ENVIRONMENTAL AND SOCIAL ANALYSIS SUMMARY
SURINAME SUSTAINABLE AGRICULTURAL PRODUCTIVITY PROGRAM (SU-L1052)

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

February 28, 2018

INTRODUCTION

The Inter-American Development Bank (Bank) and the Suriname Ministry of Agriculture, Animal Husbandry and Fisheries (LVV) are preparing the Sustainable Agricultural Productivity Program, which is designed to increase agricultural productivity in Suriname through investments in: infrastructure and management of irrigation and drainage (I&D) systems; the transfer of these system's operation and maintenance (O&M) responsibilities to farmers organized in water boards; and to improve information-based policy-making by increasing the amount and quality of agricultural information on a national level.

The Program, to be executed by the LVV, in collaboration with the Ministry of Public Works and the OWMCP (supported by the Ministry of Regional Development) is expected to result in: an increase in rice productivity in I&D areas; an increase in rice production sustainability due to water boards operating and contributing to O&M; and improved agricultural statistics and information systems.

An environmental and social assessment (ESA) was carried out to evaluate potential impacts from the Program and to identify mitigation measures to reduce or eliminate impacts, where necessary. The results of the assessment are presented in a Draft ESA Report and are summarized in this document.

STAKEHOLDER AND PUBLIC CONSULTATION ABOUT THE PROGRAM

The draft ESA report is available for public review on the LVV Facebook page, on the OWMCP website, and in the Nickerie District Commissioners office. This summary document provides a shorter version of the ESA report to help stakeholders obtain a quick picture of the elements of the Program and its potential social and environmental impacts. In addition to this written information a stakeholder meeting will be held in Nickerie (to be announced by LVV) to allow for public comment on the Program and the ESA. Substantive comments will be addressed in the final version of the ESA and will be relayed to the IDB and LVV Program team for consideration in Program design.

PROGRAM DESCRIPTION

Component 1, Irrigation and Drainage

The activities to be financed for Component 1, which include infrastructure projects and institutional strengthening actions for the Nickerie District, are described below

Rehabilitation of Water Board Polders

The Program proposes to finance the rehabilitation of a group of polders in which water boards are actively working and with members who will commit to cover operations and maintenance

costs of the rehabilitation. The water boards initially selected are the Groot Henar, Paradise and Longmay, Wasima, Nanni and Bruto, Clara, Europolder Zuid, and Uitbr. Groot Henar polders. The result of this rehabilitation will cover 7000 ha and will benefit nearly 2,000 farmers. The activities will include studies to develop plans and cost estimates, were not completed already, and construction. Construction activities will include structural improvements for the appropriate regulation and operation of the I&D system of each water board (canals, hydraulic structures) as well as functioning of the drainage systems (dams and dikes) and some minor improvement of some existing roads inside the polders to ensure adequate access to the polders. The work will be carried out by specialized contractors but the intent is to involve water board members in identifying priorities, design decisions and final inspection of the works.

Main Irrigation and Drainage System Infrastructure Repair and Construction

The table below lists the possible repair and construction activities that are under consideration for financing by the Program. Funding limitations may mean that not all the listed Programs will be carried out under this Program. Prioritization of the activities and more detailed descriptions of the work and cost estimates are still in the planning stages as of this writing.

Infrastructure	Description	Proposed Work
Nanni inlet structure	Inlet structure to: van Wouw canal; Tondonsi canal serving Europolder Zuid; Eastern lateral van Wouw canal serving Europolder Noord; van Wouw Commercial farms of Mangli and Baitali; Clara distribution box serving the 5 western WB polder systems (Corantijn, Clara, Nanni & Bruto, van Drimmelen, Wasima en Europolder Noord)	• Replace steel gates • Reconstruct roofing to allow safe installation of the pulleys • Replace wooden retaining walls (causing erosion of dikes) • Stabilize concrete retaining walls at the inflow side of the structure
Nanni spillway	Function is to release excess floodwaters from the Nanni swamp at times of high rainfall	• Replace missing wooden beams • Repair and reinforce retaining walls • Reshape and increase height of earthen dam on the south side • Clean out Nanni Creek outlet to increase the outflow capacity
Kugh inlet structure	Inlet from the Suriname canal to the Lateral Canal and Suleiman canal, serving “Hampton court polder” and “Groot Henar polder” (Suleiman inlet) and “Uitbreiding Groot Henar” en “Autonoom” polders	• Repair or replace 3 inlets gates • Repair or replace lifting devices
Ha canal inlet structure	Inlet structure from Surinam canal into the HA canal with flow regulating gate which serves Paradise-Longmay, Sawmillkreek and Bacoven polders	• Repair & replace non-functioning spindle gate • Increase height of gate to prevent overflows during high water events
Clara distribution structure	Flow distribution and regulation structure serving 5 polders : Corantijn, Clara, Nanni-Bruto, van Drimmelen, Wasima	• Replace all 5 non-functional spindle gates • Close provisional outlet to Nanni-Bruto polder
Drie koker inlet	Inlets from HA canal to 3 lateral canals serving Longmay-Paradise and Sawmillkreek polders	• Repair 3 inlets which lack closing gates
Ataoellahweg culvert	Passage under the Attaoellahweg road culvert after the inlets to the Bacoven polder & inlet into the HA canal towards the “Drie Koker” inlet	• Repair damaged inlet gate

