Environmental and Social Analysis

Suriname
Agricultural Competitiveness Program

SU-L1020

Prepared for:

Inter-American Development Bank
and
Suriname Ministry of Agriculture,
Animal Husbandry and Fisheries (LVV)

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List of Acronyms

ADRON: Anne van Dijk' Rice Research Organization

ATM: Ministry of Labour, Technology, and Environment

CARICOM: Caribbean Community Market

CDEMA: Caribbean Disaster Emergency Management Agency

CELOS: Center for Agricultural Research

EA: Environmental Assessment (set of environmental evaluation requirements by the Bank) and also refers to Environmental Analysis for Category B operations

ESMP: Environmental and Social Management Plan

FAO: Food and Agriculture Organization (United Nations)

GAP: Good Agricultural Practices

GEF: Global Environment Facility

IDB: Inter-American Development Bank

IICA: Inter-American Institute for Cooperation on Agriculture

IPM: Integrated Pest Management

ISO: International Organization for Standardization

LVV: Ministerie Van Landouw, Veetelt en Visserij (Ministry of Agriculture, Animal Husbandry and Fisheries)

NCCR: National Coordination Center for Disaster Relief

NIMOS: Nationaal Instituut voor Milieu en Ontwikkeling in Suriname (National Institute for Environment and Development in Suriname)

NMR: National Council for the Environment

PEU: Project Executing Unit

POPS: Persistent Organic Pollutants (Stockholm Convention)

PPE: Personal protective equipment

RAMSAR: Convention on Wetlands of International Importance

UNDP: United Nations Development Program

UNFCC: United Nations Framework on Climate Change

VKI: Viskeurings instituut (Fish Inspection Institute)

WHO: World Health Organization

I. INTRODUCTION

1.1 Background

The Inter-American Development Bank (Bank) and the Suriname Ministry of Agriculture, Animal Husbandry and Fisheries (LVV) are preparing a Program designed to increase competitiveness of the agricultural sector by supporting improvements in animal health, plant health and food safety and by promoting agricultural innovation through research and technology transfer projects. The health status of Suriname's agriculture and livestock is at the moment extremely vulnerable, as the laws, regulations, operating protocols, equipment and staff training, needed to enforce a scientific risk-based surveillance and control system are not currently in effect. Suriname's agricultural innovation system is also lacking. While there is a history of a solid plant breeding program in rice, the system as a whole does not have a good record of collaborative research and extension activities and has limited linkages across national research entities and with international research centers. Moreover, apart from some past success in the rice breeding program, there is little evidence of publicly-funded widespread transfer of new agricultural technologies. In addition, Suriname needs assistance to improve its pesticide management, control of imported pesticides, pesticide vendors, health safety issues, and disposal of obsolete or unused pesticides and empty containers.

This Program is designed to address these identified problems through three areas of intervention: agricultural health; food safety and agricultural innovation. This approach is based on a combination of the government's priorities for the sector, the technical feasibility of the interventions, empirical evidence on the potential impact of these areas for agricultural productivity and competitiveness, and the need to diversify the general service support provided to the agricultural sector in Suriname. Activities in animal and plant health and food safety will include establishment of new legislation; policies and procedures; preparation of manuals and educational materials for farmers and staff; staff training; minor construction of border control and quarantine facilities and acquisition of supplies and equipment for inspections, monitoring, and laboratory analyses.

1.2 Ministry of Agriculture, Animal Husbandry and Fisheries Responsibilities and Facilities

LVV, which is responsible for development of plans, policies and programs in the areas of agricultural research and extension, livestock, and fisheries, will implement the Program. LVV operates crop experiment farms throughout the country and also collaborates with the Rice Research Organization (ADRON), the Center for Agricultural Research (CELOS) and the University of Suriname for plant research and extension activities. The Ministry operates a veterinary laboratory with limited capabilities in a temporary location at the LVV headquarters in Paramaribo. A new lab that was under construction at this location burned down in 2010 and has been rebuilt but is not yet operational. The veterinary laboratory performs bacteriological analyses on milk samples, parasitological analyses on faeces and some soil analyses, as well as limited analysis for avian influenza. LVV also operates a livestock farm (reportedly undergoing renovation). A temporary plant health laboratory is operating at the LVV headquarters in Paramaribo, and is mostly doing special project work at the moment. There is also a temporary food safety laboratory at LVV headquarters that has done very limited pesticide residue testing, in collaboration with the Ministry of Health's laboratory.

The Ministry provides funding and technical support to the Fish Inspection Institute (VKI) located in the port of Paramaribo and established in 2007. The Institute monitors all fish processing plants that export (except those that export directly to the US which are inspected by the FDA) and issues export permits. It operates a well-equipped diagnostics laboratory which performs various chemical and microbial tests. It plans to begin heavy metal testing and possibly organics testing in the future, depending on the acquisition of reagents and training services. The laboratory is in the process of obtaining ISO 17025 certification for some of its analyses.

1.3 Project Description

The Program objective is to help increase competitiveness of the agricultural sector through improving the capacity of animal health, plant health and food safety and agricultural innovation services. The Program will strengthen the Suriname government's capacity for managing animal and plant health, improving food safety, and designing and conducting agricultural innovation and extension services to farmers.
The five year Program, which will be executed by a Program Executing Unit in LVV, consists of the components described below. Table 1 provides a brief summary of existing LVV infrastructure and equipment, proposed new or rehabilitated infrastructure, locations of facilities and the actions that this Program will fund at these facilities.

1.3.1 Component 1, Strengthening Animal Health, Plant Health, and Food Safety

Animal Health

The proposed actions within this activities are designed to maintain and verify Suriname's sanitary status through the establishment of a disease surveillance system; improvement of animal quarantine procedures; formulation of protocols; staff training in risk assessment, new protocols, health and safety; improvement of public/private interactions; and acquisition of equipment and supplies for the recently constructed veterinary laboratory at the LVV headquarters compound in Paramaribo (which will include a specialized wastewater treatment unit for liquid biological wastes, a treatment for solid pathological wastes and operation of an incinerator for other biological wastes). Specifically, this sub-component will:

- Install an integrated information system
- Equip the veterinary laboratory and train staff – these actions will increase capability for monitoring such diseases as Brucellosis, Leishmaniasis, Newcastle, and Foot and Mouth. The necropsy unit will enable LVV to carry out more in depth diagnoses of animal diseases.
- Strengthen the disease surveillance system through inspections, disease monitoring, and risk assessment
- Establish protocols for transport of animals to importer's in-situ quarantine facilities
- Establish an animal identification and traceability system (this will involve LVV tagging all cattle initially, while the farmers will do so in the future)
- Create and early detection and response system, which will include training of inspectors
- Update regulations
- Develop education campaigns aimed at maintaining the country's diseases free status by preventing exotic diseases and motivate the notification of suspicious event; and

- Organize and operate an accreditation system for private veterinarians and inspectors.

Plant Health

This part of the Program proposes to strengthen plant health through reorganization of the plant health service, establishment of a pest surveillance and traceability system (including a risk assessment to identify potential pests; and emergency response plans); improvement of plant import regulations and export certification; improvement of plant quarantine facilities at the airport; establishment of integrated border controls; formulation of protocols; staff training; and acquisition of equipment and supplies for the plant health/quarantine laboratory (already constructed in the Paramaribo port area). An incinerator for destruction of materials confiscated at the Johannes A. Pengel Airport will be installed. Small consignments that are confiscated at the Nickerie and Albina border posts will be transported in secure containers to the incinerator at the airport. Large rejected consignments that arrive at the seaport will be returned to the exporting country, thus eliminating the need for quarantine or disposal facilities at this location.

Some minor construction and rehabilitation of existing facilities for border controls will be funded as shown in Table 1. Aerial photos of the areas where new construction will take place and that show surrounding land use (Nieuwe Haven Seaport and J.A. Pengel Airport) are provided in Figures 1 and 2. These facilities will not only serve for control of plant materials and processed foods, but will also provide control of animals/animal products.

Other activities to be financed for plant health are:

- Establishing two "low pest prevalence" for carambola fruit flies in citrus producing areas. Fruit fly control will be accomplished through use of traps. The initial area to be established will be at Alliance Plantation in Commewijne. A possible second location in the interior is being evaluated.
- Improving rice quality. LVV will operate a rice quality and certification laboratory within the newly constructed "cluster laboratory" in Paramaribo. This Program will equip the laboratory.
- Equip the Plant Quarantine Laboratory and train staff. The new laboratory will have increased capacity in detecting diseases and pests and in determining the presence of genetically modified organisms in plant materials. It will have improved capabilities in entomology, nematology, microbiology and mycology.
- National pesticide management program. The Program will finance pesticide regulation formulation; development of a registration and tracking system and institutional support to the LVV Pesticide Division for carrying out its activities, including inspection, training, licensing and enforcement of pesticide distribution and storage facilities; developing multi-media pesticide awareness campaigns; and developing internal protocols for its operations. The Plant Health Sub-Component has included $284,000 (US) in its budget for this support, including equipment and a national consultant to work under the LVV Pesticide Division Director. The institutional support may lead to the establishment of a Pesticide Management Board which would receive applications for importation of pesticides, review pesticides information and labels, grant import licenses, register pesticides imported as well as the importers, set procedures for use, disposal and application of approved pesticides, train pesticides users, applicators and distributers and, promote and monitor compliance at all stages from application to disposal.[1]

[11] LVV is receiving advice for forming the board from IICA.

Food Safety

The goal of the subcomponent is that food safety services be improved, supported by a national Food Safety Policy, updated legal framework and a coordinating mechanism at the ministerial level. Strengthening food safety will be done through the establishment of a surveillance, inspection and monitoring system, establishment of a monitoring system for agricultural inputs, improvement of the good agricultural practices program, formulation of protocols, staff training, equipment and inputs for the pesticide residue laboratory, and an assessment of the institutional framework of the agricultural health and food safety system. Specific activities include:

- Creation of a food safety entity in LVV that would be responsible for inspecting plants, meat and fish. Food safety legislation will include: registration of farms; slaughterhouse procedures; and hygiene, transport and storage of meat; standards for import and export of fresh meat; and appointment and requirements for official veterinarians (meat inspection) and meat inspection auxiliary staff.

- Development of national GAP standards and manuals (for crops, poultry, livestock, and aquaculture) that will become mandatory for producers and the development of a code of hygiene for fresh fruits and vegetables, meat processors and fish processors. Primary producers and processors will be trained in developing and implementing their food safety assurance system based on the GAP or hygiene codes.

- Development of procedural manuals for inspection of primary producers and processors. New meat and plant inspection staff will be hired and trained and 3 inspection units (plant, meat, and fish) will be equipped. The development of a quality assurance system (ISO 17020) for 2 inspection units and accreditation of the inspection units (meat and plant) are also proposed.

- Strengthening of the food safety laboratory (to be located in the newly constructed laboratory building at LVV headquarters in Paramaribo) through purchase of equipment and supplies as well as training for laboratory staff (including occupational health and safety training). Certification in ISO 17025 for relevant analyses, accreditation and validation of laboratory methodologies is also proposed. These actions will enable the laboratory to carry out more pesticide residue testing and testing or pesticide formulas to be imported into the country, as well as testing for antibiotics, among other analyses.

- Development of public awareness activities to educate the general public about food safety, as well as informing the private sector about different food testing services.

Table 1. Summary of Existing and Proposed Infrastructure and Related Investments, Component 1

Facility & Location	Area Land Use	Status	Proposed Program Actions*
Laboratories (all existing, no new construction)			
Veterinary Laboratory, LVV compound Paramaribo.	Developed area within City, surrounded by semi-industrial and recreational uses	Built, near completion. Incinerator for biological wastes purchased, not installed	Purchase equipment, train staff Install wastewater treatment unit (see Section IV) & autoclave system, install incinerator & train staff in protocols and operation.
Plant Quarantine Laboratory, Near Nieuwe Haven	Industrial port zone	Built, near completion.	Purchase equipment, train staff

Seaport			
Rice Quality and Certification Laboratory, LVV compound, Paramaribo	Developed area within City, surrounded by semi-industrial and recreational uses	Built, near completion – same laboratory building as Veterinary Lab	Purchase equipment, train staff
Food Safety Laboratory (Residue Laboratory), LVV Compound, Paramaribo	Developed area within City, surrounded by semi-industrial and recreational uses	Built, near completion (same building as veterinary laboratory).	Purchase equipment, train staff
Border Control Posts/Quarantine Facilities (new construction and upgrades to existing buildings)			
Control and quarantine facilities J.A. Pengel Airport	Industrial area within airport property, surrounded by open land and some commercial residential areas to the north.	Existing office space to be upgraded. Construct quarantine facility including incinerator	Upgrade existing office space (budget $US 50,000) and provide equipment. Construct quarantine facility and purchase and install incinerator (budget $US 100,000) (Note: details still being worked out).
Border control post, Nieuwe Haven Seaport	Industrial Port area on Suriname River in Paramaribo	Proposed construction	Construct & equip facility (budget $US 50,000) (Note: design details not final – may consist of shipping container mounted on pad)
Border control post, Nickerie Ferry Terminal	Small industrial area serving ferry traffic surrounded by agricultural land (western border with Guyana)	Existing building	Renovate existing building (budget $US 25,000) and purchase equipment for inspectors
Border control post, Police Command Post Albina Ferry Terminal	Small industrial area serving ferry traffic ….. (eastern border with French Guyana)	Existing building	Renovate existing building (budget $US 25,000) and purchase equipment for inspectors
Border control post, Zorg en Hoop Airport, Paramaribo	Small airstrip in the city with aviation facilities surrounded by residential uses	Existing building	Install equipment for inspectors

*Note that equipment purchases include items for health and safety and environmental management, such as fume hoods, autoclaves, chemical storage, hazardous waste storage, personal protective gear (see Sections IV and V for more detail).

