GUIDANCE NOTE FOR BORROWERS

Environmental & Social Framework for IPF Operations

ESS3: Resource Efficiency and Pollution Prevention and Management

The Guidance Notes provide guidance for the Borrower on the application of the Environmental and Social Standards (ESSs), which form part of the World Bank's 2016 Environmental and Social Framework (ESF). The Guidance Notes help to explain the requirements of the ESSs; they are not Bank policy, nor are they mandatory. The Guidance Notes do not substitute for the need to exercise sound judgment in making project decisions. In case of any inconsistency or conflict between the Guidance Notes and the ESSs, the provisions of the ESSs prevail. Each paragraph of the Standard is highlighted in a box, followed by the corresponding guidance.

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Introduction

1. 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.

2. This ESS sets out the requirements to address resource efficiency and pollution[1] prevention and management[2] throughout the project life cycle consistent with Global International Industry Practice (GIIP).

Footnote 1. The term "pollution" is used to refer to both hazardous and nonhazardous 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.

Footnote 2. Unless otherwise noted in this ESS, "pollution management" includes 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.

Objectives

(a) To promote the sustainable use of resources, including energy, water, and raw materials.

(b) To avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities.

(c) To avoid or minimize project-***related*** emissions of short- and long-lived climate pollutants.[3]

(d) To avoid or minimize generation of hazardous and nonhazardous waste.

(e) To minimize and manage the risks and impacts associated with pesticide use.

Footnote 3. This includes all GHGs and black carbon (BC).

Scope of Application

3. The applicability of this ESS is established during the environmental and social assessment described in ESS1.

Requirements

4. The Borrower will consider ambient conditions and apply technically and financially feasible resource efficiency and pollution prevention measures in accordance with the mitigation hierarchy. The measures will be proportionate to the risks and impacts associated with the project and consistent with GIIP, in the first instance the Environmental Health and Safety Guidelines (EHSGs).

Resource Efficiency

5. The Borrower will implement technically and financially feasible measures for improving efficient consumption of energy, water, and raw materials, as well as other resources. Such measures will integrate the principles of cleaner production into product design and production processes to conserve

raw materials, energy, and water, as well as other resources. Where benchmarking data are available, the Borrower will make a comparison to establish the relative level of efficiency.

GN5.1. What constitutes the efficient usage of resources, including energy, water, and raw materials, is project-, context-, and country-specific but should be consistent with Good International Industry Practice (GIIP), in the first instance the Environmental, Heath, and Safety Guidelines (EHSGs). In accordance with ESS1, resource efficiency measures should be analyzed as part of the environmental and social assessment. For further information on the EHSGs, see the Reference section of this Guidance Note.

GN5.2. The terms "cleaner production" and "resource efficiency" refer to the concept of integrating pollution reduction and/or raw material-, water-, and energy-conserving measures into the design of product and production processes, or adopting an alternative process.

GN5.3. In many industrial and commercial activities, where the unit of output can be readily measured or defined, widely accepted benchmarks that describe performance in quantitative terms are available. For example, process energy use per ton of product is often an accepted benchmark. Similarly, building benchmarks may refer to energy or water use per dwelling, inhabitant, or per guest night in a hotel, or energy use per unit area in other building types with corrections for climatic variations. When these benchmarks are available and used in accordance with or to supplement GIIP, they can be used to evaluate project performance on the resource efficiency or pollution intensity requirements of ESS3. If such benchmarks are not available, using a best available techniques approach may be appropriate to benchmark one engineering approach against another.

A. Energy Use

6. The efficient use of energy is an important way in which the Borrower can contribute to sustainable development. When the project is a potentially significant user of energy, in addition to applying the resource efficiency requirements of this ESS, the Borrower will adopt measures specified in the EHSGs to optimize energy usage, to the extent technically and financially feasible.

GN6.1. Sectors that typically make significant use of energy include, for example, industrial production, resource extraction, water pumping, or transport. However, projects in other sectors may also be significant users of energy; these include waste management, agriculture, education, and health.

GN6.2. As indicated in ESS1, technical feasibility is based on whether the 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. Financial feasibility is based on relevant financial considerations, including relative magnitude of the incremental cost of adopting such measures and actions compared to the project's investment, operating, and maintenance costs, and on whether this incremental cost could make the project nonviable for the Borrower.

B. Water Use

7. When the project is a potentially significant user of water or will have potentially significant impacts on water quality, in addition to applying the resource efficiency requirements of this ESS, the Borrower will adopt measures, to the extent technically and financially feasible, that avoid or minimize water usage so that the project's water use does not have significant adverse impacts on communities, other users, and the environment. These measures include, but are not limited to, the use of additional technically feasible water conservation measures within the Borrower's operations, the use of alternative water supplies, water consumption offsets to maintain total demand for water resources within the available supply, and evaluation of alternative project locations.