Hamptoncourt inlet	Inlet from Suleiman canal to Hampton Court polder	• Replace missing gate and install spindle structure
Nanni sluice	Drainage outlet from Nanni polder into the Corantijn river	• Clean and repair 4 doors • Install lifting devices • Repair retaining walls of inlet and outlet
Clara sluice	Drainage outlet from Clara polder into Corantijn River	• Completely overhaul sluice • Replace gates and door frames • Replace concrete • Deepen outlet
Hazard sluice	Drainage outlet from Bacoven and Europolder into the Nickerie River	• Replace 4 gate doors • Repair or replace retaining walls at inlet and outlet and install protection to avoid scouring
Hamptoncourt sluice	Drainage outlet from the Hamptoncourt polder into the Nickerie River	• Clean and repair outlet gates • Repair retaining walls on inlet and outlet side • Deepen outlet
Henar sluice	Drainage outlet from Groot Henar polder into Nickerie River	• Repair 3 of 4 steel doors with wooden gates, or repair existing • Construct overhead structure to allow safe lifting; • Repair retaining walls on inflow and outflow sides
Maratakka spillway and canal	Planned spillway from Suriname canal into the Maratakka River which flows into the Nickerie river to evacuate excess flood waters from the Nanni swamp in the event of heavy rains & allow some additional inflow from eastern part of Nanni swamp into the Nickerie water in dry seasons	• Construct spillway and canal to connect to Maratakka River
Zuid (south) drain	Drainage outlet for excessive flood waters in the Corantijn canal into the Zuid drain	• Fully reconstruct damaged inlet side • Repair damaged retaining walls and foundation
Corantijn canal completion,	Canal built to provide pumped water to left bank of Nickerie River polders in dry season (not completely finished as planned)	• Complete construction of the canal • Carry out works to connect canal directly to the irrigation system

Support for Water Board Operations

The Program proposes to finance various measures to provide support to all water boards so that they are prepared to take on their own operation and maintenance. Such measures will likely include activities to:

- complete legal procedures and certification to formally transfer O&M;
- provide training to water board members;
- provide meeting and office facilities for water boards;

- assign an independent Water Controller paid by the Government to assist in 1) the preparation of annual O&M plans; 2) develop water distribution and operational procedures; and 3) control the maintenance obligations of the water board farmers;
- develop legislation and procedures for collection of fees through the District Administration;
- provide transitional financial support by the Government to assist water boards in the preparation and implementation of O&M works; and
- provide training and capacity building program for the Water Board Committee, District Water Commissions, Ministry personnel and the proposed Water Controller.

The training and capacity building for water boards will include provision of information, instruction manuals, courses and in-service assistance such as: scheduling, creating agendas and running meetings; creating record-keeping procedures; creating standards and unit costs for determining annual O&M budgets; assessing the annual tax; contracting procedures; and inspecting rehabilitation and construction works.

Institutional Strengthening for Improved Water Resources Management

The Program may provide strengthening activities to the LVV and OWMCP to improve water resource management over the long term. This could include support for the introduction of operational plans under various water supply and climate scenarios and the implementation of rotational water supply and crop water calendars.

Possible Incentives to Farmers to Support Sustainable Agriculture

The Program is considering possible additional support to farmers in key actions related to water management associated with improving the sustainability of rice production, as well as diversifying crops. Leveling of rice fields is being considered as a possible cost-sharing technology for interested farmers. Leveling rice fields has been shown to increase yields and is effective at reducing the presence of red rice, an invasive weed of rice fields that typically grows in the drier/higher micro-elevations of the rice fields.

