ENVIRONMENTAL AND SOCIAL STRATEGY (ESS)

PARAGUAY
CAIASA CRUSHING PROJECT

I. INTRODUCTION

1.1 Project Summary

Country:	Paraguay
Sector:	Agribusiness
Project name:	CAIASA Crushing Project
Borrower:	Complejo Agro-Industrial Angostura SA
Sponsors:	Losur Overseas S.L., Bunge Limited and Louis Dreyfus Commodities Group
Total project cost:	US$230 million
IDB A-loan:	Up to US$92 million
IDB B-loan:	tbd
EIC:	B

II. PROJECT DESCRIPTION

2.1 IDB financing is proposed for Complejo Agro-Industrial Angostura S.A ("CAIASA" or the "Company") which entails the design, development, construction and operation of a new soybean crushing plant, and related facilities[1] as well as the commercialization of an industrialized product derived from soybean (the "Project"). The new plant, located in Villeta, 40 km from Asuncion (see figure 1), includes a crushing capacity of 4,000[2] tons/day.

2.2 Paraguay has grown significantly in the last decade as an important worldwide soybean producer. Traditionally, the primarily export-target-market for the Paraguayan soybean to be crushed, has been Argentina. CAIASA will be one of the largest soybean crushing plants in Paraguay.

A. Project sponsors

2.3 The Project sponsors are Louis Dreyfus Commodities, Bunge Limited ("Bunge"), and Losur Overseas S.L, all of which are major players in South American agribusiness and have existing raw soybean export operations in Paraguay.

B. Site location

2.4 The new plant will be located close to the city of Villeta, 40 km southeast from Asuncion, on the Paraguay River.

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1 Equity contribution of LDC that includes an up and running Port transferred to CAIASA.

2 Assuming 330 days of normal operation, equivalent to 1.32 million metric tons/year.

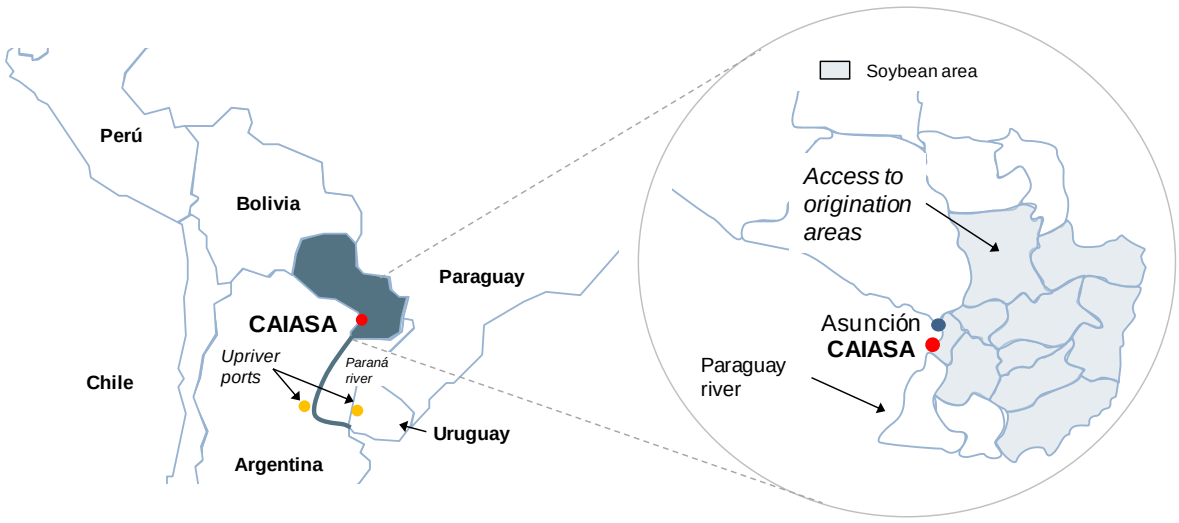

FIG. 1: PROJECT LOCATION

2.5 Due to its strategic location on the Paraguay River, CAIASA will have access to the country's main soybean origination areas, potential access to the new agricultural frontier, and also access through the Paraguay-Parana Rivers Hidrovía to Argentinian and Uruguayan ports. The location on the Paraguay River will also allow CAIASA access to soybean produced in Brazil and Bolivia.