GN7.1. For the purposes of ESS3, paragraph 7, the significance of water use will be determined on a case-by-case basis. This includes consideration of water availability, including seasonal and multiyear variations in water tables and precipitation, as well as water resource demand. Examples of projects that could involve significant use of water include agriculture, water-cooled thermal power plants, mining, urban water supply, water distribution, and groundwater abstraction projects. Water "use" generally refers to withdrawals or applications; water "consumption" refers to water no longer available in the system due to evaporative or transpiration "losses" from use in agriculture, cooling or manufacturing processes, landscaping, or net consumption by people and livestock.

GN7.2. When a project is a significant user of water, or contributes to depletion of water resources to the extent that third parties' ability to access water is adversely affected, efforts should be made to reduce water use to a level at which these adverse impacts are avoided or at least mitigated. It is also important to consider impacts on water quality. Water quality can be affected by contaminated wastewater and refuse associated with projects involving construction, agriculture, and industry, among others. Suggested measures to minimize impacts on water quality include reducing or eliminating on-site and post-project runoff of polluted water, controlling sources of pollutants, and treating contaminated water before discharge into drainage systems or receiving waters, in a manner consistent with GIIP or other compatible good practices. Mitigation measures to reduce adverse impacts on water quality and availability (quantity and timing) for other uses include avoiding the impacts by re-siting the project, applying technical and policy resource efficiency measures to reduce system impacts such as reverse osmosis-based water recovery, dry cooling, minimizing evaporation/evapotranspiration, improving irrigation systems as well as irrigation scheduling, including use of recycled urban water, promoting soil-water conservation measures (such as conservation tillage and incorporation of crop residue where appropriate), and in terms of water quality, promoting rational use of fertilizers and better management of animal wastes. Measures to address impacts on water quality and quantity in various phases of project development may be found in the EHSGs cited in the Reference section of this Guidance Note.

8. For projects with a high water demand that have potentially significant adverse impacts on communities, other users, or the environment, the following will apply:

- A detailed water balance will be developed, maintained, monitored, and reported periodically;
- Opportunities for improvement in water use efficiency will be identified and implemented;
- Specific water use (measured by volume of water used per unit production) will be assessed; and
- Operations must be benchmarked to available industry standards of water use efficiency.

GN8.1. For the purposes of ESS3 paragraph 8, high water demand is determined based on local and, as relevant, national and transboundary context, considering both water quality and water quantity/availability (including seasonal and multiyear variations).

GN8.2. A detailed water balance factors in climate variability and incorporates estimates relating to: (a) all inputs, such as precipitation, external inflow of rivers and groundwater, interbasin water transfer, and returned water from users to a hydrological unit, for example, a catchment/watershed or river basin; (b) all outputs from the hydrological unit, for example, water abstraction from surface/groundwater resources, outflow of rivers and groundwater to the sea or neighboring territories, interbasin water transfer or by evapotranspiration; and (c) changes in water storage in the hydrologic unit over a defined period of time, for example, during a month or a year. In preparing the water balance, estimates of future water availability are included, which can vary based on scenarios of anticipated changes in water demands or other factors, such as climate change. A water balance supports management of water allocation among water users. It also supports river basin management planning because it provides information on water availability and demand and can indicate potential for water conservation. Methods to support water balances include water accounting through remote sensing and in-situ sensors with appropriate analysis—to the extent technically and financially feasible, and in a manner proportionate to the project scope—to estimate water flows, fluxes, stocks, consumption, and services, and to communicate water-resources-related information to communities, users, and decision makers.

GN8.3. Various options exist to improve water use efficiency to avoid adverse impacts of water use. For example, agricultural water use efficiency can be improved through technologies and policies that incentivize maintaining net consumptive use (evapotranspiration) within specified limits, taking into account the implications for the overall watershed. In another example, urban water use efficiency can be increased through building codes that encourage installation of low flow toilets and showers, consumer awareness campaigns to promote water efficient appliances, and repair of water-distribution systems to reduce leakage. Water use in agriculture, the largest consumer of water, can be made more efficient through irrigation-system improvements, irrigation scheduling, improving water-conveyance efficiency and leakage losses, managing soils to reduce runoff, and reusing water on-farm. Depending on the significance of the project's potential impacts on communities, other users, ecosystems, or the environment, it may be useful to include an assessment of the volume of water used per unit of production in the project's environmental and social assessment. With respect to water productivity, approaches such as system water accounting may be useful to assess the extent to which water productivity increases have an effect on other water users. For example, increasing water productivity, while maintaining existing water withdrawal, will increase the efficiency of water use, but, at the same time, may affect downstream water users who depend on return flow in rivers or groundwater aquifers.

9. The Borrower will assess, as part of the environmental and social assessment, the potential cumulative impacts of water use upon communities, other users, and the environment and will identify and implement appropriate mitigation measures.