Component 2, Agricultural Statistics and Information

The Agricultural Statistics and Information Component will finance: (i) design of the Agricultural Information System; (ii) design and implementation of the agricultural census; (iii) design and collection of one or two years of agricultural surveys with probabilistic sampling; (iv) institutional strengthening; and (v) annual update of the estimates of the public support to the agriculture sector.

ENVIRONMENTAL AND SOCIAL ANALYSIS FINDINGS

The analysis found that the environmental and social impacts of the Program will be positive in terms of its contribution to improving the efficiency of water resource use, as well as improving the production of rice due to improved irrigation and drainage systems. The key Program impacts are summarized below.

Environmental Impacts

Positive Impacts

The irrigation and drainage infrastructure rehabilitation, repair and construction projects will significantly reduce the water waste which occurs now due to broken or missing gates, sluices etc. The improvements to the main system are expected to allow for provision of all the irrigation water necessary for the additional 27,000 ha that can be irrigated, without withdrawing any additional water from Nanni Swamp or its tributaries.

No adverse impacts to the Nanni Swamp basin hydrology or ecosystem are expected as it has already been significantly modified due to irrigation activities for many years. No adverse impacts to nearby protected areas are expected. The Program is unlikely to cause an expansion of agricultural production into natural areas or forests, as there are abandoned and underutilized polders available for production already.

Potential Negative Impacts

The Program is likely to cause an increase in the use of pesticides, due to the expected increase in area devoted to rice production. While it is well known that significant quantities of pesticides are used in rice production in Nickerie, there is no baseline of information about which pesticides are used, how they are used or if there are any water quality impacts.

A potential risk associated with the construction of the Maratakka Spillway is that, if not installed at the correct elevation, increased drawdown of the Nanni Swamp could occur during the dry seasons.

There are potential temporary environmental risks during the construction phase of the rehabilitation and repair of irrigation and drainage systems, such as the generation of construction debris, use of hazardous chemicals, dust and erosion and sedimentation. These risks can be managed by implementing standard environmental management construction practices.

Climate Change Impacts

The Program may have a small impact on climate change due to the production of methane from increased rice production. It will also contribute to climate resilience by providing flood control and reliable irrigation supply, as well as reductions in the use of fossil fuels used for pumping (both from the Corantijn Canal and by individual farmers removing excess water from their fields).

Social Impacts

Positive Impacts

The rehabilitation of water board polders will take care of the backlog of maintenance and repairs to allow small and medium farmers to realize increased yields and reduced problems due to excess water. Farmers who currently don't receive sufficient irrigation water currently

will be able to grow two rice crops per year. Additional polders might receive irrigation that do not receive it currently.

Installation of the Maratakka Spillway will help to reduce flooding in years when precipitation is high. .

The Program will provide services and training to help water boards and ministries responsible for irrigation and drainage in managing operations and maintenance and developing water resource management plans. These services will contribute to the long-term sustainability of the rice sector.

The Program will encourage the participation of women in decision making related to agricultural production and irrigation-related decisions.

Potential Negative Impacts and Risks

The Program will support activities to transfer the operation and maintenance of the water board polders to the water board members, in accordance with national laws and policies, which is intended to improve sustainability of the irrigated rice production sector. National laws require that water boards pay an annual tax to provide resources for their own operation and maintenance. The tax will be based on the cost of annual operation and maintenance plans for each water board, and the cost will be divided among farmers in each water board based on the total number of hectares they farm. The tax may be a burden for some small farmers, at least initially, until they are able to realize the benefits of increased production to offset O&M costs.

There are health and safety risks to the public and to construction workers during the construction phase that can be reduced by using best practices for environmental and health and safety management during construction.

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

An Environmental and Social Management Plan (ESMP) has been prepared for this Program in which the mitigation measures to reduce potential significant adverse impacts are identified; the implementation strategy including institutional responsibilities for carrying out the Plan are laid out; monitoring and reporting plans are provided; and a budget is estimated for implementation.

Mitigation and Risk Reduction Measures

The mitigation and risk reduction measures can be categorized into three major themes: 1) those intended to reduce short term, direct impacts and risks related to the construction phase of improvements to irrigation and drainage infrastructure; 2) those intended to reduce or compensate for long term impacts related to the likely increase in the use of agrochemicals due to the Program; and 3) those short and long-term social impacts related to the transfer of O&M to water boards. The mitigation measures identified to minimize adverse socio-environmental impacts are summarized below.