Figure 1. Nieuwe Haven Seaport, Site of Proposed New Construction for Border Inspection and Control

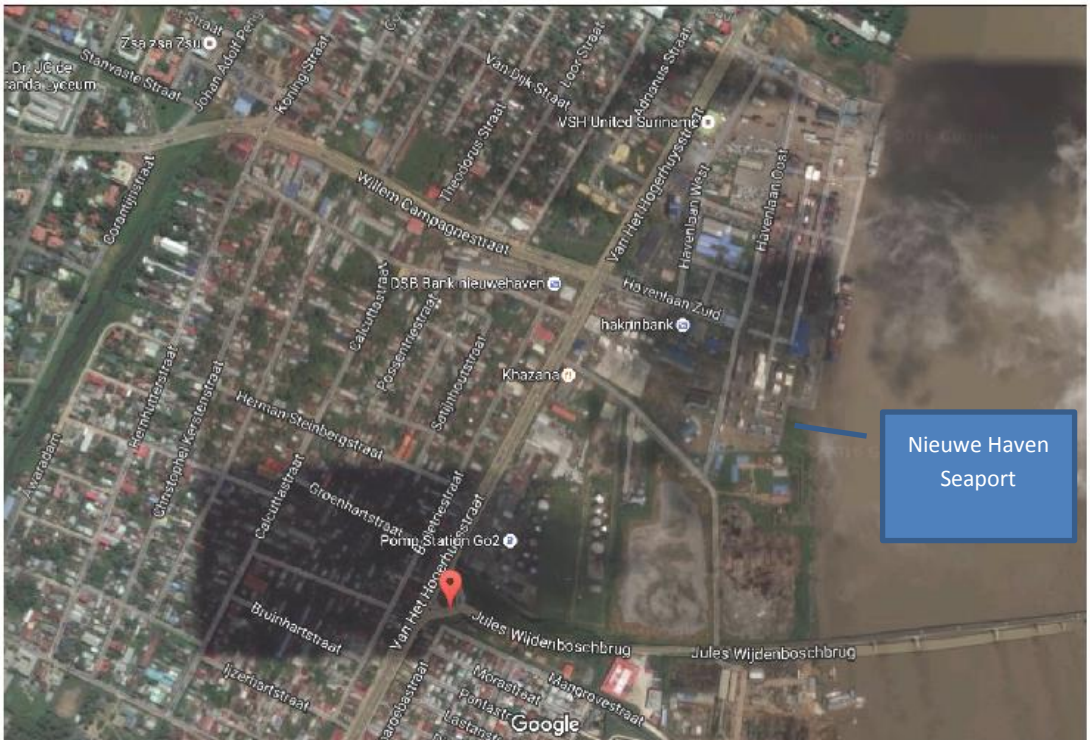


Figure 2. J.A. Pengel Airport, Site of Proposed New Quarantine Facility and Incinerator (exact location not yet determined)

1.3.2 Component 2, Strengthening Agricultural Innovation

This component will fund strategic adaptive agricultural research projects, with emphasis on validation and technology transfer implemented in collaboration with national and international research and technology transfer centers. The Program will fund seven projects:

Project 1: Strengthening of the rice sector. To reduce yield losses and production costs, as well as the widespread misuse of pesticides, this project, to be carried out by Anne van Dijk' Rice Research Organization (ADRON) and LVV, will develop IPM strategies for managing weeds, fungal diseases, insect pests and pests that are problematic during storage. The IPM strategies will be tested in farmer's fields and once they are validated, farmers will be trained in the implementation of IPM.

Project 2: Strengthening of open-field vegetable production. Yields of eggplant (boulanger), bitter gourd (sopropo), okra (oker), yard long beans (kouseband), chili peppers, tomatoes, and sweet potatoes will be improved by replacing the current, deteriorated seed stock with cleaner seed. At the same time farmers will be trained in how to save good quality seeds in order to slow down future deterioration. Improved production practices based on integrated crop and pest management will be developed, tested and promoted and may include validation of the use of bio-pesticides. Of note is that this project will work with a Maroon women's cooperative in Brokopondo in the production of chili peppers.

Project 3: *Strengthening of protected vegetable production*. In order to counterbalance the impact of climate change, agricultural production under protected circumstances (i.e., shade houses or semi-open greenhouses) will be an important solution. At the same time, the technology also helps to secure a more equal local supply of good quality vegetables year-round. 'Protected agriculture' technology is still relatively new to Suriname and requires a substantial amount of testing to determine what works best and is most cost-efficient under Surinamese conditions. The project will develop a "model" structure most appropriate for use in the country and will test year round production of lettuce and tomatoes. It will also develop Good Agricultural Practices (GAP) protocols for various crops and test heat tolerant varieties of certain vegetables. Farmers and greenhouse manufacturers will be provided with information about research results through meetings and publications.

Project 4: Strengthening citrus production. This project aims at raising yields and spreading the supply of citrus production more evenly throughout the year. Yields will be improved by developing a supply of good quality planting material; validating and introducing new, improved varieties; and by informing and training farmers in appropriate production management techniques, including planting and proper pruning. Among the production management techniques will be validation of: (a) compost formula for citrus nurseries; (b) irrigation to facilitate out of season production; and (c) the use of legume species to control weeds and capture nitrogen.

Project 5: Strengthening minor tropical fruit production. This project aims to test and validate improved varieties and seeds of passion fruit and soursop, and in-vitro slips of pineapple varieties. In addition it will promote and publish improved production techniques and provide training to

farmers in organic production and will test the use of biological pest control in passion fruit and the use of fruit bags in soursop. This project will target Maroon pineapple farmers the Marowijne district and Amerindian pineapple farmers in the Para district. The main soursop producing areas are the districts Saramacca, Wanica, and Coronie.

Project 6: Institutional capacity building. This project aims to: (a) introduce a project planning, management and evaluation culture within the Agricultural Research Sub-Directorate of LVV; (b) provide support to the newly established National Agricultural Innovation Board; (c) establish a modern media unit at the agricultural extension division; and (d) train staff. In addition, the project will provide support to LVV to improve its internal pesticide management practices at LVV extension facilities, ADRON and other institutions that participate in the Agricultural Innovation Component, as described in the ESMP in Section V.

Project 7: Funding window for small agricultural innovation projects. Part of the budget of the Agricultural Innovation Component will be invested in a funding pool for future small agricultural innovation projects. A selection mechanism will be established to secure an appropriate and efficient selection process.

1.3.3 Related Bank Projects

To support the development of the Program, a first phase of a Policy Based Programmatic Loan was approved in 2014 to support of a series of institutional and policy reforms in the agriculture sector, aimed at increasing long term agricultural growth in Suriname. A second phase is expected to be approved in 2016. The specific objectives are to develop institutional and policy reforms to enhance farmers' access to improved public agricultural and natural resources management services. The activities are playing an important role in developing new plans and legislative reforms, as well as increasing the institutional capacity to deliver key public agricultural services. The specific areas being supported by the loan are the provision of policy support for:

- Modernization of Agricultural Statistics
- Modernization of Agricultural Health (plant and animal health) and Food Safety
- Modernization of Agricultural Innovation (research and extension)
- Modernization of Irrigation and Agricultural Drainage Services
- Sustainable Fisheries Management

A Strategic Socio-Environmental Assessment was prepared for each of the two phases. Each concluded that there would be no adverse socio-environmental impacts and only minor risks that could be minimized by incorporating socio-environmental sustainability aspects into the policies under development.

1.4 Socio-Environmental Classification and Evaluation Requirements

The Inter-American Development Bank has established policy directives[2] requiring the evaluation of environmental and social impacts of projects and the development of environmental and social management plans that identify necessary measures to mitigate potential adverse impacts of proposed operations and the institutional mechanisms for carrying them out.

Following the requirements of the Bank's Environmental Safeguard Policies (OP703 and OP-765) the project team screened and classified this Program using the Safeguard Policy Filter Report. The operation was classified as category "B", based on the use and transport of small quantities of hazardous materials (laboratory reagents, pesticides) and a moderate risk of natural disasters. The screening process identified no impacts to vulnerable communities or sensitive areas and no displacement of families, and this was confirmed in the environmental analysis process. Category B operations do not require the preparation of Environmental Impact Statements or Strategic Environmental Assessments but do require the analysis of socio-environmental impacts and risks that focus on the specific issues identified in the safeguards filter report. This analysis includes the following elements:

- identification of potential environmental or socio-cultural impacts or risks, including the mitigation measures to manage them;
- analysis of local environmental and social laws and policies;
- evaluation of institutional capacity for socio-environmental management;
- development of actions necessary to avoid, reduce or mitigate the identified significant adverse impacts and risks; and
- development of an environmental and social management plan (ESMP), which included identification of institutional responsibilities, budget, schedule, and mechanisms for monitoring implementation of the plan.

Specific Bank policies that were determined to be applicable to the Program are: OP-102 (availability of documents to the public); B-OP704 (management of risks of natural disasters); OP-761 (gender equality); B-2 (compliance with country laws and regulations related to the environment, gender issues, and indigenous people's rights); B-3 (screening and classification); B-4 (other risk factors including climate change risks and institutional capacity risks); B-5 (environmental assessment); B-7 (supervision and compliance monitoring); B10 (hazardous materials); B17 (environmentally responsible procurement).

Policy B10 for hazardous materials specifically requires that operations "avoid adverse impacts to the environment and human health and safety occurring from the production, procurement, use and disposal of hazardous materials, including organic and inorganic toxic substances, pesticides and Persistent Organic Pollutants (POPs) and further states that the production, procurement, use and disposal of hazardous material and substances should be avoided whenever possible, and minimized in other cases. Further, the Bank's policy states that the use of harmful pesticides should be avoided, but where this is not possible, the least toxic pesticides should be used, and pesticide use, storage, and disposal practices should at a minimum follow the International Code of Conduct on Pesticide

[2] Environmental and Social Safeguards Policy – OP 703, IDB, Policy Document GN-2208-18, 2006

Management produced by FAO and WHO.[34] To reduce pesticide use, the Bank promotes and encourages integrated pest management (IPM).

Section VII of this report presents an explanation of how the Environmental and Social Management Plan for the Program will ensure compliance with the afore-mentioned policies.

1.5 Purpose and Content of the Environmental Analysis

The purpose of this report is to present the findings of the socio-environmental analysis; identify mitigation measures for significant adverse impacts; identify management measures for reducing risks; and develop an Environmental and Social Management Plan (ESMP) to be included in the operation's operating manual.

This report presents:

- a description of the proposed operational components and activities;
- a brief description of the environmental socio-economic and agricultural setting in Suriname;
- a summary of the institutional and legal framework for environmental and social management in Suriname that is relevant to the project;
- a discussion of potential social and environmental impacts and risks of anticipated investments and the measures to mitigate or reduce adverse impacts and risks;
- an Environmental and Social Management Plan that includes chemical, pesticide and waste management measures, execution mechanisms and responsibilities, provisions for monitoring the implementation of the plan, and a budget; and
- a description of the consultation processes with affected parties.

II. ENVIRONMENTAL AGR0-ECOLOGICAL SETTING

2.1 Location and Climate

Suriname is located on the northeast coast of South America. It is bordered by the Republic of Guyana on the west, Brazil on the south and French Guyana on the east. The country has a total land area of 166.000 km^2 and a 370 km long coastline along the Atlantic Ocean in the North.

With a tropical climate, the country has temperatures ranging from 21°C and 32°C. Rainfall averages about 320 cm per year, primarily between June and August, and again from November to January. El Nino and La Nina weather patterns affect Suriname's rainfall and storms and have contributed to coastal and river flooding.

[3] The Bank will not finance operations involving toxic pesticides as defined by the WHO in classes Ia, Ib, and II – except where adequate restrictions and sufficient capacity exist within the context of the operation for their proper and safe handling, storage and application.

