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# **ADVANCED SCIENCE & PARTNERSHIPS FOR INTEGRATED RESOURCE DEVELOPMENT PROJECT**

**QUARTERLY REPORT**

**October-December 2017**

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# Advanced Science & Partnerships for Integrated Resource Development

## QUARTERLY REPORT FIRST QUARTER FY 2018

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**Prepared for:**

United States Agency for International  
Development  
Armenia Mission  
1 American Avenue  
Yerevan 0082, Armenia

**Prepared by:**

ME&A Inc.  
4300 Montgomery Ave.  
Suite 103  
Bethesda, MD 20814  
Tel: +1 301 652 4334  
Fax: +1 301.652.3733  
[www.mendezengland.com](http://www.mendezengland.com)

Armenian Branch of ME&A  
105/1 Teryan St., Suite 204,  
Yerevan 0009  
Republic of Armenia  
Tel. +374 10 514 315  
Fax: +374 10 514 317  
Email: [aspired@engl.com](mailto:aspired@engl.com)

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## List of Acronyms

ASPIRED	Advanced Science and Partnerships for Integrated Resource Development
ATTC	Aquaculture Technology Transfer Center
AAB	Ararat Artesian Basin
BMO	Basin Management Organization
BMP	Basin Management Plan
CADI	Computer Assisted Development, Inc.
CEW	Clean Energy and Water
CoP	Chief of Party
COR	Contracting Officer's Representative
DO	Development objective
DSS	Decision Support System
EA	Environmental Assessment
EC	European Commission
EE/RE	Energy Efficiency/Renewable Energy
EGO	Economic Growth Office
EIMC	Environmental Impact Monitoring Center
EMIC	Environmental Monitoring and Information Center SNCO
EMMP	Environmental Mitigation and Monitoring Plan
ENA	Electric Networks of Armenia
ERGIS	Environmental Research and GIS
ESS	Environmental Scoping Statement
EU	European Union
ESA	European Space Agency
FAR	Fund for Armenian Relief
FTF	Farmer to Farmer Project
GIS	Geographic Information System
GOA	Government of Armenia
HMC	Hydrogeological Monitoring Center
ICARE	International Center for Agribusiness Research and Education
IEE	Initial Environmental Examination
IR	Intermediate Result
ITF	Interagency Task Force
The Lab	U.S. Global Development Lab
MoA	Ministry of Agriculture
MNP	Ministry of Nature Protection
MoENR	Ministry of Energy and Natural Resources
MoU	Memorandum of Understanding
NGO	Non-Governmental Organization
PEER	Partnership for Enhanced Engagement and Research
PERSUAP	Pesticide Evaluation Report and Safe Use Action Plan
PIRS	Performance Indicator Reference Sheet
PMP	Performance Management Plan
PPR	Performance Plan and Report
PRP Project	Partnerships for Rural Development Project
SCADA	Supervisory Control and Data Acquisition
SEDF	Sustainable Energy Development Fund
SCWS	State Committee on Water Systems
SME DNC	Small and Medium Entrepreneurship Development National Center
SOW	Scope of Work
STTA	Short-Term Technical Assistance
SWCIS	State Water Cadaster Information System
TO	Task Order
WRMA	Water Resources Management Agency
WADI	Water and Development Indefinite Delivery/Indefinite Quantity Contract
WUP	Water Use Permit
USAID	United States Agency for International Development
USGS	United States Geological Survey

## 1. Executive Summary

This report describes the programmatic activities implemented by the Advanced Science and Partnerships for Integrated Resource Development (ASPIRED) Project during the first quarter of Year 3 of the project. It covers the period from October 1 through December 31, 2017. The report reviews progress and achievements in each of the project areas during the reporting period, and describes planned activities for the next quarter. The report also highlights challenges and actions taken to address these challenges.

### 1.2 ASPIRED Summary

On September 29, 2015, the United States Agency for International Development (USAID) awarded Mendez England & Associates (ME&A) a contract to implement the ASPIRED Project under the Water and Development IDIQ (WADI). The purpose of the ASPIRED Project is to support sustainable water resource management and sustainable practices of water users in the Ararat Valley through the use of science, technology, innovation and partnership initiatives. The ultimate goal is to reduce the rate of groundwater extraction in the Ararat Valley to the sustainable levels.