GN9.1. Cumulative impacts of projects are defined in ESS1, footnote 22. With respect to water, the environmental and social assessment includes impacts on surface and groundwater, and impacts on water quality and quantity, including current and planned uses of water in the same hydraulic basin (including watersheds and groundwater). Appropriate mitigation measures should address short- and long-term cumulative impacts on communities, other users, ecosystem services, and the environment.

C. Raw Material Use

10. When the project is a potentially significant user of raw materials, in addition to applying the resource efficiency requirements of this ESS, the Borrower will adopt measures[4] specified in the EHSGs and other GIIP to support efficient use of raw materials, to the extent technically and financially feasible.

Footnote 4. These measures can include reuse or recycling of materials. The Borrower will seek to reduce or eliminate the use of toxic or hazardous raw materials.

GN10.1. Efficiency in use of raw materials and, thereby, efficiency in costs and labor, can be achieved by eliminating and/or minimizing the quantity used in the project, selecting the most appropriate raw materials possible, and reducing and recycling wastes. Projects that usually make significant use of raw materials include road construction, housing and urban development, logging, mining, and chemical manufacture and processing. Measures to eliminate, substitute, or reduce raw material use in various phases of project development may be found in the General EHSGs, and in the Industry Sector Guidelines in the Reference section of this Guidance Note.

Pollution Prevention and Management

11. The Borrower will avoid the release of pollutants or, when avoidance is not feasible, minimize and control the concentration and mass flow of their release using the performance levels and measures specified in national law or the EHSGs, whichever is most stringent. This applies to the release of pollutants to air, water, and land due to routine, nonroutine, and accidental circumstances, and with the potential for local, regional, and transboundary impacts.

GN11.1. When pollution avoidance is not feasible, technically and financially feasible technologies and processes should be used to mitigate pollution impacts. It is good practice to undertake a thorough analysis that includes consideration of the source, nature, and magnitude of the emission or discharge, its interaction with the ecosystem, and the ambient pollution problem to be addressed. Based on this analysis, appropriate technologies and processes can be selected.

GN11.2. Monitoring frequency is determined by the nature, scale, and variability of the potential emissions and may range from continuous monitoring to daily, monthly, annually, or less frequently, depending on the nature of the project emissions. In some cases, end-of-pipe emission flows can be diluted to meet emission standards while maintaining the same aggregate emission of pollutants into the environment. Therefore, it may be useful to monitor both emission flows and emission loads. If there are substantive changes to the project that modify the emissions, monitoring needs may also change. Monitoring is particularly important for projects with impacts that are uncertain and/or potentially irreversible. These projects consequently may call for more frequent or more detailed evaluation of emission levels or ambient quality. Guidance on recommended monitoring approaches and frequencies appropriate to the nature of their operations is available from many internationally recognized sources including the EHSGs.

12. Where the project involves historical pollution,[5] the Borrower will establish a process to identify the responsible party. If the historical pollution could pose a significant risk to human health or the environment, the Borrower will undertake a health and safety risk assessment[6] of the existing pollution

which may affect communities, workers, and the environment. Any remediation of the site will be appropriately undertaken in accordance with national law and GIIP, whichever is most stringent.[7]

Footnote 5. In this context, 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.

Footnote 6. Such assessment will follow a risk-based approach consistent with GIIP, in the first instance the EHSGs.

Footnote 7. If one or more third parties are responsible for the historical pollution, the Borrower will consider seeking recourse from such parties so that such pollution is appropriately remediated. The Borrower will implement adequate measures so that historical pollution at the site does not pose a significant risk to the health and safety of workers and communities.

GN12.1. The project's health and safety risk assessment should be proportionate to the potential risks and impacts of the historical pollution of land and water resources, among others, and may be conducted as part of the environmental and social assessment. Appropriate mitigation measures should be developed and implemented either as part of the project or through other means. Contamination management options, based on the outcome of the health and safety risk assessment, are site specific and may include containment or isolation as well as mitigation. It is important to consult with project stakeholders when developing such options and mitigation measures. Further information on stakeholder engagement is found in ESS10 and its accompanying Guidance Note.

GN12.2 (Footnote 7). Measures would be considered adequate where they address, in accordance with the mitigation hierarchy, significant health and safety risks to project workers and communities. Further information on Community Health and Safety is found in ESS4 and its accompanying Guidance Note.

13. To address potential adverse project impacts on human health and the environment,[8] the Borrower will consider relevant factors, including, for example: (a) existing ambient conditions; (b) in areas already impacted by pollution, the remaining assimilative capacity[9] of the environment; (c) existing and future land use; (d) the project's proximity to areas of importance to biodiversity; (e) the potential for cumulative impacts with uncertain and/or irreversible consequences; and (f) impacts of climate change.

Footnote 8. Such as air, surface and groundwater, and soils.

Footnote 9. Assimilative capacity refers to the capacity of the environment for absorbing an incremental load of pollutants while remaining below a threshold of unacceptable risk to human health and the environment.

