Document of the Inter-American Development Bank

**Suriname**

**Water Supply Modernization Program**

**(SU-L1058)**

**Monitoring and Evaluation Plan**

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# Introduction

* 1. This annex presents the main elements of the Monitoring and Evaluation Plan of the Water Supply Modernization Program in Surinam (SU-L1058). The general objective of the proposed operation is to improve efficiency, quality, and financial and environmental sustainability of the potable water services provided by SWM. The specific objectives are: (i) Reduction of NRW levels in the Central and Western Regions through the implementation of critical aspects of the 2015 NRW reduction strategy; (ii) Increase availability of water supply services in critical areas of Suriname through upgrading water production infrastructure; (iii) Modernize the operations and management of SWM through the implementation of key recommendations of the Institutional Strengthening Plan (ISP) and the development of a water supply strategy for the Interior. For the achievement of these objectives, the Program is structured in three components:
  2. **Component 1: Non-Revenue Water (NRW) reduction.** This component will be based on the 2015 NRW reduction Strategy developed under 2451/OC-SU with specific focus in the Central (Paramaribo, Wanica, and Para) Region of Suriname. Supporting SWM, in this area will improve its operational and financial  efficiency. Specific activities will include: (i) Strengthening of the NRW unit through a technical assistance consultancy which will develop the strategic requirements and plans for the establishment of the unit and will ensure knowledge transfer to SWM while carrying on an updated water balance, meter accuracy study and a meter replacement plan; (ii) expansion of District Metered Areas (DMAs) to help SWM establish and monitor at least five new DMAs, as well as proposing measures to reducing real and apparent losses in the selected DMAs through a systematic approach. The expansion of DMAs will include installation or replacement of water meters and service connections, active leak detection and repair, implementation of energy efficiency measures and smart water technologies for pressure management and meter reading; and (iii) Updating of the customer database to ensure the current database information is accurate for SWM informed decision making. For the execution of this component, the Technical Assistance will include a Project Manager with specific expertise in implementation of NRW reduction programs to oversee the implementation of the activities and provide knowledge transfer to SWM’s NRW unit staff. SWM will assign two senior engineers to work under this component. Additional staff from the operations and financial departments will assist, as required in providing data or implementing specific actions related to the component activities.
  3. **Component 2: Upgrading water production infrastructure.** The Wanica District has experienced an average population growth of approximately 3% from 2011 to 2017, one of the highest in the Country. This component will finance infrastructure works required to expand the Helena Christina pump station and for SWM to increase the treatment capacity and be able to meet projected demands. A technical analysis of the alternatives for this Component was financed under ATN/OC-17519-SU which confirmed the feasibility, estimated costs, and cost-effectiveness of the selected area29. Specific activities to be financed under this component include: (i) Expansion of the Helena Christina pump station; (ii) Construction of storage tanks at the Helena Christina pump station; and (iii) Implementation of SCADA system for the Helena Christina pump station.
  4. **Component 3: Institutional Strengthening.** This component will finance the modernization of SWM operations and management, improving its planning, management and operations capacity, as well as prepareSWM for taking over responsibility for water supply in the interior. Specific activities to be financed by the loan operation include:  (i) Study for water supply solutions for the Interior30; (ii) Information Technology Consultancy to diagnose the current state and functionality of IT systems and propose a strategy for improved integration and upgrading of IT systems, which will be crucial for SWM to respond to technological changes, allocate resources efficiently, and improve operational efficiency in the future. The levels of authorization and cybersecurity will also be considered; (iii) Strenghtening of the financial and human resources departments31; (iii) Improved capacity of SWM’s water quality laboratory towards accreditation; (iv) design and implementation of training program for women and men in water management, and plumbing; and (v) preparation of a cost study to determine the real cost of providing the service, which will empower SWM to request tariff adjustments based on reasonable costs.
  5. As indicated in the Proposal for Operation Development (POD), SWM will be the Executing Agency (EA) for the Program with broad oversight responsibility for all matters related to the Program, and with direct responsibility for the administration of resources and the procurement processes. Program monitoring will be based on the Results Framework, the Progress Monitoring Report (PMR), the Procurement Plan, and the Annual Operating Plan (AOP). SWM will submit two semi-annual progress reports throughout program execution, within 60 days following the end of each semester, as described below.
  6. Program performance will be assessed according to the indicators of the Results Matrix (RM). The Executing Agency will present the Bank for its non-objection: (i) a midterm evaluation at the end of 36 months from the date of the signature of the loan contract or after 60% commitment of the resources, whichever comes first, and (ii) a final evaluation of the program, after 90% of loan resources have been committed. The final evaluation will include an ex-post economic evaluation of the program as well as reporting on environment and social issues and on safeguards compliance. All the evaluations will be carried out by external independent consultants.