C. The project facilities

2.6 The project consists mainly of the implementation of a 4.000 tons/day soybean crushing capacity, a barge terminal and 325 kMt[3] of total storage capacity (200 kMt for beans, 100 kMt for meal and 25 kMt for soybean oil). It includes the construction and operation of an unloading- loading berth**,** trucks unloading area, oil tanks, soybean and meal storage facilities and a crushing plant. The soybean to be processed will be purchased from several suppliers.

[3] Thousands of Mega Tonnes.

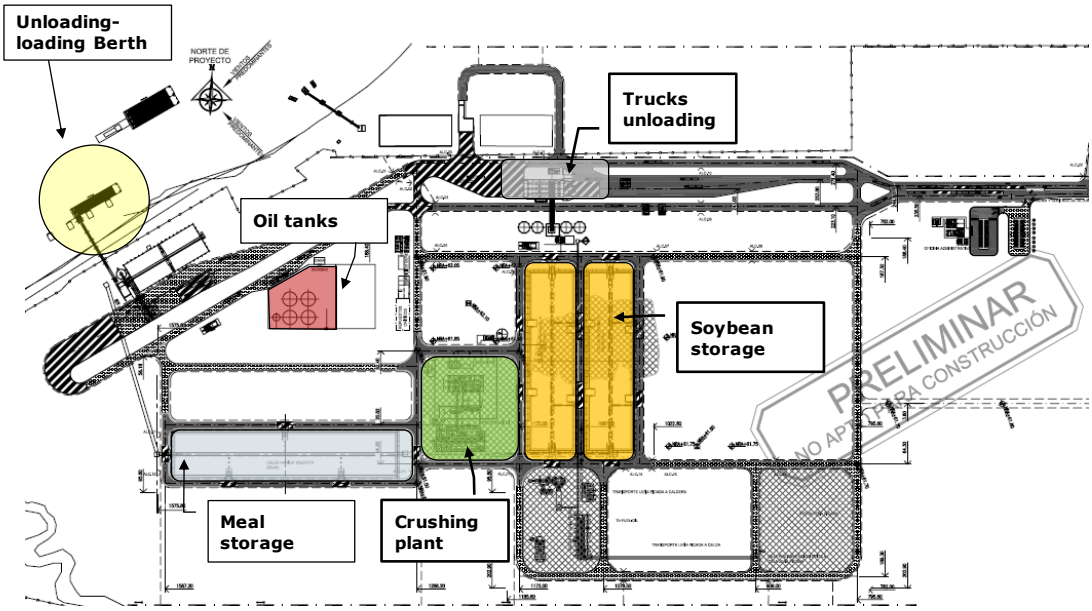

Fig. 2: Project facilities

D. The production process

2.7 The project consists basically of a grinding plant of soybean for production of oil. The plant will have a capacity for grinding 4,000 tonnes of soya/day and a total storage capacity of about 350,000 tonnes, including seeds, vegetable oils and oleaginous by-products. Figure 3 presents the production process describes in more details below.

2.8 **Seed Handling/Elevator Operations:** Soybeans received at the facility by truck or barge are sampled and analyzed for moisture content, foreign matter, and damaged seeds. Then the beans are weighed and conveyed to large concrete silos or metal tanks for storage prior to processing. When the facility is ready to process the soybeans, the beans are removed from the silo or tank and cleaned of foreign materials and loose hulls. Screens typically are used to remove foreign materials such as sticks, stems, pods, tramp metal, sand, and dirt. An aspiration system is used to remove loose hulls from the soybeans; these hulls may be combined later with hulls from the dehulling aspiration step. The beans are passed through dryers to reduce their moisture content.