GN13.1. The assimilative capacity of the environment includes the nature of the receiving environment, such as the existence of water bodies, soils, airsheds, and forests, as well as temporal and seasonal factors.

GN13.2. The assimilative capacity of receiving water bodies may depend on numerous factors, including, for example, the total volume of water, flow and flushing rates, temperature of received discharge, and the loading of pollutants from other effluent sources in the area or region. The assimilative capacity of soil may depend on the characteristics of both the received discharge and the soil, as well as the type of microbial, chemical, and physical reactions that take place in the soil layer, and climatic conditions. Waste may include sewage sludge, municipal solid waste, municipal wastewater, industrial waste, agricultural waste, and leachates of manure disposed of on land or used as fertilizer. To determine the assimilative capacity of an airshed, emission levels, ambient air quality standards, and prevailing meteorological conditions are taken into account. Appropriate air-quality modeling or similar tools are necessary to determine critical emission loads. The EHSGs and IFC Guidance Note 3: Resource Efficiency and Pollution Prevention both provide further information on the assimilative capacity of the environment, including benchmarks and thresholds for various pollutants. Information on referenced materials may be found in the Reference section of this Guidance Note.

GN13.3. When developing a project that is expected to produce potentially significant emissions of pollutants, the existing background ambient levels are evaluated in the environmental and social assessment to determine if they comply with the relevant ambient quality guidelines and/or standards. Using the mitigation hierarchy, it is important to develop measures to avoid or minimize emissions of pollutants into sensitive or already degraded water, air, or soil environments. Proximity to communities/residential areas should also be considered; the impacts of pollutants on local communities should be addressed in the project's environmental and social assessment.

GN13.4. Where a project involving the modernization or retrofit of an existing facility is expected to produce potentially significant emissions of pollutants, the current ambient conditions are evaluated to determine if they meet the relevant

ambient quality standards. If they exceed the standards, and the existing facility is a major source of emissions, the feasibility of reducing emissions is considered with the aim of developing and implementing measures that improve current ambient conditions. This is undertaken as part of the project's environmental and social assessment.

GN13.5. For projects that may discharge effluents into receiving water bodies that lack assimilative capacity, zero discharge systems should be used where technically and financial feasible.

14. In addition to applying resource efficiency and pollution control measures as required in this ESS, when the project has the potential to constitute a significant source of emissions in an already degraded area, the Borrower will consider additional strategies and adopt measures that avoid or minimize negative effects. These strategies include, but are not limited to, evaluation of project location alternatives.

A. Management of Air Pollution[10]

15. In addition to the resource efficiency measures described above, the Borrower will consider alternatives and implement technically and financially feasible and cost-effective[11] options[12] to avoid or minimize project-related air emissions during the design, construction, and operation of the project.

Footnote 10. 'Air pollution' refers to the release of air pollutants (often associated with the combustion of fossil fuels), such as nitrogen oxides (NOx), sulfur dioxide (SO_2), carbon monoxide (CO), particulate matter (PM), as well as other contaminants including GHGs.

Footnote 11. Cost-effectiveness is determined according to the capital and operational cost and financial benefits of the options considered over the life of the project.

Footnote 12. The options for reducing or preventing air pollution may include a combination of approaches such as: enhancing energy efficiency, process modification, selection of fuels or other materials with less polluting emissions, and application of emissions control techniques. Options for reducing GHG emissions may include alternative project locations; adoption of renewable or low carbon energy sources; alternatives to refrigerants with high global warming potential; more sustainable agricultural, forestry, and livestock management practices; the reduction of fugitive emissions and gas flaring; and carbon sequestration and storage; sustainable transport alternatives; and proper waste management practices.

GN 15.1. Air emissions can originate from point and nonpoint sources. The characterization and estimation of project air emissions within a defined airshed where the proposed project is to be located requires collection and evaluation of baseline data on ambient concentrations of parameters such as PM10, PM2.5, SO_2, NO_X, and ground-level ozone, in consideration of averaging time consistent with relevant national air quality standards and GIIP. The size of the airshed will depend on project design factors such as stack height, and characteristics such as meteorological conditions and topography. If the airshed is not defined by legislation or relevant environmental authorities, the environmental and social assessment should clearly define the airshed through scoping and consultation with authorities and relevant stakeholders. For further information on the reduction and/or management of air pollution, consult the EHSGs.

GN15.2 (Footnote 10). Greenhouse gases (GHGs) include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF_6), and nitrogen trifluoride (NF_3).

GN15.3 (Footnote 12). Examples of energy efficiency measures include cogeneration of heat and power; trigeneration of heat, power, and cooling; heat recovery; process changes; enhanced process control; leak elimination; insulation; and the use of more energy-efficient demand-side equipment (for example, electric motors, compressors, fans, pumps, heaters, and lighting fixtures).