To this end, the ASPIRED Project focuses several critical areas:

1. Water Resource Data
2. Technology
3. Regulatory framework/enforcement of laws
4. Coordination across stakeholders

The ASPIRED Project places a strong emphasis on building partnerships with the U.S. Global Development Lab (the Lab), the United States Geological Survey (USGS), the private sector, research organizations and international donors to pilot innovative water and energy efficiency technologies, and to promote better water resource monitoring, planning and sustainable management.

### 1.3 Main Highlights from the Reporting Period

- Data component:
  - Conducted the introductory course on geographic information system (GIS) for the staff of the Water Resources Management Agency (WRMA) and Environmental Monitoring and Information Center (EMIC) of the Ministry of Nature Protection (MNP). The goal of the training was to build capacities of the participants in working with the geodatabases, ArcCatalog, ArcMap, and ArcToolbox packages of the ArcGIS for mapping and analysis.
  - Finalized supervised classification of land cover/land use in the Ararat Valley and conducted an accuracy assessment of the classification land cover/use map, using the statistical Error Matrix, with the results indicating nearly 90% of the classification accuracy.

- Technology component:
  - Prepared the engineering design of the Aquaculture Technology Transfer Center (ATTC) facility, with the drawing and 3D models,
  - Started the implementation of the water reuse project in Sayat-Nova village, Ararat marz,
  - Successfully tested efficient degassing and aeration (EDA) technology in Masis Dzuk fishery, indicating an increase of dissolved oxygen by 30% and reduction of carbon dioxide by 32% at the fish pond due to the application of the new technology.
- Legal component:
  - Conducted desk research of the best practices of public monitoring in the water sector.
- Communication and Donor Coordination component:
  - Marked completion of the well closing project in Sipanik on November 3.
  - Signed four-party cooperation agreement with the Small and Medium Entrepreneurship Development National Center of Armenia (SME DNC)/Partnership for Rural Prosperity (PRP) Project, Fund for Armenian Relief (FAR) and Sayat-Nova community for the implementation of the water reuse project in Sayat-Nova.

## 2. Summary of Performance Indicators

Summary of performance indicators for the third quarter of FY 2018 (Year3 of the project) is presented in the table below.

	Indicator	Planned/ Actual Target for Year 3	Quarter 1	Life of project (as of now)	Notes: Descriptions/Comments/Assumptions
<b>IR 1: Establish a comprehensive, user-friendly, open data system that is accessible to all stakeholders.</b>					
<b>Sub-IR 1.1: Ararat Valley Geocoded, real-time, publically accessible data system that incorporates water resource, groundwater, and hydrological datasets from multiple stakeholders built and shared with the GOA</b>					
<b>Indicators</b>					
1.1.1	Percent (of total) of datasets for the Ararat Valley publicly accessible	40/0	0	20	80% of all datasets available on Ararat Valley will be made public, which accounts for 100% of all the data that can be available to the public according to the Armenian legislation. The achieved target refers to the inventory data which has been publicized by the ASPIRED Project and progress achieved by the team with the cadaster design.
1.1.2	Percent (of total) wells mapped in the Ararat Valley.	N/A	N/A	100%	Indicator corresponds to an activity that the project team successfully completed during Year 1.
1.1.3	Number of stakeholders engaged in the data collection activities	5/0	0	9 <sup>1</sup>	The target refers to the stakeholders engaged in the groundwater-related data collection activities in the Ararat Valley from different sectors – government, private, and public. The reported indicators for Years 3 through 5 include fish farms where ASPIRED plans to install online monitoring systems.
<b>Sub-IR 1.2: An online tool for hydrogeological modelling and decision-support for the Ararat Valley that incorporates hydrologic, economic, energy, social equity and environmental data generated</b>					

<sup>1</sup> MNP with its subdivisions, PEER grantee, Institute of Water Problems, USGS, EU Water Initiatives Project, MOA, Metsamor power plant which are/were involved in the data collection process