2.9 **Preparation of Soybeans for Solvent Extraction:** Soybeans are conveyed from the process bins to the mill. In the mill, the beans are fed into cracking rolls that "crack" each bean into small pieces, which are passed through aspirators to remove the hulls (processed separately after the removal of residual bean chips). These hulls may be combined with the hulls from the grain cleaning step.

2.10 Next, the cracked beans and bean chips are conveyed to the conditioning area, where they are put either into a rotary steam tubed device and are heated to "condition" them (i. e., make them pliable and keep them hydrated). Conditioning is necessary to permit the flaking of the chips and to prevent their being broken into smaller particles. Finally, the

heated, cracked beans are conveyed and fed to smooth, cylindrical rolls that press the particles into smooth "flakes", which vary in thickness from approximately 0.25 to 0.51 millimeters (0.010 to 0.020 inches). Flaking allows the soybean oil cells to be exposed and the oil to be more easily extracted.

2.11 **Solvent Extraction and Oil Desolventizing:** The extraction process consists of "washing" the oil from the soybean flakes with hexane solvent in a countercurrent extractor. Then the solvent is evaporated (i. e., desolventized) from both the solvent/oil mixture (micella) and the solvent-laden, defatted flakes. The oil is desolventized by exposing the solvent/oil mixture to steam (contact and noncontact). Then the solvent is condensed, separated from the steam condensate, and reused. Residual hexane not condensed is removed with mineral oil scrubbers. The desolventized oil, called "crude" soybean oil, is stored for further processing or loadout. The oil, once hydrated, is centrifuged to separate the gums, which are then added to the meal.

2.12 **Desolventizing Flakes:** The flakes leaving the extractor contain up to 35 to 40 percent solvent and must be desolventized before use. Flakes are desolventized in a desolventizer-toaster (DT), where steam is used to evaporate the hexane. In addition, the contact steam "toasts" the flakes, making them more usable for animal feeds. The desolventized and toasted flakes then pass to a dryer, where excess moisture is removed by heat, and then to a cooler, where ambient air is used to reduce the temperature of the dried flakes. The desolventized, defatted flakes are then ground for use as soybean meal.