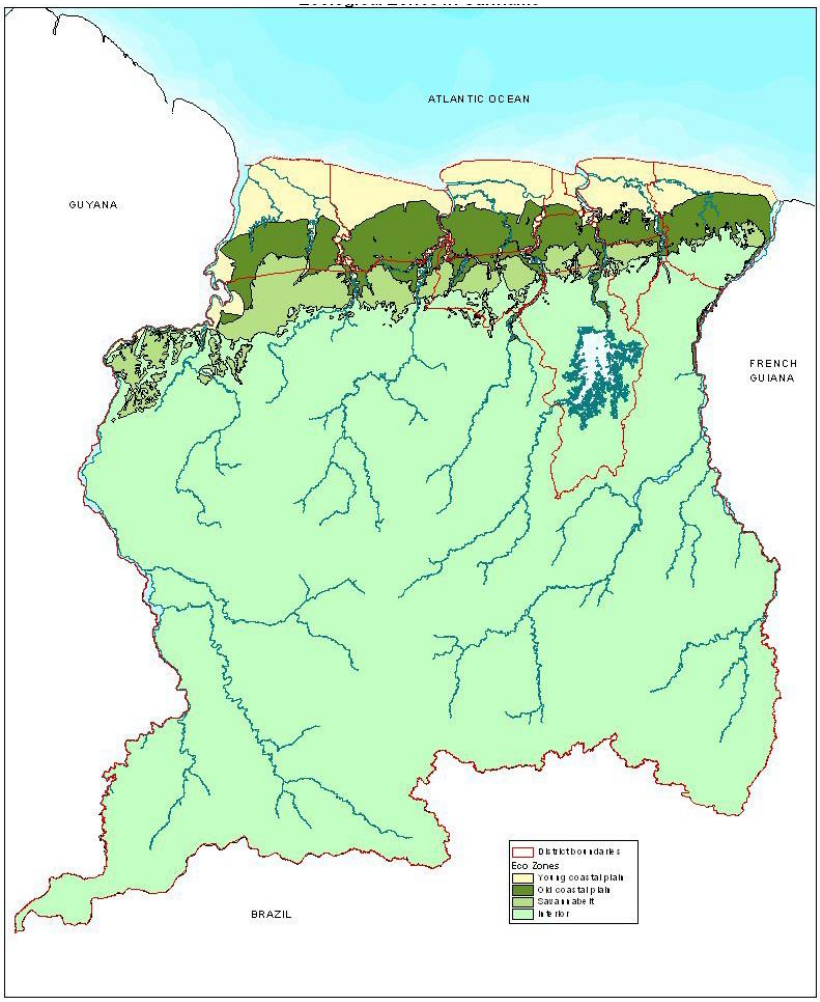
[4] Food and Agriculture Organization (FAO)/World Health Organization (WHO), International Code of Conduct on Pesticide Management, 2014.

2.2 Ecosystems

As shown in Figure 3 there are five main ecological zones in Suriname:[5]

- Marine Zone, including all off and near shore environments;
- Young and Old Coastal Plains –
  - Young Coastal Plain including coastal beaches, estuaries, mudflats, mangrove communities, and swamp and coastal forest environments; and
  - Old Coastal Plain, including higher sandy ridges, inland swamps, wetlands and forests;
- Savannah Belt (50-60 km. wide), including a mix of open grasslands, xerophytic forest, deciduous forest and rainforest communities; and
- Interior Forests, including wet tropical lowland and sub-montane forests and some massifs as high as 1,255 m above sea level, which cover about 75% of the country's land surface.

Figure 3. Ecosystems in Suriname



Source: UNDP Suriname National Biodiversity Strategy

[5] National Biodiversity Strategy, National Institute of Environment and Development & Ministry of Labour, Technology Development and Environment, UNDP Suriname and World Wildlife Fund March, 2006

Suriname's 8 major rivers and numerous fresh and saltwater wetlands provide important agricultural, social and environmental services for the country. The Corantijn River forms the border between Suriname and Guyana on the west. The Marowijne River forms Suriname's eastern border. Between them they drain over half of the country. Other major rivers include: the Nickerie in the west; the Coppename and Saramacca Rivers in the center of the country; the Suriname, which flows through the capital of Paramaribo; and the Commewijine and Cottica Rivers on the east. The Suriname River has a large dam and reservoir, which provides hydroelectric power for Paramaribo. The Nickerie and other rivers in the west provide important irrigation and drainage services, particularly for rice production.

Wetlands in the coastal zone cover an area of about 12,000 square kilometers, a third of which is permanently inundated, while the rest of the area is seasonally inundated. Brokopondo Lake, which is a man-made lake, used for hydroelectric power generation covers an area of about 1,600 km2. It discharges to the Suriname River. There are four major fresh-water wetlands. One, Nanni Zwamp, is used intensively for agricultural purposes. High water-levels in the wetlands from intensive rainfall combined poorly constructed and maintained dikes have often resulted in dike breaches and inundation of adjacent agricultural lands and urban areas.[6]

2.3 Socio-Economic and Agricultural Characteristics

Suriname is divided into ten political districts: Nickerie, Coronie, Saramacca, Wanica, Paramaribo, Commewijne, Marowijne, Para, Brokopondo, and Sipaliwini as indicated in the map in Figure 4. Of Suriname's population of over 500,000 people, about 95%, live in the coastal plains and another 5% in the interior (mostly Maroon communities and native Amerindians).

Suriname's total land area is around 15.6 million hectares. About 1.5 million hectares have agricultural potential, but less than 6% of these lands are actually being farmed. Based on the Fifth Agricultural Census 2008-09 there are 10,234 farm holdings in Suriname, of which the large majority are family farms (10,188). The remaining non-family farms, which include a few very large farm holdings, occupy about 39% of all agricultural land in Suriname.

Some 85% of the agricultural lands are located in the coastal plains.[7] These areas, largely characterized as low-lying and swampy, were diked and drained by early colonists. Only about 16% of the population is dedicated to agricultural production, with the most important activities being: rice production (80-85% of harvested cropland, concentrated mostly in the Nickerie region (there are two smaller rice production areas in the Coronie and Saramacca districts) and characterized by large farms and mechanization); bananas (a single company); and fruits and vegetables (small family farms). The main citrus (oranges, pomelos, and others) production areas are in the districts of Commewijne, Saramacca and Wanica.

Figure 4. Political Districts of Suriname

[6] Del Prado, Nancy, Analysis of instruments, principles and legal in force on domestic law of the Amazon Basin in water resources management, Methodological Protocol 2, Product 2, Suriname, 2013

[7] Roseboom, Johanne, Modernization of Agricultural Services, A Policy Analysis, 2012.

Source: UNDP Updated National Chemical Profile, July 2011

Livestock production is very limited and includes poultry, beef and dairy cattle (including water buffalo), goats and small animals. There are few cultivated or managed pastures; animals are usually grazed on fallow land and along the roadsides. Livestock production is generally found in districts of Paramaribo and Coronie. Most of the approximately 1750 farms with ruminants own less than 2 hectares of land and manage a variety of animals as well as carrying out vegetable and fruit growing. Dairy farming takes place in a large number of small farms (mostly in Wanica) as well as some medium to large farms (in Para).[8] Pork production is concentrated in some 150 farms in the districts of Wanica, Saramacca and Coronie.[9]

Women play an important role in working on the farms, both working on their own farms with other family members and to some extent as hired help. In the majority of the coastal plain districts the family farm is in most instances headed by a man and the majority of the work on the family farm is done by the man (64%). In the three interior districts- Marowijne, Brokopondo, and Sipaliwini, the situation is the opposite, with some 71% of women working on the farm. In these districts 64% of contracted labourers are also women. These districts are mainly populated by Maroons (descendants of escaped slaves) and indigenous populations, who practice small-scale agriculture mainly for their own consumption. The traditional role division in these groups is that the men are responsible for clearing the land and the women for growing the crops.[10] Traditional practice is to plant an area, and when soil

[8] LVV Thematic Fifth Agricultural Census, 2008.
[9] Vargas, Mariela, Draft Animal Health Subcomponent, V. 2, 2016
[10] Roseboom, Johanne, Draft Agricultural Innovation Component Report, September 2016.

fertility has been depleted, to abandon this area and open a new one. This practice is done on a small scale.

The fisheries industry in Suriname consists of commercial off-shore fisheries for such species as seabob (a Marine Stewardship Council certified fishery that exports directly to Europe), a bottom fish (trawling) fishery, a shrimp fishery, a yellow snapper fishery (Venezuelan fleet) and artisanal fisheries in coastal waters, estuaries and rivers. There is a very small aquaculture industry (white shrimp, tilapia, and tambaqui) in the country, composed of three major producers (one of which is reportedly closing the operation) and several subsistence farmers.[11][12]

2.4 Climate Change

Climate change can exacerbate the potential for natural disasters related to coastal flooding and increased storm surges in Suriname. It can also affect disease and pest prevalence in crops and livestock, as well as growing conditions for fruits and vegetables.

In the last several decades, coastal and river flooding has increased in scale and frequency and many tornadoes have occurred.[13] Increased coastal flooding has already damaged agricultural production in some areas and there is saltwater intrusion into agricultural lands in the Nickerie region. ADRON has reported that there has been a significant increase in the number of rice pests over the last few years and that increases in temperatures have caused problems with rice seed production (no seed formation) in some varieties. Climate change is definitely a consideration in the ADRON rice breeding program with the goals of not only increasing productivity but also resistance to pests and resilience to climate change factors.

These weather patterns are expected to continue and worsen, as climate modelling projections for Suriname predict future changes including:

- an increase in average atmospheric temperature (between 0.8 and 3.x degrees C by 2060 and 1.3 to 4.7 degrees C by 2090[14]);
- increased intensity of rain events as well as reduced average annual rainfall[15]; and
- increased sea surface temperatures.[16]
- Sea rise by between 0.18 and 0.56 meters by 2090.[17]

Suriname contributes little to greenhouse gas generation but does have potential for low carbon emission development. Agricultural activities contribute an estimated 12% to greenhouse gas emissions, but Suriname's forests act as a sink, sequestering greenhouse gases. These numbers could change if there is significant deforestation, or agriculture becomes more unsustainable.[18]

[11] Seijo, Juan Carlos, Sustainable Management of Suriname Fisheries, May 2013 and M. Vargas, personal communication 2016.
[12] Wijngaarde, Jenna, Draft Food Safety Component Investment Plan, August, 2016.
[13] Raghoebar, Hein; Country Report Suriname, United Nations Statistics Division, department of Economic and Social Affairs, 10th UN Regional Carthographic Conference of the Americas, New York, August 2013.
[14] McSweeny, C.; M. New; G. Lizcano, UNDP, Climate Change Profile: Suriname, Dec. 15, 2015
[15] Depending to some extent on El Nino and La Nina weather patterns
[16] CARIBSAVE, Climate Change Risk Profile for Suriname, March 2012.
[17] McSweeny, C.; M. New; G. Lizcano, UNDP, Climate Change Profile, Suriname, Dec. 15, 2015
[18] Ministry of Labour, Technology and Environment, Final National Climate Change Policy, Strategy and Action Plan

III. INSTITUTIONAL AND SOCIO-ENVIRONMENTAL LEGAL FRAMEWORK

It should be noted that Suriname has no comprehensive and overarching law for environmental protection and management and the institutional framework for environmental management is not well defined. However, the Constitution of 1987 lists as one of its objectives *"The creation and promotion of conditions, necessary for the protection of nature and for conservation of the ecological balance".*[19] Also, there are various laws and policies related to social and environmental issues and various institutions involved in carrying them out. Suriname is a party to numerous international conventions related to the environment, which drive many of its environmental policy efforts.

3.1 Institutional Setting for Environmental Management

A National Council for the Environment (NMR) was established in 1997 as an advisory body to the government and consists of 5 members appointed by the president and five members representing the trade and industry, unions, Amerindian and Maroon communities and consumer organizations. It is not known if the Council is active. The National Institute for Environment and Development in Suriname (NIMOS) was created in 1998 to support the NMR in implementation and research and to create national framework for environmental policy and management. NIMOS's current activities include review of environmental and social impact assessments of proposed projects, environmental monitoring and enforcement of environmental mitigation plans, and education and outreach. NIMOS is also involved in grant-funded projects related to the environment.

An Environment Section was later created in the Ministry of Labour, Technological Development and Environment (ATM), which was converted to a Directorate in 2011. NIMOS worked under this Directorate. The ATM 2012 budget did not include any funding for the Directorate or NIMOS. In 2013 the Directorate was removed from the Ministry and a National Environmental Policy Office was created in the Cabinet of the President of the Republic, which also was to oversee NIMOS. The Policy Office did not become operational until late 2015. The Office is responsible for formulating and coordinating environmental policy and environmental legislation and serves as the environmental focal point, representing the country in the various environmental conventions it is party to.[20] While officially, NIMOS, under the direction of the National Environmental Policy Office, there is apparently little coordination between the two entities. NIMOS has 9 technical staff, including the director and a number of support staff.

Additional environmental management activities and policies are under various ministries. The Ministry of Spatial Planning is responsible for protected areas and forestry management. The Ministry of Natural Resources manages water resources policy, drinking water supply (groundwater and small community drinking water systems not served by the state water company), energy resources, and mineral resources. The Ministry of Public Works manages surface water and urban drainage, conducts hydrological and meteorological monitoring, and manages sewage treatment. In the environmental

for Suriname, 2014-2021, 2015

[19] Del Prado, Nancy, Analysis of instruments, principles and legal in force on domestic law of the Amazon Basin in water resources management, Methodological Protocol 2, Product 2, Suriname, 2013

[20] Personal communication, Haydi Berrenstein, National Environmental Policy Coordinator, June 17, 2016.

arena, the Ministry of Health[21] is responsible for regulating medical waste management. LVV is responsible for pesticide management, including imports, distribution, storage and use.

3.2 Key International Environmental Accords and Corresponding National Policies and Programs

3.2.1 Kyoto Protocol to the United Nations Framework Convention on Climate Change. An inventory of CO_2 emissions has been done and a National Climate Change Strategy has been prepared (see Section 3.3.5 for more discussion of climate change policies).

3.2.2 Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade. Ratified 2000. Two pesticides have been banned by Suriname to date (Dieldrin and Monocrotophos) and the country has notified its "No consent to import" for 26 other chemicals.[22]

3.2.3 Stockholm Convention on Persistent Organic Pollutants (POPs). Ratified in 2011. A National Implementation Plan has been prepared. A National Chemical Profile was prepared in 2006 and updated in 2010.