# Monitoring

#### Indicators

* 1. Table 1 below presents the indicators that will be monitored on a semi-annual basis. Details on the physical and financial progress of each indicator is presented in the Progress Monitoring Report ([link here](https://idbg.sharepoint.com/teams/EZ-SU-LON/SU-L1058/15%20LifeCycle%20Milestones/OEL%23%20-%20PMR%20-%20SU-L1058.pdf)). The PMR incorporated the results framework to enable project teams to monitor the outputs and outcomes of the project, and their delivery in terms of both cost and time. The PMR will be updated twice a year in September and in March to facilitate reporting on the links between project outputs and outcomes, outcomes and priorities in country strategies.

**Table 1**

**Outputs Indicators by Component**

|  |  |  |  |
| --- | --- | --- | --- |
| **Output** | **Definition** | **Frequency of Measurement** | **Means of Verification** |
| **Component 1: Non-revenue Water reduction** | | | |
| Micrometers installed | Installation of micrometers in the Central region | Semiannually | SWM reports |
| Smart water infrastructure technologies for NRW reduction implemented | SWIT technologies mean pressure management systems, smart meters, automatic meter reading. | Semiannually | SWM reports |
| Service connections replaced | Replacement of service connection means the replacement of the water supply line that extends from the distribution main into the customer property. | Semiannually | SWM reports |
| Leaks detected and repaired | Losses of water in the network system are identified visually or with leakage detection equipment and repaired, meaning the water losses are stopped. | Semiannually | SWM reports |
| NRW Unit strengthened and equipped | Strengthened means that: technical assistance for the water unit in execution; a methodology for the Water balance has been developed for SWM, meter accuracy test conducted, meter replacement plan developed.  Equipped means: Business systems implemented and leak detection equipment available | Semiannually | SWM reports |
| District Metered Areas created | A district metered area (DMA) is defined as a discrete area of a water distribution network. It is created by closing boundary valves or disconnecting pipes to neighboring areas. | Semiannually | SWM reports |
| Customers data base updated | The set of SWM’s customers data is ensure is accurate | Semiannually | SWM reports |
| **Component 2: Upgrading water production infrastructure** | | | |
| Helena Cristina Pump Station expanded | The production capacity of the pump station is increased | Semiannually | SWM reports |
| Storage tank built | Additional water reservoir is constructed | Semiannually | SWM reports |
| SCADA system implemented | The supervisory control and data acquisition system is installed in the Helena Christina pump station | Semiannually | SWM reports |
| **Component 3: Institutional Strengthening** | | | |
| Drinking Water Supply Strategy in the Interior developed | Developed means: the strategy is completed and approved by SWM’s management | Semiannually | SWM reports |
| Information Technology System Audit conducted | Conducted means: the IT systems of SWM are assessed and recommendations for its improvement are made | Semiannually | SWM reports |
| Organizational structure assessed | The Organizational Structure of SWM is analyzed against the utility objectives and mandate and recommendations for its improvement made | Semiannually | SWM reports |
| Action Plan for strengthening of Financial and Economic Affairs Department at SWM implemented | Implemented means: Fixed asset administration completed; cost of service study prepared; planning and control system implemented; and financial model developed. | Semiannually | SWM reports |
| Action Plan for strengthening of Human Resources Management Department implemented | Implemented means: Strategic HR Plan is developed; Management development program and SWM training program implemented. | Semiannually | SWM reports |
| Action Plan for the Laboratory Certification developed and implemented | Implemented means: Key recommendations from the Action Plan are financed by the Loan | Semiannually | SWM reports |
| Information Technology infrastructure updated | Infrastructure updated means: Gaps identified by the IT audit are financed by the Loan | Semiannually | SWM reports |
| Certified technical training program for women in plumbing, and others, designed and implemented | At least 20 women trained. SWM will offer internships to these women | Semiannually | SWM reports |