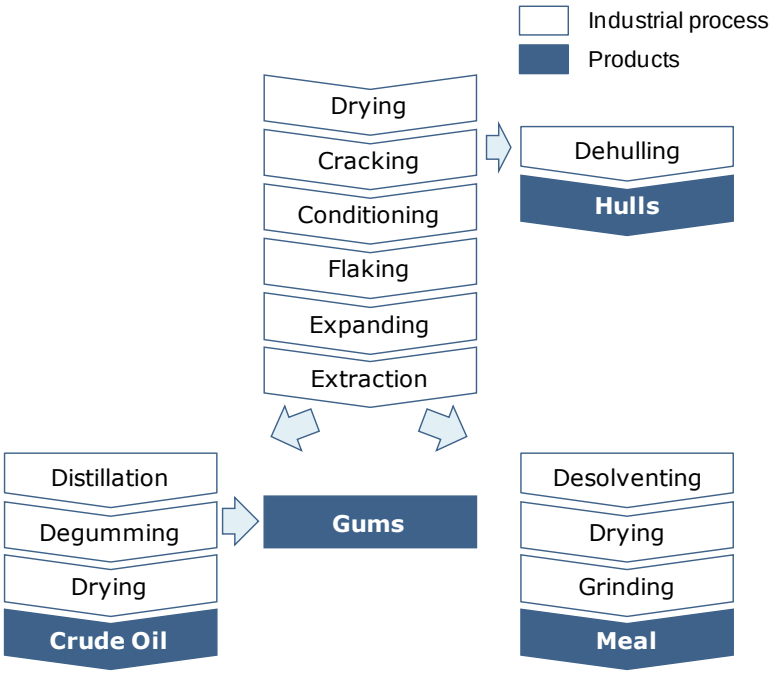

Fig. 3: The production process

E. Alternatives Analysis

2.13 Due to the fact that the project site is already owned by the Sponsors and at the site currently operates a grain reception facility and a barge loading pier, this was the most logical and feasible site for the project, and therefore no alternative sites were reviewed. The design of the plant and its production process will be similar to others operated by the Sponsors in many other countries of the region. During due diligence, an assessment of the alternatives' analysis, including different process' alternatives, layout of the facilities, etc, will be performed.

F. Schedule and budget

2.14 The construction of the plant is expected to last 22 months, and the estimated total project's cost is US$230million. The amount of workers needed for construction and operation of the plant and its potential impacts will evaluated during due diligence.

III. ENVIRONMENTAL AND SOCIAL COMPLIANCE STATUS

A. National Requirements

3.1 Key applicable national legislative requirements include Law Nr. 294/93 *Environmental Impact Assessment* and Resolution Nr. 1133/04 that regulates this law, whose enforcement authority is the Ministry of Environment (Secretaría del Ambiente, SEAM). Those regulations require an EIA for industrial plants of any kind; extraction and processing of surface and in depth solid minerals; construction, clearing and excavation works. The environmental license issued by SEAM authorizes the requesters to initiate or continue the work or activity and obliges them to comply with the mitigation measures proposed for the project. The license should be renewed every two years. Environmental licenses were already issued by SEAM for some parts of the project; this issue will be further assessed during the due diligence process.

3.2 Other applicable regulations are: Law Nr. 3239/07 of Water Resources; SEAM Resolution Nr. 222 /02 setting water quality standards; Law Nr. 836/80 Health Code; Law Nr. 3956/09, which provides for integrated management of solid waste; Law No 1100/97 to prevent noise pollution; Law Nr. 213/93 establishing the Labor Code and regulating hygiene, health and safety at work; Law Nr. 269/93, approving the Agreement for Water Transport through the Paraguay–Parana Waterway. Paraguay has no regulations establishing air quality standards.

3.3 An Environmental Impact Assessment (EIA) was carried out by a local firm, in accordance with the terms of reference approved by SEAM, who approved the EIA and issued the environmental license in the second semester of 2011. The EIA will be complemented with a more detailed study on the impacts and alternatives for management of the hexane.

B. IDB and other international requirements

3.4 IDB policies expected to be triggered in this Project include i) the Environment and Safeguards Compliance Policy (OP-703), particularly Directives B.01 (Bank policies), B.02 (country laws and regulations), B.03 (screening and classification), B.04 (other

risks), B.05 (environmental assessment requirements), B.06 (consultation), B.07 (supervision and compliance), B.10 (hazardous materials) and B.11 (pollution prevention and abatement); ii) Access to Information Policy (OP-102), and iii) Natural Disaster Risk Management Policy (OP-704). Although not expected, appliance of the OP-710 (Involuntary Resettlement) and the OP-765 (Indigenous People) will be evaluated during due diligence.

3.5 Based on current limited information, no significant impacts are expected. There could be, however, risks associated with the management of hazardous materials during project's operation -particularly hexane (C_6H_{14})- that during the due diligence will need careful evaluation and for which the application of international standards will be required.

3.6 Other traditional industrial impacts such as dust emissions, noise production and other industrial plant construction and operation impacts can be mitigated and managed with good management systems and procedures. Based on these initial conclusions, the team proposes an environmental classification of "B" for the Project under Directive B.03 of the OP-703, which will be confirmed during the ESDD.