Construction Phase

- Require contractors to use best practices for environmental management during construction activities (such as proper disposal of demolition and other wastes, dust control, erosion and sedimentation control).
- Require contractors to protect worker and public safety by complying with Ministry of Labour policies and international standards for occupational health and safety, access control, and traffic management.

Long-term Increase in Pesticide Use

Conduct a pesticide use and environmental quality study which includes:

- a survey of farmers and pesticide applicators to determine what pesticides are used and how; and
- a water quality and sediment quality study to establish a baseline of information on pesticide impacts to the environment.

Social Impact Mitigation

- Provide some start-up funds for water boards especially for those with mostly small farmers
- explore a mechanism to allow for in-kind contributions to partially off-set fee payments;
- develop a Stakeholder Involvement and Gender Action Plan to ensure ongoing participation of rice farmers, women and fruit and vegetable growers in water board decision-making; and
- establish mechanisms to ensure that fruit and vegetable growers have access to appropriate irrigation services.

<u>ESMP Implementation Strategy</u>

LVV will have overall responsibility for execution of the Program and will be responsible for ensuring the implementation of the ESMP. Because LVV does not currently have capacity for providing environmental or occupational health and safety supervision of the Program, qualified consultants will need to be hired to manage the ESMP implementation under the overall supervision of a Program Executing Unit to be established within LVV.

Because the nature of the mitigation measures require different types of qualifications and expertise, it is recommended that consultants be hired to work under the PEU as follows:

- one full or part-time Environmental Health and Safety (EHS) Construction Supervisor for supervision of mitigation measures during the construction phase;
- a short-term Pesticide Consultant Team for preparing the pesticide survey and water and sediment quality sampling and analysis plan and providing support for its execution and data review. The team would hire and train local participants such as an environmental organization and/or university students to carry out the field work. The team would also be responsible for developing public education materials to convey the results of the survey and studies as well as their health and environmental quality implications; and
- the Institutional Strengthening Consultant(s) hired to carry out the institutional strengthening support to water boards, District Water Boards, the Ministries and OWMCP would be responsible for developing the Stakeholder involvement and Gender

Action Plans, monitoring the capacity of small farmers to pay the annual tax, ensure no ethnic or gender discrimination in water boards and ensure that small fruit and vegetable growers have access to irrigation.

Monitoring and Reporting

The ESA Construction Supervisor responsible for environmental and occupational health and safety oversight of construction will be responsible for monitoring the implementation of the ESMP during the construction phase and reporting on compliance to the PEU Director on a weekly basis during the active construction phase. In addition, serious unresolved problems identified will be reported immediately to the PEU Director and Contracts Officer for further action. This information will be reported to the Bank in accordance with reporting frequency established in the operating procedures for the Program.

The PEU member responsible for supervising the pesticide survey and water/sediment quality study will monitor activities and progress and report to the Bank on progress in accordance with the operating procedures for the Program.

The Institutional Strengthening Consultant(s) responsible for providing support to water boards and the ministries will monitor the activities and report on progress or problems to the PEU.

Estimated Budget for Implementation of ESMP

Activity/Mitigation Requirement	**Estimated Cost($US)** **(Over 5 year Program Period)**
ESA Construction Supervisor for supervision of environmental and occupational health and safety during construction phase	$40,000
Pesticide Survey and Water/Sediment Quality Study • International consultant fees, travel, expenses • Local field teams (stipends, travel, equipment) • Laboratory analyses	 $90,000 $50,000 $60,000
Institutional Strengthening - social impact mitigation and monitoring	In budget for institutional strengthening sub component
Total expenditures ESMP implementation	$240,000

Additional Recommendations

The ESMP provides recommendations for additional activities to improve socio-environmental management within LVV and to improve environmental sustainability of rice production in Nickerie. The recommendations include:

- Creating an environmental management unit in LVV to improve sustainability of LVV facilities and activities
- Creating an occupational health and safety unit to improve conditions for LVV personnel
- Installing a permanent hydrological monitoring system in the Nanni Swamp basin to provide information to better manage water resources now and in the future.
- Conducting an ecological survey of the Nanni Swamp basin to provide current information about ecological conditions, endangered species, and relationships to hydrology. The intent would be to provide information for guiding future decision-making on irrigation water withdrawals and drainage management which allows for the protection of important ecological functions and species.