GN15.4 (Footnote 12). Examples of renewable energy sources include solar power or heat generation, hydro, wind, certain types of geothermal, and sustainable biomass. Biomass-based renewable energy systems can often be combined with pollution-control devices (for example, anaerobic digestion of liquid effluents) and can create useful energy from organic waste. This system can allow the carbon contained in the waste to be released into the atmosphere as carbon dioxide rather than as methane, a more potent GHG.

16. As part of the environmental and social assessment of the project, the Borrower will characterize and estimate sources of air pollution related to the project.[13] This will include an estimate of gross GHG emissions resulting from the project, providing that such estimation is technically and financially feasible. Where the Borrower does not have the capacity to develop the estimate of GHG emissions,

the Bank will provide assistance to the Borrower.[14] For projects that have diverse and small sources of emissions (for example, community-driven development projects) or where emissions are not likely to be significant (for example, projects in education and social protection), GHG estimations will not be required.

Footnote 13. For the purposes of such estimate, the Borrower may utilize national methodologies accepted in the context of international agreements on climate change, with the agreement of the bank.

Footnote 14. Depending on the capacity of the Borrower, the type of the project, and the basis on which financing is being provided to the Borrower, this assistance may involve the Bank carrying out the GHG estimation on behalf of the Borrower, for example relating to IDA or FCS, projects, working with Borrower counterparts, and using project information provided by the Borrower. The Bank can also provide technical assistance to the Borrower in the use of the methodologies established by the Bank so that Borrower competency is strengthened in this respect.

GN16.1. The environmental and social assessment includes an estimate of the annual gross GHG emissions over the life of the project, where technically and financially feasible. To avoid double counting, gross GHG emissions are calculated only for direct GHG emissions (scope 1) from the project and further prorated according to the share of the total costs that the project finances.

GN16.2. National methodologies for estimating GHG emissions accepted in the context of international agreements on climate change or other methodologies may be used to make the estimate, provided such methodology is acceptable to both the Borrower and the Bank.

GN16.3. When determining whether a project produces significant emissions, sector-specific methodologies are utilized to estimate GHG emissions. Examples of sectors that have potentially significant emissions include energy, transport, heavy industry, building materials, agriculture, forest products, and waste management. Certain projects are designed to produce GHG savings. For purposes of this Guidance Note, their emissions are not considered significant, or calculating their gross GHG emissions is not considered technically feasible. These include reduction and control options such as: (a) enhancement of demand-side energy efficiency and reduction of system losses in transmission and distribution; (b) protection and enhancement of sinks and reservoirs of GHGs; (c) promotion of sustainable forms of agriculture and forestry; (d) promotion, development, and increased use of solar and wind energy; and (e) reduction of fugitive methane emissions or recovery of methane emissions for use in waste management. Product changes can also bring about significant reductions in GHG emissions, with potential cost and energy savings as well.

B. Management of Hazardous and Nonhazardous Wastes

17. The Borrower will avoid the generation of hazardous and nonhazardous waste.[15] Where waste generation cannot be avoided, the Borrower will minimize the generation of waste, and reuse, recycle and recover waste in a manner that is safe for human health and the environment. Where waste cannot be reused, recycled or recovered, the Borrower will treat, destroy, or dispose of it in an environmentally sound and safe manner that includes the appropriate control of emissions and residues resulting from the handling and processing of the waste material.

Footnote 15. These wastes may include municipal waste, e-waste, and animal waste.

GN17.1. It is important to apply the mitigation hierarchy as set out in ESS1 paragraph 27 to the management of wastes during all phases of a project, including design, construction, operation, closure, and decommissioning. The environmental and social assessment determines the source, type, quantity, and risks associated with the waste likely to be generated by the project and, if such waste cannot be avoided, proposes appropriate measures to minimize, reduce and, where not possible, mitigate, the risks associated with the waste. Environmentally sound and safe management of wastes and the obligations to manage such waste are included in relevant contractual arrangements of the project, particularly the technical design and construction contracts. For further information on the management of hazardous and nonhazardous wastes, consult the EHSGs. Further guidance on exposure of communities to hazardous wastes and chemicals is found in paragraphs 18.1 to 18.4 in the Guidance Note for ESS4.

GN17.2 (Footnote 15). Actions that avoid or minimize the creation of nonhazardous wastes and ensure the recycling, reuse, or safe disposal of such wastes generated by the project should also be included in the environmental and social assessment.

18. If the generated waste is considered hazardous,[16] the Borrower will comply with existing requirements for management (including storage, transportation, and disposal) of hazardous wastes including

national legislation and applicable international conventions, including those relating to transboundary movement. Where such requirements are absent, the Borrower will adopt GIIP alternatives for its environmentally sound and safe management and disposal. When hazardous waste management is conducted by third parties, the Borrower will use contractors that are reputable and legitimate enterprises licensed by the relevant government regulatory agencies and, with respect to transportation and disposal, obtain chain of custody documentation to the final destination. The Borrower will ascertain whether licensed disposal sites are being operated to acceptable standards and where they are, the Borrower will use these sites. Where licensed sites are not being operated to acceptable standards, the Borrower will minimize waste sent to such sites and consider alternative disposal options, including the possibility of developing its own recovery or disposal facilities at the project site or elsewhere.