IV. ENVIRONMENTAL AND SOCIAL SETTING

4.1 The environmental and social setting described below is based primarily on the EIA received from the Company.

A. Environmental aspects

4.2 **Land use.** The project will be located on the Paraguay River, in a property owned by the company, with a total of 141 ha. At the site currently operates a grain reception facility and a barges' loading pier. The plant is located in a rural district. There are other ports in the area, which are engaged in the same activity.

4.3 **Biodiversity.** Although not pristine, part of the area is covered with vegetation in state of secondary succession, since it has been subject to modification by the productive activities that were carried out previously. There are trees, shrubs and bushes in the property and the surroundings. According to the EIA findings, there are no endemic or endangered species found on the construction site and in the surroundings. The plant site, located in the periurban area of Villeta, is highly disturbed and does not exhibit a great deal of biodiversity. However, the right bank of the Paraguay River is relatively free of human activity and is part of the Chaco savannah – a terrestrial ecosystem considered to be important for conservation. This will be further assessed during due diligence.

4.4 **Water resources.** The main water resource in the area is the Paraguay River (mean discharge: 4,300 m^3/s). There is also a small creek running through the project site. During due diligence, the risk of flooding and the Paraguay River's water quality will be assessed, in order to determine whether some of the key project's facilities could be subject to flooding and if enough data is available to establish a water quality baseline . The water use in the plant will be of approximately 12,000 lts/hr (3,33 lts/sec), which will come from the Paraguay River.

Fig. 4: Project site

B. Socioeconomics aspects

4.5 The project's location is characterized as rural to periurban, is located 7 km from the route linking Villeta with a highway access to Asuncion. Its main entrance is located on the route which connects Villeta with the city of Alberdi. In the surroundings, it is observed the presence of livestock establishments, farms, poultry farming, small farms, and fisheries.

4.6 There is no dense population or urban settlements surrounding the project site. No need for resettlement has been identified, neither the presence of indigenous communities. This will be further assessed during due diligence, including the exact number and location of potentially affected population. No consultation process has been undertaken yet regarding the project; during due diligence, a consultation scheme will be agreed with the client.

V. Environmental and Social Impacts and Risks

A. Construction Impacts and Risks

5.1 The key potential environmental and social issues from the Project's construction include physical impacts from soil removal and labor health and safety risks. Other environmental and social impacts associated with the construction will be air pollution, vibrations, noise, waste and wastewater generation, soil erosion, problems associated with truck traffics, etc. Overall, the construction activities are transitory and can be mitigated or managed, and are considered likely to have a minor to moderate adverse impact. Details of key potential impacts are presented below.

5.2 **Impacts on terrestrial habitats.** The main direct ecological impact from the construction phase will be the loss of vegetation associated with the "clearance" for the

construction of the project's facilities. Although at the site currently operates a grain reception facility and a barge loading pier, some surface will need to be cleared of vegetation for the construction phase. As described in 4.3, no significant natural habitat, endemic or endangered species are found in the area, which is covered with vegetation in state of secondary succession.

5.3 **Soil Erosion.** Removal of preexisting vegetation can generate moderate impacts on the soil. The Contractor will be required to minimize areas of exposed soil and to compact and resurface the disturbed areas as soon as possible, as well as to build a drainage system during the very initial stage of the project. As an impact associated with the construction period, the alteration in water quality due to soil erosion is considered a temporary impact. After the end of the earth-moving activities, the potential for sediment transport to the Paraguay River will be significantly reduced.

5.4 **Surface water.** Among modifications in physical properties with the corresponding change in water quality are the color changes, increased turbidity and increased concentration of total solids which could potentially take place due to erosion and corresponding runoff during construction. Considering the high discharge of the Paraguay River, this impact is expected particularly in the small creek located in the project's site, although temporary.

5.5 **Groundwater.** It will be subject to a risk of contamination during the construction phase due to the possible infiltration of domestic sewage from chemical bathrooms to be used at the worker's camp during construction. In addition, any accidents involving toxic fuels or other materials during construction, due to maintenance activities and supply of machinery and equipment, may cause localized pollution problems. Additionally, there is a possibility of pollution with oil or other substances derived from the activities of washing, cleaning and lubrication of equipment and vehicles used during construction.