#### Data Collection and Instruments

* 1. All the indicators for the proposed interventions are and will be based on information collected directly by the EA or by consultants hired for specific tasks within the program and recorded within the internal administrative record system of SWM.
  2. The EA will also be responsible for the process of systematization of the information obtained from the semi-annual reviews (semi-annual progress report), the mid-term evaluation and the final evaluation, with the overarching objective to support the preparation of the Project Completion Report.
  3. All the outputs and outcomes indicators will be measured directly. As mentioned above, at times the EA personnel will receive external support to carry out the measurements. Measures and estimates will be compared with the expected outputs and outcomes presented in the RM. The EA will submit two semi-annual progress reports throughout program execution, within 60 days following the end of each semester, as described below.
  4. It was agreed to use the RM and the activities defined in the PMR as the principal elements for monitoring the operation. This means that program monitoring will be based on the RM (that details also the means of verification), the PMR, and the AOP.

#### Reporting monitoring results

* 1. Besides the AOP and the Annual Procurement Plans (see Summary Implementation Arrangements in the POD), the EA will submit two semi-annual progress reports throughout the life of the project execution, within 60 days after the end of the calendar year or half year. These reports will contain at least the following elements: (i) descriptions of the executed activities per component; (ii) accounts of the contractors’, consultants’ and the supervision firm’s performances; (iii) description of the procurement processes carried out during the reported period and any update to the procurement plan; (iv) updated schedule of physical progress and disbursements; (v) level of compliance with the performance indicators, according to the PMR system; (vi) review of critical determinants of the socioeconomic feasibility of the project, particularly actual investments costs; (vii) progress with respect to the implementation and execution of environmental audits, including timeline, results and implemented measures to comply with the Environmental and Social Management Report (ESMR); (viii) description of the elements that are affecting program implementation, and identification and proposal of corrective measures; (ix) identification of new risks / events that may potentially affect the future implementation of the program, and update of the matrices produced within the Project Risk Management process; (x) execution plan to be completed in the following two six month periods; (xi) maintenance plan for the following two six month periods; (xii) a summarized project financial statement; (xiii) the estimated cash flow for the next two six month periods; and (xiv) any lesson learned stemming from the execution of the program.
  2. As mentioned above, the semi-annual progress reports will be structured to facilitate easy updates of the PMR system (based on the RM). A standard template has been developed in this sense indicating indicators and milestones for the programs outputs, outcomes and impacts.
  3. Inspection visits will be conducted by the IDB regularly, to monitor relevant technical, operational, and financial aspects of the Project. Inspection visits reports will be prepared quarterly. Administration missions will be conducted by the IDB whenever the need arises.

#### Financial Auditing

* 1. Financial management of the project will be carried out in accordance with the Bank’s Management Guidelines (OP-273-12). Financial programming will be carried out based on standard models included in the Bank’s project disbursement guide. The Bank will determine the supervision procedures necessary to verify the success of the operation, including independent financial auditing performed in accordance with the guidelines for financial reporting and external auditing of projects financed by the Bank.Additional fiduciary arrangements and auditing requirements are detailed in Annex III.