Footnote 16. As defined by the EHSGs and relevant national law.

GN18.1. Hazardous wastes present a risk to human health, property, ecosystem services, and the environment due to their physical or chemical characteristics. Hazardous waste may include: explosives; compressed gases, including toxic or flammable gases; flammable liquids; flammable solids; oxidizing substances; toxic materials; radioactive material, including radioactive medical waste; corrosive substances; chemical fertilizers; soil amendments; chemicals, oils, and other hydrocarbons; paints; pesticides; herbicides; fungicides; asbestos; metal waste; hospital waste; used batteries; fluorescent light bulbs and ballasts; byproducts of plastic incineration at low temperatures; heavy metals (Pb, Cr, Cd, and Hg); dioxin-bearing wastes; and polychlorinated biphenyls (PCBs) in electrical equipment.

GN18.2. The project's environmental and social assessment identifies the hazardous waste that may be generated or managed by the project, taking into account national law, GIIP, and the EHSGs. It is good practice to conduct a hazard analysis, where a project has the potential to release hazardous material, or where project operations could result in injury to project workers or the public. A hazard analysis allows for systematic identification of systems and procedures that could result in accidental release of hazardous materials, and associated risks. Standard tools for hazard analysis include Hazard Identification (HAZID), Hazard and Operability (HAZOP) studies, Process Safety Management (PSM), and Quantitative Risk Analysis (QRA). Where there is risk of a spill of uncontrolled hazardous materials, a spill control, prevention, and countermeasure response plan is prepared as part of the environmental and social assessment. Information related to the project's management measures for hazardous materials is disclosed to stakeholders, including project workers.

GN18.3. The generation of hazardous wastes is avoided, if possible, or at least minimized to the extent that is technically and financially feasible. Where generation of hazardous wastes cannot be avoided, different types of waste are segregated for appropriate disposal and management. Disposal is carried out in accordance with GIIP. It is also important to ensure that waste containers designated for off-site shipment of hazardous wastes are secured and labeled, properly loaded on transport vehicles before leaving the site, and accompanied by appropriate shipping documents. The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal serves as a valuable source of information on this topic. The Convention focuses on the reduction of hazardous waste generation and the promotion of environmentally sound management of hazardous wastes, wherever the place of disposal; and on the restriction of transboundary movements of hazardous wastes except where it is lawful and in accordance with the principles of environmentally sound management.

GN18.4. If no suitable disposal method is available, the Borrower should consider developing its own treatment or disposal facilities. Where this is not feasible, or where disposal outside the host country is restricted or prohibited by relevant international conventions, then it may be necessary to construct facilities for long-term storage of waste on-site or at an alternative location until appropriate disposal options become available. It is important that both options—treatment/disposal facility or long-term storage—be managed in an environmentally sound and safe manner, consistent with GIIP.

GN18.5. Information obtained as part of the process to contract third parties for hazardous and nonhazardous waste management may be essential to ascertain the reputability and legitimacy of the third party. Depending on the nature of the project and the potential risks and impacts, particularly where hazardous wastes are involved, information about and/or provided by and pertinent to the third party may need to include:

- Information in public records, for example, corporate registers;
- Current business licenses, registrations, permits, certificates, and approvals;
- Documents relating to their track record pertaining to hazardous waste management systems;

- Safety records; and
- Copies of relevant previous contracts.

Further information on the management of hazardous and nonhazardous wastes may be found in the EHSGs and in the Reference section of this Guidance Note.

C. Management of Chemicals and Hazardous Materials

19. The Borrower will avoid the manufacture, trade, and use of chemicals and hazardous materials subject to international bans, restrictions or phaseouts unless for an acceptable purpose as defined by the conventions or protocols or if an exemption has been obtained by the Borrower, consistent with Borrower government commitments under the applicable international agreements.

GN19.1. Chemicals and hazardous materials to be avoided are identified in relevant international conventions, such as: the Stockholm Convention on Persistent Organic Pollutants; the Rotterdam Convention on the Prior Informed Consent for Certain Hazardous Chemicals and Pesticides in International Trade; the Montreal Protocol on Substances that Deplete the Ozone Layer, including the Kigali Amendment to the Montreal Protocol, the Minamata Convention on Mercury; and the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal. The relevant international conventions are considered in the environmental and social assessment as they relate to the project, regardless of whether the Borrower is a party to those conventions. The requirements of these conventions, and their protocols, and agreements are addressed, as relevant, in any proposed mitigation measures.