5.6 **Air Emissions.** Construction activities can generate dust that can cause a nuisance to local residents and cause a health risk to construction workers. As there is no dense population close to the project's site, it is considered unlikely that there will be a significant impact on local people during construction. The main risk is considered to be the exposure of workers on site. Dust control measures, together with the use of appropriate personal protective equipment and vehicle maintenance will be applied to mitigate this impact. The impact of emissions of vehicle exhaust gases on air quality is considered minimal.

5.7 **Other polluting material**. Potentially polluting materials will be carefully stored in suitable containment to reduce the risk of pollution incidents from spills and leaks.

5.8 **Traffic.** At the plant site, the impact on traffic is not expected to be significant during construction, although this risk will be further assessed during due diligence.

5.9 **Noise.** Noise generation in this phase will be associated with the operation of machines needed for the construction of civil works, although it is not expected that the noise generated by the works cause excessive discomfort to the surrounding population. Anyways, measures to reduce construction noise levels will be included in the Environmental and Social Management Plan (ESMP).

5.10 **Impacts from the influx of workers.** It is not currently known the expected amount of workers that will be on site at the peak construction time. This will be further assessed during due diligence and measures defined to avoid the potential risk of conflicts within the community.

5.11 **Labor Health & Safety.** During the construction phase of the project, moderate risks to health and safety of workers are expected, related to the construction of foundations, reinforced concrete and steel, ports, silos and other industrial plants. Both national regulations and IFC[4] labor health and safety guidelines will be applied during the construction phase. If properly implemented and monitored, these risks can be reduced and managed.

B. Operation Impacts and Risks

5.12 **Air Emissions.** Particulate matter and volatile organic (VOC) compounds[5] are the principal emissions from vegetable oil processing. Particulate matter (PM) results from the transfer, handling, and processing of raw seed. VOC emissions will come from the oil extraction solvent -hexane, which is classified as a hazardous material. Solvent emissions arise from several sources within vegetable oil processing plants. There are potential solvent emissions from the transfer and storage of hexane on site as well as potential leaks from piping and vents. Small quantities of solvent (up to 0.2 percent by volume of oil) are present in the crude vegetable oil after the solvent is recovered by film evaporators and the distillation stripper. This hexane may volatilize during the oil-refining process. Trace quantities of solvent are present and available for volatilization in waste water collected from the condensation of steam used in the distillation stripper and desolventizer-toaster.

5.13 Vents are another source of emissions. Solvent is discharged from three vents: the main vent from the solvent recovery section, the vent from the meal dryer, and the vent from the meal cooler. The main vent receives gases from the oil extractor, the film evaporator and distillation stripper, and the desolventizer-toaster. Vents for the meal dryer and meal cooler typically vent to atmosphere.

5.14 Despite the existence of equipment to control emissions of particulate materials during the operation of the plant, there is a moderate risk of dust generation during the operation. If properly implemented and monitored, this risk can be reduced and managed. Proper equipment will be installed to control particulate emissions. Although the Sponsors have a great deal of experience on managing hexane, special attention will be given to the design of the hexane's management and monitoring facilities in order to minimize the risks involved.

5.15 **Effluents.** The design of the plant includes a Wastewater Treatment Plant, which consists of a physical, chemical and biological treatment by anaerobic and facultative stabilization lagoons. This WWT will treat the effluents from washing floors, domestic use, spills and others. Regarding the process water, the company will implement a zero effluent system

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[4] IFC (International Finance Corporation)'s i) General Environmental, Health and Safety (EHS) Guidelines and ii) Environmental, Health and Safety Guidelines for Vegetable Oil Processing.

[5] **Volatile organic compounds** (VOCs) are organic chemicals that have a high vapor pressure at ordinary, room-temperature conditions.