3.2.4 Convention on Biological Diversity. Ratified in 1996. A Strategy for Biodiversity was prepared in 2006 as well as a Biodiversity Action Plan. Suriname has 16 protected, proposed for protection, and special multiple-use areas totaling over 2 million acres.[23]

3.2.5 Cartagena Protocol on Biosafety to the Convention on Biological Diversity. Suriname has developed a National Biosafety Strategy (NBF), presented in 2004, with the participation of LVV and other organizations. The NBF applies to the research, development, handling, transport, use, trans-boundary movement, release and management of Genetically Modified Organisms (GMOs). It consists of a policy and regulatory framework; an administrative system to handle requests; a mechanism for risk assessment, monitoring and enforcement; mechanisms for public participation, and a system to provide information to stakeholders. Genetically modified organisms are currently banned in Suriname.

3.2.6 Convention on Wetlands of International Importance especially as Waterfowl Habitat. (RAMSAR). Came into effect in 1985. Suriname has one site designated under RAMSAR – Coppename monding in the Saramacca region (12,000 ha.).[24]

3.2.7 Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal. Approved on February 15, 2011.

3.3 National Environmental Legislation, Policies and Practices

[21] Sometimes referred to as Public Health.
[22] Rotterdam Convention website, http://www.pic.int/, September 2013
[23] Fourth National Report to the Convention on Biological Diversity, Ministry of Labour, Technology and Environment. 2012.
[24] RAMSAR Convention website, http://www.ramsar.org/cda/en/ramsar-home/main/ramsar/1_4000_0__

3.3.1 Environmental Management and Protection Legislation

The policy of the Government of Suriname on environmental management was specified in the Government Declaration 2000-2005 and the corresponding Long-Term Development Plan 2000-2005. The plan focused on the following priority action areas[25]:

- Formulation of national regulations, standards and guidelines to comply with international regulations;
- Use of sustainable agricultural practices and reduction of pesticides;
- Formulation of national climate change regulations;
- Strengthening the waste management system;
- Promoting sustainable development of natural resources and energy; and
- Strengthening public participation systems for local communities

Despite the existence of the National Environmental Policy Office and NIMOS, there is no over-arching law for environmental management in Suriname. A draft law to establish and environment management framework was proposed in 1998 and submitted to the Council of Ministers, which then submitted it to Parliament. The law was never passed. Another version of an environmental law was prepared by the Climate Change Expert Group of Suriname[26] and submitted to the Council of Ministers in 2013. If adopted this law would incorporate climate change as a key issue and would allow the government to take steps to control climate change. The law would also establish an environmental authority and contain provisions to control environmental pollution. To date, the proposed law has not moved forward.[27] Due to the current lack of a global environmental law, there are no clear lines of authority for environmental management. There are no regulatory standards for ambient water quality, ambient air quality, or management of hazardous substances or wastes.[28]

3.3.2 Environmental Impact Assessment and Environmental Permitting

NIMOS has developed guidelines for classifying and studying environmental impacts of proposed projects (similar to those of the World Bank) and procedures for their review and enforcement of mitigation measures, but they are not mandatory. However, NIMOS reports that numerous international companies voluntarily subject themselves to the guidelines and follow the procedures, including the preparation environmental management and monitoring plans. Generic guidelines have been developed for the classification of proposed projects, and the type of environmental evaluations required, as well as specific guidelines for some sectors, including agriculture (for projects greater than 10 ha.). There are no written guidelines for evaluation of policy projects or programs, although two strategic environmental assessments have been prepared and evaluated by NIMOS (one in forestry and one on small-scale mining).

There are no laws requiring environmental permits for programs or projects (aside from permits for incinerators (see Section 3.3.4).

[25] National Biosafety Strategy for Suriname, April 2004, ATM.

[26] Made up of representatives from NIMOS, the Meteorological Office, Conservation International, and University of Suriname, among others.

[27] Personal communication Haydi Berrenstein, National Environment Policy Coordinator Cabinet of the President, June 17, 2016.

[28] There are some standards for airborne chemicals and particulates for indoor air quality in the workplace.

3.3.3 Pesticide Use and Legal Framework

Suriname does not have any pesticide manufacturers; all pesticides are imported. The levels of documented imported pesticides in 2013 included 73,144.77 kg of insecticides; 447,390.80 kg of fungicides and 277,234.00 kg of herbicides.[29]

Chemical pesticides to control pests and diseases in rice, fruits and vegetables are widely used, but also misused (i.e., higher and more frequent doses than recommended, mixing pesticides, and using prohibited pesticides).[30] Rice farmers (especially larger operations) use pesticides in a preventative manner, before a problem has even been diagnosed and LVV reports that rice farmers typically use higher dosages of pesticides than the packaging states, as well as mix various pesticides into cocktails.[31] Rice paddies and banana plantations are sprayed aerially on both large and small farms, and planes often pass directly over homes that have adjacent rice fields. Pesticides are widely available at chemical and agricultural supply businesses, gas stations, and grocery stores.[32]

The Pesticide Act of 1972 requires that all pesticide manufacturers and importers obtain authorization from LVV to import and use pesticides. These authorizations are good for 5 years. Additionally the Law of Import and Export of Goods (1999 and 2003) prohibits the import of all Rotterdam Annex III chemicals and the possession, sale and use of 33 different pesticides. Six additional pesticides are prohibited to be imported by decree and LVV is prohibiting import of 5 more. Methyl bromide is also prohibited under the Stockholm Convention. The State Order of Pesticides of 2005 classifies pesticides as to their toxicity, requires adequate labelling, specifies the use of protective clothing for pesticide applicators, provides basic requirements for storage facilities and authorizes LVV to regulate disposal of containers. There is a separate Ministerial Order on labelling as well.

A new draft pesticide law has been proposed and was approved by the Council of Ministers before being sent to Parliament. It will prohibit the sale of pesticides in grocery stores and other unlicensed facilities.

Despite the existing laws and rules, LVV lacks a system and the capacity to adequately monitor imports of pesticides. Current practice is to review MSDS submittals and labels (labels must be in Dutch) for adequacy, but Suriname does not yet have the capability to test pesticide content to confirm ingredients listed on the labels. LVV also lacks sufficient regulations and staff (there is currently one staff person in the Division) to inspect and supervise pesticide distributors or oversee pesticide use, although there are various efforts to inform farmers about pesticide risks and methods for protection.

This lack of capacity has resulted in problems. For example, two prohibited pesticides (endosulfan and lindane) were recently found in taro leaves, possibly due to incorrect labelling on the pesticide container.[33] Little information is available on how farmers use pesticides, but there have been many

[29] Abdoel Wahid, F.Z. , W. Hawkins, M. Wilson, J.K. Wickliffe, A. van Sauers, M.Y. Lichtveld. Pesticide contamination of produce and medicinal plants in Suriname: An emerging environmental health threat. Tulane University School of Public Health and Tropical Medicine, New Orleans, LA/US, 2 Department of Global Environmental Health Sciences of Tulane University School of Public Health and Tropical Medicine, New Orleans, LA/US, 3 Ministry of Agriculture, Husbandry and Fisheries in Suriname, Paramaribo, SR,

[30] Strengthening of Open Field Vegetable Production Project Description, LVV, Aug 2016.

[31] Rice Project Proposal, LVV, Aug 2016.

[32]. Personal observation and personal communication, Carmen vanDijk, October 6, 2016

[33] Wijngaarde, Jenna, Draft Food Safety Component Investment Plan, Aug. 2016.

rejections of fruit and vegetable exports to Europe due to pesticide residuals in excess of allowed limits, suggesting improper use of pesticides.[3435] There have been anecdotal reports of accidental pesticide poisonings, but no recorded data are available. No information is available as to how farmers dispose of excess pesticides or empty containers.

3.3.4 Solid, Biological, Medical and Hazardous Waste and Wastewater Management

The Ministry of Health through its Bureau of Public Health (BOG) has established general guidelines for proper management of medical wastes (which include veterinary clinic and laboratory wastes), but they are not mandatory.[36] Permits for the installation of incinerators are required to be obtained from the relevant District Commissioner (under the Nuisance Act of 1930 that applies to pollution from industrial activities) and are reviewed by BOG with input from NIMOS.[37] BOG receives routine reports from incinerator operators, but not air quality monitoring data, as there are no emissions or ambient air quality standards.

Currently, two hospitals in Paramaribo and Nickerie operate their own medical waste incinerators and the one in Nickerie accepts medical waste from outside clinics. Other medical wastes are incinerated by a private company (WASPAR), burned in barrels (especially in the interior) or disposed of at the public landfills, including the one serving greater Paramaribo - Ornamibo[38], where open burning is practiced.[39]

There are no specific national laws or regulations governing hazardous (chemical) waste treatment and disposal, nor is there capacity for treatment and disposal. A recycling company called AMRECO was involved in recycling of used/rinsed pesticide containers for a pilot project with LVV and still accepts empty, triple rinsed pesticide containers for recycling the plastic into chips. The company is now requiring certification that pesticide applicators have been trained by LVV in triple rinsing techniques.[40]

According to the 2006 National Profile prepared for the United Nations Institute for Training and Research, no separate solid waste collection is practiced and chemical household, industrial, laboratory, and construction debris are all dumped on uncontrolled municipal garbage dump sites. No separation of chemical wastes from wastewater is practiced; photo- and laboratory chemicals or others from different small scale or informal industries are disposed of into sewage system, which in some areas is composed of open channels.[41]

[34] Wijngaarde, Jenna, Draft Food Safety Component Investment Plan, Aug. 2016.

[35] Abdoel Wahid, F.Z. , W. Hawkins, M. Wilson, J.K. Wickliffe, A. van Sauers, M.Y. Lichtveld. Pesticide contamination of produce and medicinal plants in Suriname: An emerging environmental health threat. Tulane University School of Public Health and Tropical Medicine, New Orleans, LA/US, 2 Department of Global Environmental Health Sciences of Tulane University School of Public Health and Tropical Medicine, New Orleans, LA/US, 3 Ministry of Agriculture, Husbandry and Fisheries in Suriname, Paramaribo, SR.

[36] Personal communication, Mr. Algoe, Ministry of Health, June 17, 2016.

[37] “

[38] Open dump landfill serving greater Paramaribo.

[39] Tinj A Soe, Simone, Final Draft ISP, Responsible Healthcare, the Road of Policy-Making for Medical Waste Management, Paramaribo, Nov. 2013.

[40] Personal communication, Carmen VanDyk, LVV Pesticide Division Director, October 5, 2016.

[41] United Nations Institute for Training and Research, National Profile Suriname, project on “National Profile Preparation, Priority Setting and Information Exchange for Sound Chemicals Management”, 2006.

In general in metropolitan areas wastewater management consists of septic tanks and latrines for sanitary wastes (80% of wastewater in Paramaribo is managed in this manner) and direct flows to open ditches for graywater.[42]

There are no standards for air emissions, wastewater treatment or discharge quality, or ambient water quality.

3.3.5 Climate Change Management

Suriname is party to the Kyoto Protocol for the United Nations Framework on Climate Change (UNFCC). The country's 2012-2016 National Development Plan, the 2013 Second National Communication to the United Nations Framework Convention on Climate Change (UNFCCC) and the 2012-2016 Environmental Policy Plan all recognized the significance of climate change impacts on Suriname, with special emphasis on developing opportunities for low carbon emission development.[43]

Initiatives are underway by the government as a result of the 2008 Integrated Coastal Management Plan and the 2012-1016 National Development Plan (improving drainage in some areas, rehabilitating and enhancing infrastructure such as dikes) and NGOs (restoring mangrove swamps along the coast).[4445]

The most recent Suriname National Climate Change, Policy, Strategy and Action Plan for the period 2014-2021 took into account the CARICOM Liliendaal Declaration of July 2009 and the Regional Framework for Achieving Development Resilient to Climate Change of July 2009 (along with its Implementation Plan of March 2012).[46] For the agriculture sector the 2016-2021 National Climate Change Plan establishes the following objectives, outcomes and programs, assigning lead responsibility to LVV:

> ***National vision:*** *Ensure food security and food safety; establish Suriname as leader in food security in the region; promote sustainable agricultural production; establish Suriname as food producer and food supplier of the Caribbean region.*
>
> ***Climate change objectives:***
> - *Food security, safety and export is maintained and expanded in the context of a variable and changing climate.*
> - *More efficient production systems are implemented, reducing energy consumption and incorporating the reuse of already exploited or abandoned fields.*

[42] IDB, Suriname Water Supply Infrastructure Rehabilitation Su-L1018 Draft Environmental and Social Analysis/ Environmental And Social Management Framework, Aug. 2010.
[43] Ministry of Labour, Technology and Environment, Final National Climate Change Policy, Strategy and Action Plan for Suriname, 2014-2021, 2015.
[44] Conservation International, Building with Nature Coastal Protection, http://Suriname.conservation.org/projects/building-with-nature-coastal-protection/; accessed 9/18/16.
[45] Intended National Contribution under UNFCC from the Republic of Suriname, September 2015.
[46] Ministry of Labour, Technology and Environment, Final National Climate Change Policy, Strategy and Action Plan for Suriname, 2014-2021, 2015

- *Opportunities are seized for the production of renewable energy in the agricultural sector, attracting climate finance.*

Outcomes:

- *Improved knowledge of how climate change will impact on Suriname's agriculture, livestock and fisheries sectors and development of climate resilient products/techniques.*
- *Integration of climate resilience into agricultural extension services (raising awareness of farmers, pastoralists and fisherfolk on the impacts of climate change, and building capacity on how to manage impacts).*
- *Agricultural crops, livestock and fisheries are protected from water shortages, flooding and salt water intrusion.*
- *Decreased greenhouse gas emissions from agriculture.*

Programs:

- *Comprehensive national research program on social, environmental and economic baselines, climate science, vulnerability, impacts and risk management.*
- *Develop and implement law, policy and regulation to incorporate climate resilience into agriculture, livestock and fisheries management.*
- *Infrastructure development to conserve water, provide irrigation and protect agriculture from salt water intrusion.*
- *Financial support to farmers, pastoralists and fisherfolk to build climate resilience.*
- *Technological transfer program on sustainable and environmental friendly agricultural practices*

In April of 2016, Suriname signed the COPS21 climate agreement negotiated in Paris, pledging to reduce greenhouse gas emissions by 0.01 percent.