GN 19.2. The Annexes A and B to the Stockholm Convention contain the list of chemicals to be eliminated or restricted. Registered parties to the Convention may obtain specific exemptions for applicable production and use as outlined in the Convention annexes (for example, the use of DDT for malaria control). Where projects involve existing stockpiles of obsolete Persistent Organic Pollutants, the environmental and social assessment addresses phaseout within a reasonable time frame. It is also important to minimize the unintentional production and release of the chemicals listed in Annex C of the Convention. Guidance on how to identify, quantify, and reduce emissions of Annex C chemicals from potentially significant sources is included in the publications that support the Convention.

GN19.3. The Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, Annex III, contains the list of chemicals for which manufacture, trade, and use are to be avoided.

GN19.4. The Montreal Protocol on Substances that Deplete the Ozone Layer, Annexes A, B, C, E, and F, list the compounds of which the manufacture and consumption are to be avoided. Continued use of CFC refrigerant already present within refrigeration machinery is permitted, although in these circumstances it is good practice to minimize refrigerant leakage. While the Montreal Protocol does not anticipate complete phaseout of hydrochlorofluorocarbon (HCFC) refrigerants until January 1, 2040 in Article 5 countries, in many such countries proven zero-ozone-depletion alternatives are already in use, have supporting service infrastructure, and are preferred to HCFCs.

GN19.5. The Minamata Convention on Mercury addresses the avoidance of mercury production, and measures regarding its intentional use in products and processes, unintentional release from industrial activity, and trade. It is important to ensure the application of environmentally sound management and handling of mercury throughout its life cycle, including in waste-contaminated sites and long-term storage. In this regard, the Minamata Convention contains important guidance on the best available technologies and practices for reducing and controlling emissions of mercury from various sectors and sources, including combustion of fossil fuels, processing of mineral materials, use of solid incineration residues in road pavements, construction applications, and the remarketing of recycled mercury, among others.

GN19.6. The Cartagena Protocol on Biosafety to the Convention on Biological Diversity promotes biosafety by establishing rules and procedures for the safe transfer, handling, and use of Living Modified Organisms (LMOs), also referred to as Genetically Modified Organisms (GMOs). There is a specific focus on transboundary movements of LMOs. These rules are designed to protect ecosystems from the release of LMOs that are potentially detrimental to human health or the environment. Further information on biodiversity and living natural resources is found in ESS6, together with its accompanying Guidance Note.

20. The Borrower will minimize and control the release and use of hazardous materials.[17] The production, transportation, handling, storage, and use of hazardous materials for project activities will be assessed through the environmental and social assessment. The Borrower will consider less hazardous

substitutes where hazardous materials are intended to be used in manufacturing processes or other operations.

Footnote 17. These materials may include chemical fertilizer, soil amendments, and chemicals other than pesticides.

GN20.1. Opportunities to use nonhazardous substitutes are considered throughout the life of the project, especially when the hazards of the exposure or release of the materials cannot be easily prevented under normal use or disposal. The effectiveness, compatibility, and cost of the substitute, and existing measures to adequately control its use and disposal, are considered when determining its suitability for use under the project. Examples of means to minimize and control the use of hazardous materials are found in the EHSGs.

GN20.2. Nutrient pollution is a challenging environmental, health, and economic problem. Nitrogen and phosphorus occur naturally and play a major role in the health of aquatic and other ecosystems. However, when these elements enter the environment (air and water bodies) in excessive amounts through runoff or various other human activities, they have the potential to pollute the air, groundwater, and waterways, causing serious environmental, health, and economic problems. The primary sources of nutrient pollution are agriculture (fertilizer and animal manure), runoff from storm- and wastewater, use of disinfectants and home cleaning products, and use of fossil fuels. Good agricultural and effluent management practices help reduce potential nutrient pollution and promote efficient use of plant nutrients (for example, nutrient management, conservation tillage, cover crops, buffers, water treatment, drainage management, watershed management, and reuse and recycling of nutrient loaded wastewater).

D. Management of Pesticides

21. Where projects involve recourse to pest management measures, the Borrower will give preference to integrated pest management (IPM)[18] or integrated vector management (IVM)[19] approaches using combined or multiple tactics.

Footnote 18. IPM refers to a mix of farmer-driven, ecologically based pest control practices that seeks to reduce reliance on synthetic chemical pesticides. It involves: (a) managing pests (keeping them below economically damaging levels) rather than seeking to eradicate them; (b) integrating multiple methods (relying, to the extent possible, on nonchemical measures) to keep pest populations low; and (c) selecting and applying pesticides, when they have to be used in a way that minimizes adverse effects on beneficial organisms, humans, and the environment.

Footnote 19. IVM is a rational decision-making process for the optimal use of resources for vector control. The approach seeks to improve the efficacy, cost-effectiveness, ecological soundness, and sustainability of disease-vector control.