(ZED), a closed circuit for recirculation. This system will be installed in the area of solvent extraction in order to minimize the liquid effluent and to increase the recovery of condensate that will be returned to the boiler, maximizing energy efficiency.

5.16 **Land conversion.** During due diligence, measures will be identified to ensure that the project will not lead to, or be associated with, additional conversion of natural habitat to soy bean fields.

5.17 **GHG generation and energy consumption.** Although not expected to be significant, an assessment of the potential emissions of greenhouse gases from the Project and its energy consumption will be undertaken during due diligence. The Company is planning to reuse 100% of its process solid waste (mainly soybean pellet) burning it in the boilers, reducing in this way emissions of approximately 85,000 tn CO2/year.

5.18 **Noise.** The EIA concluded that noise levels generated from the plant are unlikely to cause disturbance in any of the nearby communities during the evening or night. For workers health and safety, the company will be required to implement appropriate noise management practices in all aspects of the design and operation of the plant and transport of raw materials, and comply with the IFC EHS Guidelines regarding noise.

5.19 **Fluvial transportation.** The movement of barges (the total amount is not yet known) has the potential of destabilizing the river banks and the destruction of levees through the production of waves. Possible contacts between barges and margins can lead to compaction and alteration of river morphology, as well as to the generation of erosion and siltation processes, degradation of riparian vegetation and habitat destruction. This impact is considered moderate and mitigation measures will be identified in the ESMP.

5.20 **Traffic and transportation impacts**. In the case of the plant, it is anticipated that operation traffic (mainly truck traffic) could have an impact on current volumes of traffic that use the main arterial highways and the local routes. This impact will be further assessed during due diligence.

5.21 **Solid waste**. The solid waste generated in the production process will be reused in the final product, specifically in the soybean meal or the hull's pellet. The common solid waste will be stored in metal containers for his transport and disposal in landfills authorized by the local authorities.

5.22 **Operational impacts on local communities**. Transportation of raw materials as well as potential noise and air pollution caused by the plant, can affect the normal activities and the quality of life of local communities. If managed properly, and considering that there is no dense population surrounding the project site, these community issues should not be significant. However, this will be further assessed during due diligence, including the identification of the potentially impacted population, if any, and its location.

5.23 **Indirect impacts on employment.** During due diligence, an assessment will be carried out regarding the risks and impacts that could have an induced spontaneous migration of people in search of employment and economic opportunities on the site of the project (for example, informal services sales).

5.24 **Labor Health & Safety.** The dust and noise emissions resulting from the operation of the plant can be harmful to the health of the workers, so that methods of emissions control and the use of personal protective equipment will be adopted. Local regulations establish maximum permissible daily exposure to noise and annoying sounds within industrial facilities. Soybean crushing plants generally present health risks to workers, mainly associated with exposure to dusty material throughout the production process in the loading, unloading and transportation of raw materials and the eventual exposure to hexane emissions. Although relevant, these impacts can be managed through the implementation of sound management schemes.

C. Cumulative Impacts

5.25 The EIA took into consideration the indirect area of influence and impacts from other ports operating in the area. Air emissions were determined to have a minimal impact on ambient air conditions so they are therefore unlikely to result in cumulative impacts. Increased traffic could possibly contribute to cumulative effects on the traffic on the roads. The barge operations at the plant's port will also contribute until some extent to the cumulative impacts on the Paraguay River. Nevertheless, these impacts are considered moderate.

D. Environmental, Social, Health & Safety and Labor Management

5.26 The EIA recommended various mitigation and management measures, some of which have been mentioned previously, and these will be incorporated into management plans and procedures that will be reviewed during the ESDD. The Sponsors have adopted corporate environmental and social policies and procedures that will be applied to the project, including integrated management systems regarding environmental quality, health and safety, and labor management.