#### Monitoring Coordination, Work Plan and Budget

* 1. As indicated above and in the POD, the EA will be in charge of monitoring program performance and progress throughout execution. Overall, the EA will be responsible for developing the system for gathering and maintaining the data related to the different indicators included in the Results Matrix, as well as for collecting the retaining updated information on the performance indicators and implementation plans. Acknowledging the need to ensure proper internal communication, appropriate staff will be designated by the EA for the execution of the program. The Program Manager will be responsible for monitoring progress against agreed benchmarks, assessing the continued viability of the program and present monitoring reports to the IDB every six months.
  2. Table 2 presents the program monitoring timeframe, budget allocated for each main activity and source of funding.

Table 2  
Monitoring Work Plan

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Key Monitoring Activities/Products per Activity** | **Year 1** | | | | **Year 2** | | | | **Year 3** | | | | **Year 4** | | | | **Year 5** | | | | **Responsible** | **Costs (US$)** | **Funding** |
| **1** | **2** | **3** | **4** | **1** | **2** | **3** | **4** | **1** | **2** | **3** | **4** | **1** | **2** | **3** | **4** | **1** | **2** | **3** | **4** |  |  |  |
| General data collection and monitoring activities | X |  | X |  | X |  | X |  | X |  | X |  | X |  | X |  | X |  | X |  | SWM | 15,000\* | Loan resources (included in item “Financial and technical auditing, monitoring and evaluation”) |
| Semi-annual progress report | X |  | X |  | X |  | X |  | X |  | X |  | X |  | X |  | X |  | X |  | SWM | 20,000 | Loan resources (included in item “Program Administration”) |
| Inspection visits |  | X |  | X |  | X |  | X |  | X |  | X |  | X |  | X |  | X |  | X | IDB Program Team Leader | 10,000 | Yearly assigned transactional budget (staff in country) |
| Annual financial audit report |  |  |  |  | X |  |  |  | X |  |  |  | X |  |  |  | X |  |  |  | Firm of independent auditors acceptable to the Bank, contracted by SWM | 80,000 | Loan resources (included in item “Financial and technical auditing, monitoring and evaluation”) |
| Final financial audit report |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | X | Firm of independent auditors acceptable to the Bank, contracted by SWM | 20,000 | Loan resources (included in item “Financial and technical auditing, monitoring and evaluation”) |

# Evaluation

#### Main Evaluation Questions

* 1. The main goal of this program evaluation is to appreciate the extent to which the program objectives were achieved as a function of what had been established in the result matrix. In order to do so, a comprehensive assessment of the progress level towards the objectives will be conducted. As indicated above an ex-post socioeconomic evaluation will assess if the costs and benefits identified in the ex-ante evaluation were materialized. The main evaluation questions for this operation will thus be:
     1. Did the volume of potable water bill increase in Central?
     2. Did the level of non-revenue water in central decrease in Central?
     3. Did the households with access to water supply network in Wanica region by the program increase?
     4. Was the strategy for water supply services in the interior region approved?
     5. Are the audited financial statements of SWM available to the public?
     6. Is SWM complying with laboratory quality standards (ISO:17025)?
  2. The lessons learned that will stem from this exercise will be used in the preparation of subsequent phases and future interventions