3.4 National Social Legislation

3.4.1 Occupational Health and Safety

The Ministry of Labour and Technological Development and Environment[47] is responsible for occupational health and safety legislation and inspection with broad authority to inspect and require safe workplaces, for both the private and public sectors. Its authority comes from the Safety Act of 1947 and a later law that requires employers to provide insurance for workplace health and safety problems. The Department of Labor Inspection has 60 inspectors who conduct regular unannounced inspections of work places as well as inspections in response to complaints. There is a Labor Tribunal that can levy fines for violations of workplace safety. Employers are required to provide personal protective equipment but health and safety plans are not required, although large companies generally have plans.

[47] Note that environmental functions are no longer part of this Ministry

The 1947 law excluded farming activities because most farms were small family operations. However the law would apply to agricultural laboratories.[48]

Suriname is a member of the International Labor Organization (ILO) and has ratified several conventions related to workmen's compensation, safety standards for construction, and labour inspections[49].

3.4.2 Food Safety

Suriname has no national food safety policy and no integrated food safety system, but there are activities carried out by several ministries (Health, Agriculture, Trade, and Finance) and the private sector in the area of food safety. The activities are not coordinated, leading to overlaps and gaps. The Ministry of Health has primary responsibility for inspecting processed foods and operates a laboratory for food testing. The Fish Inspection Laboratory inspects and tests fish and seafood destined for export. LVV is responsible for inspecting primary products (livestock and fruits and vegetables) but only conducts veterinary inspections. There is some overlap with the Ministry of Health inspection program. The current level of inspection and testing is inadequate.[50]

Recently an Inter-Ministerial Working Group was instituted with Bank support through its policy loan (see Section 1.2.3) to improve coordination, but it is not actively functioning. Several pieces of legislation have been drafted for draft Animal Health, Production and Welfare Act, the Veterinary Professions Act, the Slaughterhouse and Meat Inspection Act and the Animal Feeds Act. These acts were developed originally under a FAO project and were revised where necessary using resources of the IDB policy loan. The European Union is also financing some Food Safety support and there is coordination between the EU and the Bank to ensure no duplication of effort.

3.4.3 Natural Disaster Risk Management

Suriname is a member of the Caribbean Disaster Management Agency (CDEMA), a regional inter-governmental agency for disaster management in the Caribbean Community (CARICOM). Its role, in addition to assisting countries with disaster relief efforts is to facilitate and motivate its members to plan and carry out Comprehensive Disaster Management. This includes the adoption of disaster loss reduction and mitigation policies. Suriname has not submitted a Country Profile to CDEMA or any other information on its activities.[51] It has not signed on to the United Nations Sendai Framework for Disaster Risk Reduction or adopted a National Platform under the Hyogo Framework.

The National Coordination Center for Disaster Relief (NCCR) within the Ministry of Defense was created in 2006 and is tasked with planning for disaster prevention as well as response. The NCCR has participated in training offered through CDEMA and has begun: collecting data on vulnerabilities to disasters; creating an early warning system (pilot programs with UNDP support); and increasing public awareness about preparing for disasters in collaboration with other organizations including the

[48] Personal communication Dr. John Courtar, June 17, 2016.
[49] Labour Inspection Decree from 1947; personal communication Dr. John Courtar, Ministry of Labour, Technological Development & Environment, June 17, 2016.
[50] Wijngaarde, Jenna, Draft Investment Plan, Food Safety Component, August 2016.
[51] CDEMA website, http://www.cdema.org/ , accessed Oct. 24, 2016.

Suriname Red Cross and the Fire Brigade.[52] To date, no national policy for disaster prevention has been formulated.

The National Climate Change Policy, Strategy and Action Plan for Suriname for 2014-2021 has established several outcomes and action items for natural disaster management to be carried out by the NCCR:

Outcomes:

- *Improved knowledge of how climate change may influence disaster occurrences and disaster risk management.*
- *Disaster risk management considers climatic impacts.*
- *Integration of climate resilience into disaster risk management infrastructure and operations*
- *People are protected from the negative health impacts of climate-related disasters.*

Actions:

- *Comprehensive national research program on social, environmental and economic baselines, climate science, vulnerability, impacts and risk management.*
- *Awareness raising program on the impacts of climate change on disaster occurrence and methods of seeking assistance and staying safe.*
- *Develop and implement law, policy and regulation to integrate climate resilience into disaster risk management.*
- *Financial measures to increase resilience in the wake of disaster.*

3.4.4 Gender and Indigenous Populations

Suriname is party to the Convention on Elimination of all Forms of Discrimination Against Women (CEDAW) and created a National Gender Policy Bureau in the Ministry of Home Affairs, as well as an Integrated Gender Plan of Action (2001 with an update for 2006-2010). Focal Points on Gender were created in all Ministries under the Action Plan. The Multi-Annual Development Plan for 2001 to 2005 identified policies on gender for rural areas which included adult education, health care, agriculture, crafts and markets. The focus of the Bureau is to mainstream gender policies into the policies and programs of the government through each ministry.[53]

3.5 Environmental and Social Management and Institutional Capacity within LVV

3.5.1 Programs and Plans

The Ministry of Agriculture (LVV) does not have an environmental management program or plan. However, the Ministry recently created an Environmental Focal Point within the Planning Sub-Directorate in response to a request from the National Environmental Policy Office for information

[52] Karijokromo, Caitlan, Disaster Management in Suriname: The Level of Preparedness and Mitigation, Erasmus University Rotterdam, 2011.

[53] Personal communication, Ellen MÿLand, LVV Focal Point, October 5, 2016.

about LVV's environmental management procedures and initiatives.[54] The role of this position for LVV is still being defined and could play a role in the execution of this Program with technical support and training (see the ESMP in Section V).

LVV does not have a health and safety officer, policy or program, but laboratory staff are generally cognizant of the risks they face in their work and use protective personal equipment and laboratory managers are capable of overseeing compliance with the ESMP requirements as they relate to laboratory functions.

3.5.2 Waste and Pesticide Management

It should be noted that the plant and animal health laboratories are currently in very limited operation in temporary facilities. The laboratory facilities have been rebuilt after a fire destroyed a newly constructed building in 2010. The buildings are nearly completed but are not yet operational. The Fish Inspection Institute Laboratory (which is operational) has procedures in place for sterilization of biological wastes (autoclave), management of sharps, and is now collecting and segregating its chemical wastes for temporary storage until hazardous waste disposal options become available.[55]. LVV has reported that for their laboratory's veterinary pharmaceuticals, as well as some chemical laboratory wastes are sent to a private company for disposal by incineration, but it is unclear where this is being done. LVV laboratory wastewater is currently discharged to the general drainage system (ditches), except for sanitary wastes from bathrooms. However, certain chemicals that are used for analyses are collected in separate containers and stored.

LVV experimental gardens and ADRON use pesticides in their operations, including a number of pesticides classified by WHO as moderately toxic (Class II). In general, LVV facilities do not have adequate, segregated storage facilities either for current pesticide stocks or expired/obsolete pesticides. LVV reports that empty pesticide containers are triple rinsed and taken to the private recycling company, AMRECO, by some, but not all of their facilities.

With the assistance of FAO, LVV collected banned and expired pesticides across the country and placed them into temporary storage for eventual treatment/disposal. LVV reported that several containers of the obsolete pesticides were recently shipped to Great Britain for treatment and disposal, with the financial help of FAO and GEF.[56] Currently the government is looking for a secure repository for the discarded and obsolete pesticides, and other chemical wastes. FAO is also working with LVV, as well as other Caribbean Countries, to identify potentially contaminated sites and to conduct rapid assessments for prioritizing possible remediation in the future.

Under supervision from LVV, animal carcasses from public slaughterhouses are disposed of by burial or sent to a landfill after treatment with a disinfectant. Autopsy materials or animal products confiscated by customs officials or LVV are buried or a sent to a private company for incineration. General solid wastes from LVV are collected and taken to a landfill by the national waste management system.[57]

[54] Personal communication, Anand Ramkisoensing, June 16, 2016.
[55] Fish Inspection Institute Laboratory site visit, 16 June 2016.
[56] Personal communication, Carmen vanDijk, October 6, 2016.
[57] Email communication Virginia Popken, LVV, July 2016.

3.5.3 Socio-Environmental Agricultural Development Objectives

The recently developed National Master Plan for Agricultural Development in Suriname[58] contains some socio-environmental objectives, among them:

- Provision of microcredit loans for small farmers
- Establishment of agricultural resource and training centers and experimental farms in various parts of the country to improve delivery of research and extension services to farmers
- Establishment of agro-villages for poor families to include housing and farming opportunities
- Protection of forested areas by concentrating agricultural activities in existing agricultural areas
- Adoption of environmental friendly cultivation practices
- Protection of coastal resources by locating agricultural activities outside of the coastal strip

This Program will contribute to the objective of promoting adoption of environmentally friendly cultivation practices (GAP) through the Food Safety and Plant Health Sub-Components

3.5.4 Gender Social Programs and Policies in LVV

There is a designated Gender Focal Point in LVV whose responsibilities include development of gender mainstreaming policies into LVV policies and programs. To date, because of lack of resources to assist the Gender Focal Point, there are no policies or programs developed within LVV. However, a training program for extension agents and other staff on gender awareness was conducted.[59]

IV. SOCIO-ENVIRONMENTAL IMPACTS AND RISKS

The activities proposed for each of the components and activities within them were analyzed to assess the potential for both positive and adverse socio-environmental impacts and risks, with a focus on the issues identified in the Bank's Environmental Safeguard Screening report. In addition to evaluating the proposed activities, an assessment was made of LVV's current environmental and occupational health and safety management procedures and practices and one of LVV's experimental garden sites, as well as ADRON were visited to observe operations and pesticide management and storage activities. The Fish Inspection Laboratory was also visited to observe chemical management practices in the laboratory. LVV staff was interviewed and meetings were held with the Ministry of Health, Ministry of Labour and National Environmental Policy Office and NIMOS to better understand regulatory and management practices related to environmental permitting, medical and laboratory wastes, pesticides, chemical handling and hazardous wastes, and occupational health and safety.

The impacts and risks that were identified in the socio-environmental analysis are presented below and in Table 2, where risk reduction measures are also listed.

[58] Kaplan Planners Ltd., National Master Plan for Agricultural Development in Suriname, March 2016.
[59] Personal communication, Ellen MÿLand, LVV Focal Point, October 5, 2016.

4.1 Potential Environmental Impacts and Risks

No significant adverse direct or indirect environmental impacts are expected as a result of implementing the Program as described below.

4.1.1 Protected or Fragile Areas and Natural Ecosystems

No significant expansion of agricultural activities into protected areas or areas that are fragile or sensitive is likely because there is already a large supply of formerly agricultural land available and not in use. Natural ecosystems and species will be indirectly benefited from the plant and animal health programs due to increased monitoring and control of pests and diseases entering Suriname. Proposed new buildings and upgrades of existing buildings for improving food safety, plant and animal health inspections and border controls are all located in already developed industrial port, airport and ferry terminals and will not adversely impact natural ecosystems.

4.1.2 Pesticide Use

No increase in the use of pesticides is expected as a result of executing the Program. Instead, Program support to LVV for its Pesticide Management Program will contribute to better control of pesticides on a national level by strengthening regulations, inspection capacity, public information campaigns, and laboratory capability for testing pesticide residues and pesticide content. The fruit fly control program proposed under the Plant Health Sub-Component will utilize traps for luring and killing fruit flies, rather than spraying insecticides.

Implementation of the Food Safety Sub-component will promote the use of Good Agricultural Practices (GAP) among farmers. GAP standards and protocols contribute greatly to better management of pesticides on farms that are GAP compliant. The Program objective is to certify 200 agricultural farmers with more than 4 ha. of land and to certify 100 livestock farmers.

Implementation of some of the agricultural innovation projects in Component 2 will also help to reduce inappropriate pesticide use over the long term by developing and transferring IPM strategies for rice, certain vegetables, and citrus fruits. In addition, organic production will be emphasized for some fruits.

There are some minor risks due to the Program related to pesticide use during innovation projects, if pesticides are not properly stored and managed at LVV facilities, ADRON, farms, and other participating facilities. Based on data provided by LVV and on observations at some facilities, the volumes of pesticides used and stored at the facilities are very small (generally less than 5 gallons of pesticides stored in 1 liter bottles or bags per month). LVV pesticide applicators have been trained to properly mix pesticide solutions for application in the field and to apply the diluted final tank rinse to the field. Thus, the risks of releases to the environment are low and they are easily minimized by assisting LVV in improving its internal pesticide management capabilities and equipment, and in finding less toxic alternatives to the Class II pesticides currently used in many of the LVV facilities (see Table 2).

