater resources through leaching and runoff. Manure also contains disease-causing agents such as bacteria, pathogens, viruses, parasites, and prions which may also potentially affect soil, water, and plant resources (for human, livestock, or wildlife consumption).	• Animal waste management systems involve the collection, transport, storage, treatment, and utilization (rather than disposal) • Implement a comprehensive nutrient and waste management plan that takes into account the potentially harmful constituents of this waste including potential phytotoxicity levels, potential concentration of hazardous substances in soils and vegetation, as well as nutrient limits and groundwater pollutant limits; • Ensure production and manure storage facilities are constructed to prevent urine and manure contamination of surface water and groundwater (e.g. use concrete floors, collect liquid effluent from pens, and use roof gutters on buildings to collect and divert clean stormwater); • Keep waste as dry as possible by scraping wastes instead of, or in addition, to flushing with water to remove waste; • Reduce the amount of water used during cleaning (e.g. by using high-pressure, low-flow nozzles); • Minimize the surface area of manure in storage; • Cool the manure surface to maintain temperatures at 15ºC or less (e.g. by using cooling fins on the manure surface), if practical, to reduce ammonia emissions; • Locate manure stacks away from water bodies, floodplains, wellhead fields; or other sensitive habitats; • For feedlots, ensure that solid waste (e.g. bedding and muck) is gathered regularly and is not permitted to lie on the ground for long periods of time; • Reduce the volume of rainwater in the storage system by covering slurry tanks or lagoons with a rigid roof or floating cover and by placing dry manure or litter in a covered or roofed area; • Check for storage systems leakage regularly (e.g. inspect tanks for corrosion of seams, especially those near ground level; annually empty and inspect tanks); • Use double valves on outlets from liquid tanks to reduce the probability of release; • Conduct manure spread only as part of well-planned strategy that considers potential risks to health and the environmental due to the presence of chemical and biological agents as well as nutrient balance in an

[30] This section is based on the World Bank Group Environmental, Health, and Safety General Guidelines for Mammalian Livestock Production, 2007

			agricultural setting. Ensure that manure is applied to agricultural land only during periods that are appropriate for its use as plant nutrient (generally just before the start of the growing season); • Manure storage facilities should have capacity for 9–12 months of manure production or as necessary to avoid over application; • Design, construct, operate, and maintain waste management and storage facilities to contain all manure, litter, and process wastewater including runoff and direct precipitation; • Remove liquids and sludge from lagoons as necessary to prevent overtopping; • Build a reserve slurry storage lagoon; • Transport liquid effluent in sealed tankers.
	Wastewater / Industrial Process Wastewater	Effluents have the potential to contaminate surface water and groundwater with nutrients, ammonia, sediment, pesticides, pathogens and feed additives, such as heavy metals, hormones, and antibiotics	• Install vegetative filters to trap sediment; • Install surface water diversions to direct clean runoff around areas containing waste; • Implement buffer zones to surface water bodies, avoiding land spreading of manure within these areas;
	Air Emissions / Ammonia and Odors	Ammonia gas and other sources of odor are generated primarily during denitrification of manure and can be released directly into the atmosphere at any stage of the manure handling process, including through ventilation of buildings and manure storage areas. Ammonia gas levels are also affected by the ambient temperature, ventilation rate, humidity, stocking rate, litter quality, and feed composition (crude protein).	• Consider the siting of new facilities taking into account distances to neighbors and the propagation of odors; • Control the temperature, humidity, and other environmental factors of manure storage to reduce emissions; • Consider composting of manure to reduce odor emissions; • Reduce emissions and odors during land application activities by applying a few centimeters below the soil surface and by selecting favorable weather conditions (e.g. • wind blowing away from inhabited areas); • If necessary, apply chemicals (e.g. urinase inhibitors) weekly to reduce conversion of nitrogen to ammonia;
	Air Emissions / Greenhouse gases	The livestock account for 9% of anthropogenic CO2 emissions (mostly from deforestation / land use changes for grazing and pasture for feed crops), 37% of anthropogenic methane emissions, mostly from enteric fermentation by ruminants, and 65% of anthropogenic nitrous oxide emissions, the majority of which from manure.	• Improve the productivity and efficiency of livestock production (thus lowering the methane emissions per unit of livestock) through improvements in nutrition and genetics; • Supplement livestock diets with nutrients, as necessary (e.g. increasing the level of starch and rapidly fermentable carbohydrates, use of urea supplements). Production of feed supplements, may also, however, result in production of GHGs. • Increase the carbon to nitrogen ratio in feeds to reduce methane and nitrous oxide production; • Implement balanced feeding (e.g. optimizing proteins and amino acids to correspond to requirements of particular animal groups) • Consider various techniques to manage methane emissions from manure including controlled anaerobic digestion (to produce biogas), flaring / burning, use of biofilters, composting, and aerobic treatment. Use of anaerobic digestion may also reduce emissions of nitrous oxide; • Minimize the amount of manure production through the implementation of animal waste management approaches; • Control the temperature, humidity, and other environmental factors of manure storage to reduce methane and nitrous oxide emissions. This may involve use of closed storage tanks, or maintaining the integrity of the crust on open manure storage ponds / lagoons. • Implement pasture / grazing management techniques to reduce nitrous oxide and methane emissions, including not overstocking pastures, avoiding late fall and winter grazing, improving soil drainage, and avoiding soil compaction from grazing to maintain the anaerobicicity of the soil.