#### Existing Knowledge (previous evaluations, ex ante economic analysis)

* 1. A cost-benefit analysis for the main components of the program was performed using a discount rate of 12%. The program is economically viable, showing an Economic Rate of Return (ERR) of 22% and an Economic Net Present Value (NPV) of US$3.6 million for the NRW interventions (Component 1), and an ERR of 15% and an NPV of US$1.8 million for the upgrading of the production infrastructure (see [link](https://idbg.sharepoint.com/teams/EZ-SU-LON/SU-L1058/15%20LifeCycle%20Milestones/Anexo%20Socioeconomico%20SU-L1058.docx?d=wabf2264ae0484c9991672f9cfa902427)). The analysis was complemented by appropriate sensitivity and risk assessments. The achieved ERRs can be safely regarded as the lower bound estimation, as conservative assumptions were made for the analysis. The details of these analysis are presented below:
  2. **Non-Revenue Water.** The main impact of the project is to decrease the NRW level and hence improve the quality of the system. Water losses are product of a deficient infrastructure and poor O&M. Therefore, users face discontinuities in the service and low water pressure. With the system rehabilitation and the NRW program, approximately 6% of the water production, a significant part of which is lost (estimated at 45% in the Central region), will be recovered and distributed to users. For NRW interventions, the benefit of the reduction of physical losses is usually estimated as the savings in production cost. This estimate is based on: 1) a technical estimate of the amount and timing of the reduction of physical losses, and 2) an economic estimate of the economic cost of producing water. The cost of producing water was estimated using data on administration, operation and maintenance costs provided by SWM. This cost is not including capital expenditures, therefore is underestimating the value of water. Additionally, since most of the water supply is pumped from the ground, the cost of electric energy should be adjusted to reflect economic costs. The production cost calculated as explained above, is equal to US$0.65/m3, and this is the value used to obtain the cost savings due to the project. The total value of planned investments, at market prices reached about US$ 9 million.
  3. **Upgrading Water Production Infrastructure in Wanica**. Wanica has 29,756 connections to the water system and will benefit 3,720 new households. Based on the demand projections and on the new developments, the growth rates estimated by Castalia (SWM Prefeasibility Study) are as follow:

**Demand Growth Rate**

|  |  |
| --- | --- |
| **Year** | **Growth Rate** |
| 1 | 5% |
| 2 | 10% |
| 3 | 13% |
| 4 | 15% |
| 5 | 16% |
| 6 | 1.20% |
| 7 | 1.20% |
| 8 | 1.20% |
| 9 | 1.20% |
| 10 | 1.20% |

* 1. The benefits of this project were estimated using SIMOP, that allow us to estimate the benefits on increasing the production capacity based on the current demand and future projections. With the project future water rationing will be avoided. The total value of planned investments in HC, at market prices reached about US$ 7 million.

#### Key Outcome Indicators

* 1. The key outcome indicators of the program are presented in Table 3 below.

**Table 3 Key Results Indicators**

|  |  |  |  |
| --- | --- | --- | --- |
| **Indicator** | **Formula / Definition** | **Frequency of Measurement** | **Source** |
| Non-revenue water in program areas | (1- billed volume/produced volume)x100 | Annual | SWM reports. |
| Volume of potable water billed |  | Annual | SWM reports |
| Households with access to water supply network in Wanica | Number of households in Wanica that are receiving water from the water supply network | Annual | SWM reports |
| SWM with approved strategy for water supply services in the Interior Region | Approved Water Supply strategy for the interior | Annual | SWM reports |
| SWM with audited financial statements available to the public | Audited financial statements available and published. | Annual | SWM reports |
| SWM complying with laboratory quality standards (ISO:17025) |  | Annual | SWM reports / ISO certification |

1. D. Evaluation Methodology
   1. An ex-post economic evaluation will be carried out to measure the changes occurred in key variables before and after the proposed interventions have taken place.
2. E. Technical Aspects of Selected Methodology

**Data Collection**

* 1. **NRW.** The ex-post economic evaluation will include the comparison between the executed (ex-post) investment and operation and maintenance costs and the project benefits. For the project benefits, the levels on NRW at the end of the project will be used, as well as the cost of producing water. This evaluation will be carried out once 90% of the program resources have been committed.
  2. **Upgrading Water Production Infrastructure.** The ex-post economic evaluation will include the comparison between the executed (ex-post) investment and operation and maintenance costs and the project benefits. The expost economic evaluation will be done using SIMOP. For SIMOP the following data should be used: (i) price of a m3 at the end of the project; (ii) capacity increased of the PS HC. This evaluation will be carried out once 90% of the program resources have been committed.