VI. ENVIRONMENTAL AND SOCIAL DUE DILIGENCE

6.1 The focus of the environmental and social due diligence will be on the potential impacts and risks during construction and operation of the project. The due diligence will include an evaluation of the EIA study and all associated documentation, as well as all the legal requirements. The due diligence will provide the evaluation of the Company's capacity to identify, mitigate and manage the environmental and social aspects and risks during the construction and operation phases. In addition to the environmental impacts and risks, the ESDD will pay attention to the potential impacts on the local communities to the project. Development and application of comprehensive health and safety procedures will also be a focus of the due diligence process.

6.2 The Bank will perform an environmental and social due-diligence (ESDD) in order to confirm that the Project's direct and indirect impacts and risks will be properly and adequately mitigated. In particular, the ESDD will assess the following:

1. Evaluation to confirm that the Project's direct, indirect and cumulative negative environmental and social impacts have been properly identified and evaluated, in particular: (1) potential impacts on habitats; (2) potential risks and associated impacts

related to flooding, erosion and land stability to the project, and/or exacerbated by the project; (3) land use impacts; (4) other potential community impacts such as traffic, dust, public safety, and pressure on services; (5) impacts related to industrial emissions (especially dust and other particulates), effluents, and waste management; (6) potential risks from accidental events, including worker accidents, accidental spills, and other unforeseen events.

2. Assessment of compliance with applicable IDB Bank environmental and social policies, including specifically the Environmental and Safeguard Compliance Policy, Disclosure of Information Policy, Disaster Risk Management Policy, IFC EHS guidelines and other International and Regional Agreements and applicable International Conventions.
3. Assessment of compliance status with the applicable environmental, social, health and safety, and labor legal requirements in Paraguay (e.g., laws, regulations, standards, permits, authorizations, applicable international treaties/conventions, etc.), in particular the requirements in the EIA authorization and project-specific legal requirements, including consultation.
4. Evaluate the proposed environmental and social management plans, procedures, and documentation for the Project (e.g. confirm that the plans define the Project-specific proposed environmental and social control, management, and mitigation measures, monitoring programs, costs, schedule of implementation, designated responsibilities, that the ESMP has been developed based upon the assessment of the anticipated environmental and social impacts, that it is current).
5. Evaluate the design of the handling and monitoring measures prepared by the client in order to ensure the safety management of the hexane during the operation of the plant.
6. Confirmation that adequate health and safety plans and procedures will be established and implemented both for construction and operation (including sub-contractors) to address potential worker health and safety risks associated with the Project.
7. Confirmation that adequate contingency plans and procedures will be implemented during construction and operation (including sub-contractors) to address potential Project-related accidental events (i.e., spills, explosions, fires, etc.).
8. Assessment of the Company and any contractor’s capacity to mitigate and monitor environmental, social, health and safety and labor aspects properly under their respective responsibility.
9. Evaluation of Project-related information disclosure and public consultation activities that have been performed including confirmation that the participation processes of stakeholders has been adequately conducted and that the proposed future actions to provide adequate ongoing information disclosure and public consultation with the local population is in compliance with IDB policies. This will include confirmation of adequate stakeholder engagement, and that the communities have participated meaningfully in pertinent decisions that affect them throughout the Project lifecycle and future proposed information disclosure and public consultation activities.

10. Evaluate the identification of cumulative impacts and risks associated with the Project, including long-term socio-economic impacts and land-use issues.
11. Evaluate the potential impacts of the Project on greenhouse gas emissions, in particular, those arising from operation of the boilers and energy consumption.
12. Evaluate positive impacts of the Project and any additionality from IDB involvement.

6.3 As part of the Bank's environmental and social due-diligence, the Bank will prepare an Environmental and Social Management Report (ESMR) for consideration by the Bank's Environmental and Social Review (ESR) group. The ESMR will provide a synthesis of the relevant environmental and social aspects of the Project and the proposed Bank recommendations in terms of Project-specific environmental and social requirements.