4.1.3 Hazardous Chemicals, Hazardous Wastes and Biological Materials

There are some potential environmental risks due to implementation of the Program related to the expected increase in the number of analyses to be carried out by LVV laboratories. The laboratories will

use small quantities of hazardous chemicals such as acids, bases, and toxic organic compounds and will work with potential pathogens in the Veterinary Laboratory. The increase in laboratory operations will cause a marginal increase in the generation of chemical, biological and pathological wastes over what is currently being generated. Volumes of chemicals used and wastes generated will vary with the demand for testing and the type of analyses and it is difficult to provide estimates. To provide a general idea, recent volumes of chemicals on-hand in the Food Safety (residue) lab ranged from around 500 mg of granular pesticides in 100 mg packages to 1 liter of liquid pesticide, as well as several liters of acids, bases, alcohols and organic reagents. The Nematology Department had between 1-3 liters of nematicides on hand; Entomology had fewer than 2 liters of pesticides; and Mycology had less than 1 liter total of fungicides on hand. The Vegetable Research Department had less than 1 liter of pesticides.

Of course, these volumes are expected to increase over time, with the implementation of the Program. For example, the Plant Quarantine Lab is expected to increase the number of samples tested from 85 to 140 per week. Estimates of the increase in the number of laboratory analyses in the Food Safety and Veterinary Laboratories are not available. However, volumes will still not be large and for this reason a formal Chemical Management Plan is not considered to be necessary. Nonetheless, risks related to chemical, biological and hazardous wastes will be minimized by implementation of proper management techniques that are detailed in Table 2 and in the Environmental and Social Management Plan in Section V.

Because Suriname lacks capacity for treatment and disposal of hazardous wastes and pesticides, as well as funding for sending wastes out of the country for treatment and disposal, LVV laboratories and other facilities that use pesticides will store their wastes in secure containers and secure storage cabinets. Budgets for these have been included all the components.

For the Veterinary Laboratory, a wastewater treatment unit will be purchased and installed to treat liquid wastes from the necropsy lab. This unit, manufactured by Medister, sterilizes wastewater by generating steam. It is designed to treat small batches of wastewater before discharge (this is adequate, given that wastewater from necropsies is generated only periodically). Its installation will include a 5 year maintenance contract and training for LVV operators. In addition this laboratory will install a grinder/autoclave for processing and treating small volumes of solid biological wastes. A two compartment incinerator (already purchased by LVV) will also be installed for treatment of larger volumes and sizes of biological solid wastes. Staff will be trained in incineration protocols and incinerator operation by the manufacturer.

For the J.A. Pengel Airport quarantine facility, an incinerator will be installed to treat confiscated materials brought in through the airport and the border posts. Incinerator design details have not been developed yet, but LVV will consult with CARICOM for technical assistance.

4.2 Potential Social Impacts and Risks

Positive social impacts are expected from implementation of the Program over the long term because of increased agricultural yields and resulting increases in incomes for farmers and exporters due to better plant and animal health controls. In addition, improved food safety will benefit Suriname consumers.

Implementation of IPM programs and organic production techniques will reduce farmer exposure to pesticides. Improved management of pesticides by LVV through better control of pesticide distributors,

labeling and use requirements will benefit farmers and the general public by reducing inappropriate storage and mixing practices and incorrect or inexistent labeling, thus reducing pesticide exposures to farmers and the general public.

Some Program activities will directly benefit women farmers and vulnerable ethnic groups through projects in the Agricultural Innovation Component.

No adverse social impacts from Program implementation are expected. However, there are potential occupational health and safety risks due to the increase in chemical use and pesticide use related to the operation of laboratories and the agricultural innovation projects that will use pesticides and to increased analyses in the Veterinary Laboratory. These risks are easily managed by use of appropriate safety equipment and procedures, as well as staff training. The management of occupational health and safety is discussed in the Environmental and Social Management Plan.

4.3 Program Risks Related to Natural Disasters

The Environmental Safeguards Screening found that the risks and potential severity of a natural disaster to the Program were moderate, because Program funded activities will be located in areas with high sea levels prone to coastal flooding from storm surges or high wave activity. Such natural disasters could damage infrastructure, flood agricultural lands or cause soil erosion. The Screening process indicated that a Disaster Risk Assessment that includes a Disaster Risk Management Plan may be necessary.

The proposed program activities have been analyzed to identify potential risks and severity from these possible natural disasters and the results presented below in Sections 4.3.1 and 4.3.2. It has been concluded that in fact the risks to the Program from Natural Disasters are low.

4.3.1 Risks to Infrastructure

As previously mentioned in Section 1.2.1, the Program will be funding minor construction or upgrades of border control posts in coastal areas: at the ferry terminals in Nickerie and Albina; the J.A. Pengel Airport; the Zorg en Hoop Airport, and at the Nieuwe Haven Seaport. Investments in these buildings are small (less than $50,000 for new construction), thus natural disaster damages to them would not be significant from a cost standpoint. Therefore a detailed Disaster Risk Assessment or Management Plan is not believed to be necessary.

Measures to protect the newly constructed building from flooding at the Seaport, the quarantine facility and incinerator at the J.A. Pengel Airport and the upgrades of existing buildings (where feasible) could be incorporated into the design of the building.

There are also risks to equipment (particularly laboratory equipment) that will be acquired by the Program (the buildings have already largely been constructed and it is not known if any protective measures were put into place in the design and construction of them). Analytical devices will be elevated on laboratory benches and would, therefore, not be at risk. But there are risks to the incinerator to be installed at the airport and the Veterinary Laboratory and to the wastewater treatment unit at the Laboratory. Measures to protect them from potential for flooding should be incorporated into plans for installation of this equipment.

4.3.2 Risks to Agricultural Activities

As far as specific agricultural production activities, the Program is funding small-scale innovation and technology transfer projects in rice, citrus, minor fruits, open field vegetable production, and protected agriculture. Because of the small scale (demonstration or pilot projects) of these innovation projects being directly financed by the Program, no Disaster Risk Assessment or Management Plan is needed. However, it is recommended that because the projects are largely located in flood-prone areas, that flood risks are considered when developing new agricultural, aquaculture or livestock production techniques that will be transferred to farmers.

4.4 Program Risks Related to Climate Change

The Program will contribute to meeting many of the objectives of the National Climate Change Policy, Strategy and Action Plan including food security and safety and more efficient production systems.

Increased risks of new pests and diseases is one of the effects of climate change. The Program will contribute to controlling new pests and diseases through the monitoring, tracking, early warning, and control systems being put in place for Animal Health and Plant Health. Inspections of imported livestock and foodstuffs, as well as tracking livestock on farms through the registration and traceability programs, will help detect potential problems early and trigger actions to prevent their spread.

The Program will also be developing and transferring sustainable agricultural practices through implementation of GAP techniques, IPM and other approaches, which will contribute to the action item in the National Climate Change Policy, Strategy and Action Plan for the technological transfer on sustainable and environmental friendly agricultural practices.

The Innovation Component is addressing climate change through its Protected Agriculture Project, which will design an ideal model greenhouse/screen house and develop appropriate production practices to help the agricultural sector with controlling production to counter the effects of climate change.

It is recommended that the Innovation projects to be funded through the small projects open window be encouraged to incorporate aspects to respond to climate change effects. Suggested criteria are presented in Section 5.2.5.

Table 2. Key Socio-Environmental Risks and Proposed Risk Reduction Measures

Activity	Potential Environmental Risks and Risk Level	Potential Social Risks and Risk Level	Proposed Risk Reduction Measures
Component 1. Plant and Animal Health and Food Safety			
Short term construction/upgrade of border control points (new construction Nieuwe Haven Seaport; upgrades: Nickerie & Albina Ferry terminals	Minor construction impacts – dust generation, waste generation. Minor impacts due to small scale of construction and sites located in already developed port areas. Note that Nickerie ferry terminal is surrounded by agricultural land.	Moderate risks to construction workers during construction activities (accidents from tools, possible falls from ladders, exposure to small amounts of paints and other materials	Apply standard environmental construction management practices: dust control, disposal of construction wastes in municipal landfills. No special management plan needed. Apply standard construction safety measures and use of PPE (hardhats, steel toed boots, work gloves, etc.)
Establishing Low Pest Prevalence Areas for Carambola Fruit Fly via fruit fly control programs	Positive long term environmental impact, as trapping will be used, eliminating the need for spraying campaigns	Reduced risks for farmworkers and surrounding communities by avoiding insecticide spraying Low risk to staff replacing baits/insecticides in traps & to public if trap is interfered with	Use chemical resistant gloves (thick latex or Neoprene) and goggles for liquid baits Conduct public awareness campaign and/or warning signage where public access is possible
Pesticide management program in Plant Health Component	Positive long term indirect environmental impacts due to better regulation and control of pesticide imports, distribution, use, storage and disposal	Positive indirect social impacts due to expected reduction over time in pesticide residue in food, lower risks of exposure to pesticide applicators	Pesticide Program should follow the principles of the International Code of Conduct on Pesticide Management (FAO and WHO)
Operation of laboratories: increase in number of analyses and therefore in the use of small quantities of hazardous materials (chemical reagents, pesticides) and generation of hazardous wastes in laboratories (plant, food safety, rice quality, animal health)	Potential for environmental contamination if chemicals are not properly stored or are disposed of improperly. Risk is small due to the small volumes of chemicals to be used.	Potential health and safety risks to laboratory staff if appropriate controls and procedures are not in place. Note that certifications in ISO 17025 are proposed for the plant & food safety laboratories and are underway for the Fish Inspection Laboratory, which will help develop some protective management procedures.	Continue to implement current procedures to collect toxic reagents and byproducts rather than pouring in drain, and ensure that containers are adequately labelled and stored. Ensure that laboratories have adequate chemical storage and hazardous waste storage facilities (as there is no hazardous waste treatment or disposal in country) Ensure that laboratories have adequate engineering controls and equipment to protect worker health such as laminar flow hoods, emergency showers and eyewashes. Conduct occupational health and safety training for laboratory staff
Development & application of mandatory GAP standards	May have positive long-term & indirect environmental impacts if standards	Positive long term social impacts for consumers due to improved food	

	related to environmental sustainability are incorporated (such as management of soils, fertilizers, water, animal welfare, waste management, etc.) and farmers adopt them.	safety from farm to processing Positive economic benefits to farmers and food processors for reduced rejections of exports due to sanitation problems	
Possible increase in generation of pathological wastes in veterinary laboratory	Potential high environmental risk if not properly managed, depending on type of pathogen, but very small volumes of waste materials expected.	Potential high risk to laboratory staff from exposure to pathogens	Ensure adequate treatment of all biological wastes via use of autoclaves, incinerator, on-site wastewater treatment system. Provide health and safety training for laboratory staff as well as training in waste management, including operation of treatment facility and incinerator
Increased inspections of agricultural products and livestock and generation of waste materials that are confiscated	Positive long-term indirect environmental impacts due to improved detection of possible pests, diseases and potentially invasive plants that could adversely affect local wildlife and ecosystems. Increase in generation of waste materials with associated risks of environmental contamination from improper disposal of confiscated plant materials, livestock or food products.	Positive economic impacts for farmers, fishermen and exporters. Reduced risks for farmers from new pests and diseases Risks to inspection staff from exposure to potential pathogens, or physical risks during inspection (such as container soybean shipments – confined space entry)	Provide occupational health and safety training and adequate personal protective equipment to inspectors, as appropriate for their activities and risks. Ensure that new protocols for managing confiscated materials are applied (incineration for small quantities of plant materials, secure transport of confiscated materials to incinerator at Paramaribo airport; controlled burning and burial of diseased animal carcasses). Select burial sites to avoid contamination of surface or groundwater, wherever possible. (Note that water table is high along the coastal area – but there is no other adequate solution at this time (i.e. no central quarantine facility)... Ensure that an adequate incinerator for the J.A. Pengel Airport is installed, considering capacity needs, waste streams to be treated and air emissions controls. Ensure that purchase/installation contract includes assistance with development of protocols, operator training and at least 5 years of maintenance.

Component 2. Agricultural Innovation Projects			
All innovation projects	Positive long-term impacts from transfer of IPM techniques for rice & vegetable production and organic production techniques for fruit production.	Positive long-term social impact for women's agricultural cooperatives for producing chili peppers and Maroon and Amerindian communities (especially women) producing fruit Positive long term economic impacts for farmers if improved varieties, seed selection and production techniques are adopted	Ensure that IPM or organic production techniques are carried out in currently identified projects and in small projects window.
	Possible direct risks from inadequate use and storage of pesticides at experiment stations involved in technology development ,if not properly managed	Potential risks to farmers or surrounding communities from pesticide applications, aquaculture projects that discharge wastewater, etc.	Ensure that facilities and farmers involved in research and demonstration projects have adequate storage facilities and adequate pesticide management practices, equipment and PPE in compliance with FAO Pesticide Guidelines for PPE. Ensure that farmers receiving extension services for the projects are trained in proper pesticide handling.
	Potential long-term indirect risks from an increase in the generation of plastic and other wastes greenhouse/shade house construction if suitable, long lasting materials are not used and unwanted materials are improperly disposed by farmers.		Ensure that in development of model greenhouse longevity of materials is considered to reduce the need for frequent replacement.
	Potential environmental risks if small as yet unidentified projects could cause or lead to eventual environmental damage (soil erosion, forest clearing, filling of wetlands, introduction of invasive species; etc.)		Incorporate into project selection criteria social and environmental sustainability measures such as: promoting organic production; developing and transferring IPM; improving animal welfare; benefitting women and/or vulnerable cultural groups; leading to fair trade certification. Establish a project selection criterion that no project may cause significant adverse environmental or social impacts or risks.

V. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

5.1 Purpose

The purpose of the Environmental and Social Management Plan (ESMP) is to establish principles and procedures of socio-environmental management to ensure that all Program activities have the necessary social and environmental safeguards to prevent or minimize adverse impacts and risks, and to promote social and environmental sustainability in the short and long-term. Implementation of the ESMP will ensure compliance with Bank and local environmental policies, as well as international norms.

5.2 Risk Reduction Measures

As there have been no identified adverse environmental or social impacts, but only risks to the environment and human health, the ESMP specifies measures to reduce risks and ensures that the Program budget is sufficient to accomplish this. Environmental management equipment and health and safety equipment and supplies, as well as necessary training in environmental management and occupational health and safety have been specified in the plans and budgets of the components during the preparation of the Program. Therefore, the risks will be managed in accordance with the risk reduction measures listed in Table 2 and as detailed below.

5.2.1 Construction Criteria for Border Control, Port and Airport Facilities

Despite the fact that the investments in infrastructure are very small, designs and construction should include protective measures to protect structures against flooding, wherever possible. In addition construction contractors should be required to comply with all applicable workplace safety requirements of the Ministry of Labour.

5.2.2 Chemical Substances and Hazardous Waste Management

Each laboratory will be responsible for development or improvement of existing procedures for properly managing laboratory chemicals and the resulting hazardous wastes to prevent environmental contamination. This will include:

- developing written, posted procedures to collect hazardous reagents after use, rather than pouring them into drains;
- determining the most appropriate recipients for used reagents;
- ensuring proper labeling to facilitate future treatment and disposal;
- maintaining a registry of used reagents; and
- ensuring proper storage of used reagents, particularly separation of incompatible materials.

The Residue Laboratory will ensure proper management of pesticide standards and any pesticide products received for testing, including adequate storage of chemical reagents, . In addition, it will establish sampling protocols and tracking methods to maintain control and quality of all samples and analyses.

The Veterinary Laboratory will install the specified wastewater treatment unit and ensure its proper operation and maintenance. It will develop written protocols for managing potentially pathogenic wastes, procedures for autoclaving and incineration, and operation of the wastewater treatment unit. In addition, mechanisms for ensuring proper maintenance of autoclaves and the incinerator will be developed and implemented. Staff will be trained in proper operation of the equipment.

Written protocols will be developed for managing treatment and disposal of confiscated materials and transporting confiscated materials from border posts and quarantine facilities to prevent release of potential pests or diseases and avoid environmental contamination. Operating procedures for incineration will be developed and operators will be trained to operate the incinerator to be installed at the J.A. Pengel Airport (training by the manufacturer must be be included in the purchase contract). The purchase contract for the incinerator should include at least 5 years of maintenance. Design parameters and siting of the incinerator must take into account capacity needs, wastestreams to be treated and control of air emissions (given that there are residential land uses in the area).

Each laboratory will ensure that adequate hazardous materials storage facilities are installed (cabinets, special rooms, etc. as appropriate). Signs will be installed on storage facilities indicating their contents and they will be locked.

5.2.3 Pesticide Management in LVV and Related Facilities

LVV must ensure that all of its extension facilities involved in the Program, as well as ADRON and other involved facilities that will be using pesticides in the Agricultural Innovation Component apply appropriate management techniques and have adequate mixing and storage facilities that comply with Bank policies and the International Code of Conduct on Pesticide Management. In addition, LVV and ADRON should serve as models of good pesticide management for farmers. Provisional funds have been included in the Agricultural Innovation Component budget (Institutional Strengthening Project) for this purpose. Therefore, LVV will:

1. Conduct inspections of existing pesticide mixing and storage facilities to evaluate their adequacy (i.e. ventilation, temperature controls, control of access – humans and animals, impermeable floors, lighting, shelving, labels and signs, fire extinguisher, location, emergency eyewash/shower, etc. as appropriate) and interview pesticide managers regarding mixing and application procedures currently used (including the use of PPE).
2. Evaluate if training for pesticide applicators is needed and develop a training plan and budget.
3. Develop an action plan for improving facilities as necessary for currently used pesticides, used pesticide containers and unusable pesticides).
4. Implement needed improvements to facilities (general housekeeping and organization, new pre-fabricated outdoor storage facilities, retrofitting of existing structures, etc.).
5. Ensure that adequate PPE is available and is used by pesticide applicators (including staff replacing bait and insecticide in fruit fly traps). Develop a list of PPE needed and a budget for acquisition.
6. Develop a plan for substituting lower toxicity pesticides to replace those Class II Moderately Toxic pesticides currently in use at LVV facilities.
7. Develop a plan for monitoring compliance at LVV and ADRON and other participating facilities to be implemented over the length of the Program.

5.2.4 Occupational Health and Safety

Training

All laboratory staff that handle chemicals or biological materials and all inspection staff will receive Occupational Health and Safety training tailored to their job activities and their types of risk or exposure. This training should be completed in Year 1 of the Program or prior to beginning operations. Evidence of this training will be provided to the Bank. It is recommended that supervisors also attend the training.

PPE

Personal protective equipment shall be acquired for all laboratory and inspection staff, as appropriate to their job activities and risks of exposure. Staff will be trained in their use as part of the Occupational Health and Safety Training activities and laboratories and inspection supervisors will establish protocols for their use. PPE shall include as necessary: goggles or face shields; chemical resistant gloves; disposable protective coveralls; appropriate foot wear; respirators for chemical vapors; dust masks for risks of breathing dust particles, head protection; and vapor and/or oxygen/CO^2detectors for inspectors in the event of inspections of potentially fumigated shipments or confined space entries.

Laboratory Safety Engineering Controls and Emergency Safety Equipment

Equipment for ensuring the health and safety of laboratory workers will be installed in all laboratories. This includes such equipment as: laminar flow or extraction hoods, depending on the analyses to be performed; emergency showers and eyewashes; and fire extinguishers. This equipment is already listed in Component 1 budgets.

5.2.5 Criteria for Small Project Window

To avoid selecting projects that could cause direct or indirect adverse environmental or social impacts, the following criteria should be incorporated into project eligibility and selection criteria.

Eligibility Criterion: No project that may cause significant adverse environmental or social impacts or risks will be selected.

Selection Criteria: Projects should incorporate social and environmental sustainability measures wherever possible such as:

- Promotion of organic production
- Development of IPM techniques
- Improvement of animal welfare
- Improvement of soil fertility, water resources management
- Providing benefits to women and vulnerable ethnic groups
- Addressing resilience to climate change, including but not limited to:
    - selection and breeding of crop and animal varieties suitable to new climate regimes;
    - building awareness in the agricultural community about how to use climate information in land preparation, harvesting and pest control; and

- development of new agricultural approaches for conservation such as agroforestry for plant and animal production.

5.3 Compliance with Local Environmental and Health and Safety Requirements

Management of potentially pathological and biological wastes from laboratories and border control posts must comply with Ministry of Health guidelines for medical waste treatment.

Installation and operation of incinerators for treatment of confiscated items at border crossings and for the Veterinary Laboratory will require permits from the relevant District Commissioner. Obtaining these permits will be the responsibility of LVV. Evidence that permits have been obtained and that any permit conditions are being complied with will be provided to the Bank.

LVV managers overseeing the activities of food safety, animal and plant health inspectors and laboratory staff must ensure that their staff comply with Ministry of Labour policies for health and safety in the workplace.

This EA and ESMP meet the spirit of Suriname's voluntary environmental assessment guidelines that were established by NIMOS.

No other environmental permits are believed to be required as there is no environmental permit system in place.

5.4 Plan Implementation

Several Sub-Directorates of LVV will have responsibility for implementing specific measures of the ESMP, which will be incorporated into the Operating Procedures of the Program. A Project Execution Unit (PEU) will be established within the LVV Planning Sub-Directorate to execute of the Program. The PEU will include a half time environmental consultant for two years to monitor the ESMP implementation in coordination with the other LVV divisions, as shown in Table 3. The Environmental consultant will work closely with the LVV Environmental Focal Point in developing the monitoring and reporting approach and in training that person to take over the monitoring and reporting responsibilities after year 2. Funding has been incorporated into the administrative budget of the PEU for training the LVV Environmental Focal Point in hazardous materials management and in environmental management and compliance monitoring. This will help to strengthen future in-house environmental management in LVV, potentially leading to an environmental management plan and program for the entire Ministry.

The Environmental Consultant will be qualified in hazardous materials management and pesticide management, and will have an understanding of health and safety management. In addition the consultant must have good management skills and good communication skills. Terms of Reference for this position are provided in Annex A. The Program Manager in the PEU will supervise the work of the Environmental Consultant.

Responsibilities for carrying out environmental and health and safety measures for managing risks are summarized in Table 3.

Table 3. Responsibilities for ESMP Implementation

Responsible Unit	Tasks
Environmental Consultant in PEU/LVV Environmental Focal Point	1. Carry out overall supervision of the implementation of the ESMP in coordination with LVV counterparts. 2. Work closely with the LVV Environmental Focal Point to provide on-the-job training, facilitate training courses and acquisition of needed equipment and supplies. 3. Verify that permits for incinerators are obtained from District Commissioners and that any required conditions are met. 4. Set up coordination mechanisms for receiving input from laboratories and inspection supervisors regarding implementation of relevant ESMP measures and conduct periodic inspections to verify compliance. 5. Conduct periodic visits to laboratories and border posts to verify compliance with the ESMP as needed. Coordinate with the LVV Pesticide Division to ensure implementation of pesticide management measures within LVV under the Agricultural Innovation Component. 6. Participate in selection process for the Small Projects Window to be funded in the Agricultural Innovation Component to evaluate potential adverse environmental or social impacts and to apply the socio-environmental selection criteria. 7. Provide input for reporting to Bank on progress of ESMP implementation.
Laboratory managers	1. Ensure that necessary storage facilities for reagents and chemical wastes are installed and used. 2. Establish protocols for handling of waste reagents, organic pathological wastes and contaminated laboratory materials. 3. Ensure that engineering safety measures and equipment are installed (fume hoods, laminar flow hoods, emergency showers and eyewashes, fire extinguishers, etc., as needed for the types of analyses being performed. 4. Ensure that waste treatment equipment is installed (autoclaves, incinerators, wastewater treatment unit at Veterinary Lab), as identified in proposed budgets. 5. Arrange for occupational health and safety training for staff that handle chemicals and pathological wastes and ensure that incinerator operators receive appropriate training in management protocols and incinerator operation. 6. Ensure that laboratory staff have the necessary PPE. 7. Report progress on implementation of environmental and health and safety measures to LVV Environmental Focal Point.
Supervisors of plant, animal and food safety inspectors	1. Arrange health and safety training for inspectors regarding risks & PPE use. 2. Ensure that inspectors are provided with the necessary PPE appropriate to the types of inspections they will be doing. 3. Ensure that there are written protocols and records for management of confiscated materials and animals to avoid environmental contamination and that incinerators are installed for treatment, as necessary. Ensure that staff are trained in protocols and incinerator operation. 4. Monitor compliance with protocols and report information to Environmental Coordinator in PEU.

LVV Pesticide Division	Conduct evaluation of pesticide handling and storage facilities at LVV extension facilities, ADRON, and other involved facilities in Innovation Component and ADRON & develop pesticide management protocols and action plan and budget that identifies needs for improvement (i.e., retrofitting storage & mixing facilities, pesticide applicator training, acquisition of PPE). Oversee implementation of the action plan & conduct periodic checks on facilities for compliance. Develop a plan for substituting less toxic pesticides for Class II pesticides currently used in LVV facilities.

5.5 Monitoring and Reporting

The Environmental Consultant in the PEU and later the LVV Environmental Focal point will be responsible for monitoring and reporting to the Bank on compliance with this ESMP. Monitoring will include ensuring that:

- Permits for incinerators have been obtained and incinerators are installed and operating and staff have been trained in their operation;
- Pesticides are being properly managed and storage facilities are adequate at LVV facilities and ADRON (or other facilities) where pesticides are used for Innovation Projects and for fruit fly control;
- Occupational Health and Safety Training has been provided to laboratory staff and inspectors;
- Laboratories have been equipped with necessary health and safety equipment;
- The Veterinary Laboratory has installed an autoclave/grinder system and a wastewater treatment unit for liquid organic wastes, and the incinerator and are trained in their proper operation; and
- Laboratories and border control posts are properly managing chemicals and biological wastes.

5.6 Budget

Budget resources needed for implementation of the ESMP are shown in Table 4 and have already been incorporated into the Program budget in the technical Components and the administration budget for the PEU. Since the veterinary and plant health laboratories are already functioning to a limited extent, the budgets take into account existing equipment and supplies

Table 4. Budget for ESMP Implementation

Activity/Mitigation Requirement	**Estimated Cost($US)**
Quarantine incinerator for treating confiscated materials, J.A. Pengel Airport	$100,000 (Included in Plant Health Sub-Component for quarantine facility)
Veterinary Laboratory Biological waste management: wastewater treatment unit, autoclave/grinder and incinerator training. Health and Safety equipment and PPE	 $665,274 $153,425

	(Incinerator already purchased with LVV funds. Cost of wastewater treatment system, autoclave/grinder and other environmental controls included in Animal Health Sub-Component budget)
Plant Laboratory, environmental controls, health and safety engineering controls/equipment & PPE	$8,300 (Included in Plant and Animal Health and Food Safety Component Budgets)
Food Safety Laboratory environmental management & health and safety equipment & PPE	$25,578
Personal protective equipment and supplies for inspectors	$21,200 Included in Plant and Animal Health and Food Safety Component Budgets
Occupational Health and Safety Training laboratory staff and inspectors	$22,000
Development of laboratory protocols for chemical and biological management	No cost, part of normal workload. Note that for laboratories planning to certify in ISO 17025, consultant costs for developing most of these protocols are included in Component budgets.
Improvement of pesticide management practices and storage facilities at LVV/ADRON facilities involved in Innovation Component (training, PPE acquisition, storage facility retrofit/construction/purchase	$250,000 (included in Agricultural Innovation Component, Institutional Strengthening Project)
Environmental Coordinator (consultant) in the PEU to oversee ESMP implementation	$36,000 (Included in administrative budget for PEU, plus administrative supplies)
Training in hazardous materials management and environmental management & compliance auditing for LVV Environmental Focal Point	$4,000 (Included in administrative budget for PEU)
Supplies for LVV Environmental Focal Point	(Included in administrative budget for PEU)
Total expenditures related to environmental management and health and safety	$1,285,777

5.7 Additional Recommendations

This section presents some recommendations related to improving socio-environmental management within LVV that are beyond the scope of the Program and this ESMP.