1. F. Complementary Evaluation
   1. The final and ex-post economic evaluation will be complemented by a mid-term and a final qualitative progress evaluation. The purpose of these complementary evaluations is not only to capture the degree of attainment of program objectives in relation to plans and reasons for any variances, but also to appreciate the main bottlenecks encountered during execution.
   2. At the end of 30 months from the date of the loan contract or after 60% commitment of the resources, whichever comes first, this mid-term evaluation will take place with the support of an external consultant who will focus on, among other things: (i) level of progress in attaining the program’s objectives stated in the Results Framework; (ii) level of acceptance of procedures developed under the program.
   3. The final evaluation, to be carried out also with the help of an external consultant, is to take place after 90% of loan resources have been committed. The evaluation will assess:
      1. degree of attainment of program objectives in relation to plans and reasons for any variances;
      2. the organization established for program execution;
      3. implementation and acceptance of procedures and systems developed through the program;
      4. lessons learned that could be applied to future projects.
   4. The ex-post economic evaluation described above will be performed as part of this final evaluation.
2. G. Reporting Results
   1. The information included in the final complementary evaluation and in the ex-post economic evaluation will be used as inputs to prepare the PCR. The mechanisms and instruments to report program evaluation results are those listed above, and in particular the PMR system (with the semi-annual updates), paying particular attention to the change in the risk analysis and the conditions recorded at program inception. The PCR compares actual results achieved with the expected results. It will report on: (i) time and cost of outputs achieved from the last PMR; (ii) on results achieved and evaluation methods used; and (iii) Bank’s performance during the life of the project. The exercise will be used to improve management for results, learning and greater accountability.
   2. All the evaluation reports are expected to be available within 6 months after completion. The reports will benefit the Bank as well as the borrower and the executing agency.
3. H. Evaluation Coordination, Work Plan and Budget
   1. All the evaluations (mid-term and final, which will include the ex-post economic evaluation) will be carried out by an external independent consultant. The contracting will be managed by SWM, which will prepare the Terms of Reference and supervise the consultant with the support of the Bank and will be financed through loan resources.
   2. The final evaluation plan will be revised by both SWM and the IDB team, in order to ensure the accuracy of the information and to ensure that the most relevant aspects of the program are analyzed.
   3. The evaluation timeframe, budget allocated for each main activity and source of funding are presented in Table 5 below.

**Table 4**

**Evaluation Work Plan**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Key Evaluation Activities/Products per Activity** | **Year 1** | | | | **Year 2** | | | | **Year 3** | | | | **Year 4** | | | | **Year 5** | | | | **Responsible** | **Costs (US$)** | **Funding** |
| **1** | **2** | **3** | **4** | **1** | **2** | **3** | **4** | **1** | **2** | **3** | **4** | **1** | **2** | **3** | **4** | **1** | **2** | **3** | **4** |  |  |  |
| *Mid-Term Evaluation* | | | | | | | | | | | | | | | | | | | | | | | |
| Consultant contracted for mid-term (complementary) evaluation |  |  |  |  |  |  |  |  |  |  | X |  |  |  |  |  |  |  |  |  | SWM | 25,000 | Loan resources (included in the budget line “Financial and technical auditing, monitoring and evaluation”) |
| Mid-term evaluation completion |  |  |  |  |  |  |  |  |  |  | X | X |  |  |  |  |  |  |  |  | Consultant contracted by SWM |
| *Ex-post economic and final evaluation* | | | | | | | | | | | | | | | | | | | | | | | |
| Consultant contracted for final and ex-post evaluation |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | X |  |  |  | SWM | 35,000 | Loan resources (included in the budget line “Financial and technical auditing, monitoring and evaluation”) |
| Data collected (number of beneficiaries and investment costs ex post) |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | X |  |  |  |  |
| Data analysis and report preparation |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | X | X |  | Consultant contracted by SWM |
| Final evaluation completion |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | X |  | Consultant contracted by SWM |