GN21.1 (Footnote 19). Vector control is a key component of vector-borne disease management. Integrated Vector Management (IVM) approaches integrate both chemical and nonchemical interventions to manage disease vectors in a cost-effective and environmentally sound manner. IVM approaches limit reliance on chemical pesticides and reduce the selection pressure for insecticide resistance.

22. In the procurement of any pesticide the Borrower will assess the nature and degree of associated risks, taking into account the proposed use and the intended users.[20] The Borrower will not use any pesticides or pesticide products or formulations unless such use is in compliance with the EHSGs. In addition, the Borrower will also not use any pesticide products that contain active ingredients that are restricted under applicable international conventions or their protocols or that are listed in, or meeting, the criteria of their annexes, unless for an acceptable purpose as defined by such conventions, their protocols, or annexes, or if an exemption has been obtained by the Borrower under such conventions, their protocol, or annexes, consistent with Borrower commitments under these and other applicable international agreements. The Borrower will also not use any formulated pesticide products that meet the criteria of carcinogenicity, mutagenicity, or reproductive toxicity as set forth by relevant international agencies. For any other pesticide products that pose other potentially serious risk to human health or the environment and that are identified in internationally recognized classification and labelling systems, the Borrower will not use pesticide formulations of products if: (a) the country lacks restrictions on their distribution, management, and use; or (b) they are likely to be used by, or be accessible to, lay personnel, farmers, or others without training, equipment, and facilities to handle, store, and apply these products properly.

Footnote 20. This assessment is made in the context of the environmental and social impact assessment.

GN22.1. The list of pesticides proposed for procurement under the project must be checked against the criteria of carcinogenicity, mutagenicity, or reproductive toxicity outlined in the pesticide's Material Safety Data Sheet and as set forth by relevant international agencies and outlined in the Globally Harmonized System of Classification and Labelling of Chemicals (GHS). The relevant international conventions are considered in the environmental and social assessment as they relate to the project, regardless of whether the Borrower is a party to those conventions. The requirements of the conventions, protocols, and agreements are addressed, as relevant, in any proposed mitigation measures.

GN22.2. If pesticides are applied, training and awareness raising are required for personnel handling and applying pesticides to avoid harm to personnel and avoid environmental issues like surface and groundwater pollution, wind drift beyond the targeted area, and other adverse side effects.

23. The following additional criteria apply to the selection and use of such pesticides: (a) they will have negligible adverse human health effects; (b) they will be shown to be effective against the target species; and (c) they will have minimal effect on nontarget species and the natural environment. The methods, timing, and frequency of pesticide application are aimed to minimize damage to natural enemies. Pesticides used in public health programs will be demonstrated to be safe for inhabitants and domestic animals in the treated areas, as well as for personnel applying them; (d) their use will take into account the need to prevent the development of resistance in pests; and (e) where registration is required, all pesticides will be registered or otherwise authorized for use on the crops and livestock, or for the use patterns for which they are intended under the project.

GN 23.1. Some instances may warrant the use of pesticides that have impacts on nontarget species. For example, it may be necessary to manage a vector that is responsible for a disease outbreak (such as a certain mosquito species), but the only solution is a pesticide that can negatively affect multiple invertebrate species including beneficial insects. In these instances, careful selection and application of pesticides is warranted to limit impacts on nontarget species, the environment, and human health.

24. The Borrower will ensure that all pesticides used will be manufactured, formulated, packaged, labelled, handled, stored, disposed of, and applied according to relevant international standards and codes of conduct, as well as the EHSGs.

25. For any project involving significant pest management issues[21] or any project contemplating activities that may lead to significant pest and pesticide management issues,[22] the Borrower will prepare a Pest Management Plan (PMP).[23] A pest management plan will also be prepared when proposed financing of pest control products represents a large component of the project.[24]

Footnote 21. Such issues would include: (a) migratory locust control; (b) mosquito or other disease vector control; (c) bird control; (d) rodent control, etc.

Footnote 22. Such as: (a) new land-use development or changed cultivation practices in an area; (b) significant expansion into new areas; (c) diversification into new crops in agriculture; (d) intensification of existing low-technology systems; (e) proposed procurement of relatively hazardous pest control products or methods; or (f) specific environmental or health concerns (e.g., proximity of protected areas or important aquatic resources; worker safety).

Footnote 23. Depending on the nature and the scale of the risks and impacts of the project, the elements of a PMP may be included as part of the ESCP, and preparation of a stand-alone PMP may not be necessary.

Footnote 24. This is when financing of substantial quantities of pesticides is envisaged. A pest management plan is not required for the procurement or use of impregnated bednets for malaria control, or of insecticides for intradomiciliary spraying for malaria control identified in internationally recognized classification systems.

References

There are many resources that may be useful to a Borrower in addressing the application of the ESF. Set out below are references that may assist the Borrower in implementing the requirements of the ESF. The resources listed here do not necessarily represent the views of the World Bank.

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