Because the current practice of burning and then burying diseased animals that are in in-situ quarantine facilities presents risks to the environment and potentially human health, it is recommended that in the future, if imports of animals increases significantly LVV install a centralized quarantine station(s) that would include safer treatment options.

It is recommended that LVV develop ministry-wide environmental management and occupational health and safety programs that would identify goals and objectives, identify problem areas and risks, develop action items and prioritize them, create staff training plans, and prepare budgets for their implementation. Occupational health and safety training should be ongoing and periodic for existing as well as new staff members.

VI. PUBLIC CONSULTATION PROCESS

The Bank requires consultation with affected parties to ensure that they have an opportunity to comment on the Program. In this case affected parties include: farmers; food processors; fishermen; food, fish, agricultural and livestock importers and exporters; agricultural supply businesses; butcher shops; and the general public that will benefit from improved agricultural products and food safety.

6.1 Stakeholder Involvement to Date

Leading to the development of Component 1, LVV carried out various activities related to animal health with stakeholders. Farms were visited by LVV staff in 2015 to begin establishing a registry for incorporating data into the information system to be used to trace animals. During the preparation of the Food Safety Sub-component the Association of Exporters of Agricultural Products of Suriname was consulted to identify concerns and needs.

For Component 2- Agricultural Innovation, LVV held five stakeholder meetings in July of 2016 to obtain farmer input in developing the five proposed innovation projects. These meetings involved individual farmers, representatives of agricultural cooperatives and associations, and food processors. Meetings and their related topics are summarized in Table 5.

Table 5. Stakeholder Meetings, Innovation Component

Date	Subject of Meeting	#Attendees*
7/11/16	Citrus	26
7/11/16	Open Field Vegetables	63
7/11/16	Minor Fruits	55
7/12/16	Protected Agriculture	15
7/20/16	Rice	15

* Includes LVV staff

6.2 Planned Public Consultation

In addition to the stakeholder consultations already realized, the EA report and ESMP will be made available for review and public comment on the Bank's website (in English) and on the LVV website in Dutch. The LVV Coordinator of Public Relations will post the report and a separate short public information sheet on the LVV website and will announce its availability on the LVV Facebook page, as well as issuing a press release. At the same time, LVV will notify directly certain Ministries, stakeholders (agricultural and food processor associations), and the Office of National Environmental Policy and NIMOS. The public will be able to comment on the report and ESMP via the LVV Facebook page. The comment period will be open for about 3 weeks. Comments received will be reviewed and any substantive, significant comments will be addressed in a final version of the EA/ESMP, which will again be posted on the Bank and LVV websites. The ESMP will be incorporated into the Operating Program, which will be translated into Dutch in the future.

VII. CONCLUSIONS, CONSISTENCY OF PROGRAM WITH BANK SOCIO-ENVIRONMENTAL POLICIES

As a result of the analysis of environmental and social impacts and risks, it has been concluded that there will be no significant adverse environmental or social impacts, but there will be risks associated with the use of small volumes of chemicals in LVV laboratories and resulting generation of small quantities of hazardous wastes, as well as biological wastes. These risks are easily managed by implementing the ESMP and a special chemical or pesticide management plan is not necessary. There will not be any adverse impacts from the construction of new or upgraded quarantine or border posts, given the small footprint of these buildings and that they are all located in existing port, airport and ferry terminals.

Expected impacts of the Program will be positive for both social and environmental factors, given the benefits to farmers and to the Surinamese population because of increased agricultural productivity, improved food safety, and reduction in the use of pesticides. The Program's support for the national Pesticide Program will assist LVV in better controlling pesticide imports, distribution, use and disposal. The Program will also strengthen the environmental management capacity of LVV through technical assistance (consultant contracted), on-the-job training and training courses for management of the ESMP.

The findings of the EA are consistent with the findings of the Safeguards Screening Report. Risks from Natural Disasters, although high in general for the Country, are not considered to be significant for this Program and despite the original determination of a Moderate level of risk for Natural Disaster, the actual risk in terms of investments is low. Implementing the ESMP for this Program will comply with Bank policies and be consistent with the spirit of NIMOS voluntary environmental assessment and mitigation guidelines.

Specific Bank policies that were determined to be applicable to the Program are shown in Table 6, along with an explanation of how each is addressed in this environmental and social analysis to ensure Program compliance.

Table 6. Program Compliance with Bank Policies

Policy	Program Compliance
OP-102, Availability of Documents to the Public	Section VI presents summary of already completed consultations with stakeholders and plan for making the document available for public comment
OP704, Management of Risks of Natural Disasters	Risks of Natural Disasters and an assessment of the level of risk are presented in this report in Section 4.3. Because investments in infrastructure are very small a detailed Natural Disaster Risk Assessment or Management Plan is not necessary. Construction and upgrades of border control facilities should incorporate mechanisms for flood resistance in their designs where possible, as stated in the ESMP
OP-761, Gender Equality	Data on women's role in agricultural activities is provided in Section 2.3 and assessment of impacts on women in Section 4.2. No adverse impacts to women are anticipated as a result of Program implementation; in fact at least one women's cooperative will be direct beneficiaries of one of the

	Agricultural Innovation Projects. No special provisions for ensuring gender equality are necessary for this Program.
B-2, Compliance with Country Laws and Regulations	Section 5.3 of the ESMP outlines the requirements for compliance with country laws and regulations. By implementing the ESMP, the Program will ensure compliance and consistency.
B-3, Screening and Classification	As documented in Section 1.4, the Program was screened and classified using the Safeguards Screening Form. The EA was carried out in compliance with the classification as a Category B operation and the ESMP ensures that the Bank policies identified as applicable to the operation were specifically addressed.
B-4, Other Risk Factors	The EA addresses risks due to climate change in Section 4.4 and makes recommendations in the ESMP for incorporating criteria related to climate change into the proposed research and demonstration projects in Component 2, Agriculture Innovation Projects.
B-5, Environmental Assessment	A socio-environmental analysis was carried out for the operation and the results presented in this report.
B-7, Supervision and Compliance Monitoring	Requirements for supervision and monitoring and reporting of the implementation of the ESMP are included in Section 5.5. In addition a budget is included to provide resources for carrying out these activities.
B-10, Hazardous Materials	Use of hazardous materials and generation of hazardous wastes are described in Section 4.1.3. Management of hazardous materials is addressed in the ESMP in Section V.
B-17, Environmentally Responsible Procurement	Construction activities included in the Program are very small and do not represent much opportunity for environmentally responsible procurement. Equipment to be acquired for plant, animal and food safety inspectors and laboratory operations are highly specialized and the number of providers limited. Again, this does not present opportunity for environmentally responsible procurement.

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ANNEX A. TERMS OF REFERENCE FOR ESMP ENVIRONMENTAL CONSULTANT IN PEU

Background

The Inter-American Development Bank (Bank) and the Suriname Ministry of Agriculture, Animal Husbandry and Fisheries (LVV) have prepared a Program designed to increase competitiveness of the agricultural sector by supporting improvements in animal health, plant health and food safety and by promoting agricultural innovation through research and technology transfer projects. Activities in animal and plant health and food safety will include establishment of new legislation, policies and procedures; preparation of manuals and educational materials for farmers and staff; staff training; and acquisition of supplies and equipment for inspections, monitoring, and laboratory analyses.

The Program was designed with two components: 1) Strengthening Animal Health. Plant Health and Food Safety and 2) Agricultural Innovation. The activities of each component are summarized below.

Component 1, Strengthening Animal Health, Plant Health, and Food Safety

Animal Health

The proposed actions within this activities are designed to maintain and verify Suriname's sanitary status through the establishment of a disease surveillance system; improvement of animal quarantine procedures; formulation of protocols; staff training in risk assessment, new protocols, health and safety; improvement of public/private interactions; and acquisition of equipment and supplies for the recently constructed veterinary laboratory in Paramaribo (which will include a specialized wastewater treatment system for liquid biological wastes, a treatment for solid pathological wastes and operation of an incinerator for other biological wastes).

Plant Health

This part of the Program proposes to strengthen plant health through reorganization of the plant health service, establishment of a pest surveillance and traceability system (including a risk assessment to identify potential pests; and emergency response plans); improvement of plant import regulations and export certification; improvement of plant quarantine facilities; establishment of integrated border controls; formulation of protocols; staff training; and acquisition of equipment and supplies for the plant health/quarantine laboratory (already constructed in the Paramaribo port area). An incinerator for destruction of materials confiscated at the Johannes A. Pengel Airport will be installed. Small consignments that are confiscated at the Nickerie and Albina border posts will be transported in secure containers to the incinerator at the airport. Large rejected consignments that arrive at the seaport will be returned to the exporting country.

Some minor construction and rehabilitation of existing facilities for border controls will be funded. New construction is proposed at the Nieuwe Haven Seaport to house inspectors and support operations. Existing facilities for border inspectors will be upgraded at: the Nickerie ferry border crossing and the Albina ferry terminal. A quarantine facility with an incinerator will be installed at J.A. Pengel Airport through rehabilitation of existing facilities. The operation will also finance purchase of equipment for the existing Zorg en Hoop Airport facility. These facilities will not only serve for control of plant materials and processed foods, but will also provide control of animals/animal products.

Food Safety

The goal of the subcomponent is that food safety services be improved, supported by a national Food Safety Policy, updated legal framework and a coordinating mechanism at the ministerial level. Strengthening food safety will be done through the establishment of a surveillance, inspection and monitoring system, establishment of a monitoring system for agricultural inputs, improvement of the good agricultural practices program, formulation of protocols, staff training, equipment and inputs for the pesticide residue laboratory, and an assessment of the institutional framework of the agricultural health and food safety system.

Component 2, Strengthening Agricultural Innovation

This component will fund strategic adaptive agricultural research projects, with emphasis on validation and technology transfer implemented in collaboration with national and international research and technology transfer centers. The Program will fund seven projects to strengthen the rice sector; open field vegetable production; protected vegetable production (green or shade houses); citrus production; and minor fruits (passion fruit, pineapple, soursop). In addition, this component will provide some institutional strengthening for LVV. Other smaller projects will be funded in the future through a competitive process (Small Projects Window) based on proposals submitted for agricultural research and extension.

Consultancy Objectives

As part of the preparation of the Program environmental and social impacts were assessed and an Environmental and Social Management Plan (ESMP) was prepared to reduce identified risks and increase environmental sustainability.

The consultancy will assist LVV in implementing the ESMP by providing management, oversight and compliance monitoring services for implementation. The consultant will work within the Project Executing Unit and will collaborate closely with LVV counterparts including: LVV environmental staff, laboratory managers, the Pesticide Management Division, and food safety inspectors to ensure compliance with the ESMP.

Main Activities

1. Carry out overall supervision of the implementation of the ESMP in coordination with LVV counterparts.
2. Work closely with the LVV Environmental Focal Point to provide on-the-job training, facilitate training courses and acquisition of needed equipment and supplies.
3. Verify that permits for incinerators are obtained from District Commissioners and that any required conditions are met.
4. Set up coordination mechanisms for receiving input from laboratories and inspection supervisors regarding implementation of relevant ESMP measures and conduct periodic inspections to verify compliance.

5. Conduct periodic visits to laboratories and border posts to verify compliance with the ESMP as needed. Coordinate with the LVV Pesticide Division to ensure implementation of pesticide management measures within LVV under the Agricultural Innovation Component.
6. Participate in selection process for the Small Projects Window to be funded in the Agricultural Innovation Component to evaluate potential adverse environmental or social impacts and to apply the socio-environmental selection criteria.
7. Provide input to the PEU Manager for reporting to Bank on progress of ESMP implementation.

Deliverables

The consultant will develop a monitoring plan and will provide reports to the PEU Coordinator for subsequent reporting to the Bank. Other deliverables will be produced as needed to complete the required activities and may include monitoring forms or checklists, and other documents.

Qualifications

The consultant shall have the following minimum qualifications

- Bachelor's Degree in biological sciences, chemistry, ecology, or agronomy
- Experience with pesticide management issues, management and disposal of hazardous materials and wastes, working knowledge of biological waste issues, understanding of occupational health and safety risks and protective measures related to chemical and biological exposure
- Fluency In Dutch and English
- Good organizational and management skills
- Good communication skills

Characteristics of the Consultancy

The consultancy will be for a period of two years, on a half-time basis.

Payment

The fees for this consultancy will be up to $1,500 US per month, depending on qualifications