Indicators					
1.2.1	GIS-based decision support tools for Ararat Valley developed	1/0	0	0	ASPIRED will produce decision support tools for the Ararat Valley by the end of Year 3.
<b>Sub-IR 1.3: A publicly accessible system that maximizes the use of open source technology and produces reports based on high-quality, real-time monitoring data created</b>					
Indicators					
1.3.1	Number of fisheries with automatic data system installed	5/0	0	0	These targets refer to the systems to be installed by the ASPIRED Project. Coca Cola HBC will equip the central management unit in the MNP, where data received from the systems will be stored. By the request of the GOA, the ASPIRED Project initiated the pilot project in Year 3. In December 2017, the ASPIRED Project cancelled a public tender (previously announced in November 2017) due to the reasons described in <a href="#">Section 4: General Administrative Issues</a> . ME&A Home Office will announce the new tender during the next reporting period.
<b>Sub-IR 1.4: Plan for decentralized, sustainable data collection methods to monitor groundwater resources and strengthened implementation capacities of partners developed in partnership with the Government of Armenia (GOA) and local stakeholders</b>					
Indicators					
1.4.1	Percent (of total) coverage of the groundwater extraction points monitored	8/0	0	0	The indicator refers to the percentage of the groundwater extraction wells monitored with the use of the online automated system installed by the ASPIRED Project versus the total number of the operational groundwater wells available in the fisheries <sup>2</sup> . This indicator depends on the progress with the implementation of Indicator 1.3.1.
<b>IR 2: Introduce locally appropriate, cost effective technologies to improve water resource management</b>					
<b>Sub-IR 2.1: Technologies developed, piloted, and evaluated at different sized fish farms with the objective of improving water resources management</b>					
Indicators					
2.1.1	Number of groundwater extraction reduction technologies piloted and evaluated	3/0	0	2 <sup>3</sup>	This indicator refers to technologies introduced at fish farms or other water use points that lead to the reduction of the groundwater extraction by users. This indicator also provides information on annual water saved in cubic meters. During Year 3, ASPIRED

<sup>2</sup> During the latest inventory of the groundwater wells, natural springs and fish farms of the Ararat Valley, ASPIRED inventoried a total of 2807 wells in the Ararat Valley, of which 1795 were found to be operational. Out of 1795 functioning wells, 336 are reportedly located in the fisheries of Ararat and Armavir marzes.

<sup>3</sup> The data refers to the Water Reuse Project in Hayanist<sup>3</sup> and the Well Sealing Project in Sipanik village



					started implementation of the ATTC (where several groundwater reduction technologies will be applied) and the Sayat-Nova Water Reuse Project, the data on which will be reported after their completion.
2.1.2	Thousands of cubic meters of water saved annually in Ararat Valley	9000/475	475 <sup>4</sup>	2050	This indicator counts the water savings from the demonstration of innovative water saving technologies by the ASPIRED Project at fish farms and other water use points, as well as the implementation of water rehabilitation projects in the communities of the Ararat Artesian Basin affected by the shortage of groundwater resource (in collaboration with Participatory Utilization and Resource Efficiency of Water (PURE) Project). The data is cumulative and includes recurrent savings provided by completed water projects (Hayanist 1.1 mln, Sipanik 1.9 mln). ASPIRED initiated the Water Reuse Project in Sayat-Nova village and the ATTC, the data for which will be reported after their completion.
<b>Sub-IR 2.2: Technologies with the objective of increasing energy efficiency and/or renewable energy generation of water users developed, piloted, and evaluated</b>					
<b>Indicators</b>					
2.2.1	Number of energy efficiency and/or renewable energy (EE/RE) technologies piloted and evaluated	3/-	-	-	This indicator refers to water-use related EE/RE technologies to be piloted during the project implementation. ATTC data will be reported after completion <sup>5</sup> .
2.2.2	Megawatt hour of energy saved annually	125/0	0	24	This indicator refers to the kilowatt-hour energy savings generated due to more efficient use of energy. Recurrent savings generated by completed projects are counted in the subsequent years.
2.2.3	Clean energy generated annually, MWh	63/0	0	0	This indicator refers to the clean energy generation capacity resulting from the introduction of RE technologies aimed at minimizing extraction of the groundwater. The data of this indicator depends on the implementation of EE/RE technologies, tracked under Indicator 2.2.1
2.2.4	Gains in the reduction of GHG emissions as a result of USG assistance	40.80	0	11.4 <sup>6</sup>	GHG emissions reduction-related data will be calculated based on the kilowatt hour of savings resulting from application of energy saving technologies in metric tons/year.

4 Savings generated by Sipanik for a quarter period. Hayanist will be counted with the start of the irrigation season.

5 ASPIRED intends to install two types of RE technologies in the ATTC project: photovoltaic and biogas.

6 Data refers to Hayanist project.

2.2.5	Number of people receiving improved service quality from an existing basic or safely managed water service as a result of USG assistance.	5700/0	0	340 <sup>7</sup>	Qualitative improvements <sup>8</sup> of the water resource resulting from the infrastructure projects implemented by ASPIRED <sup>9</sup> . The term "water users" refers to households, local farmers and others benefitting from this improvements. (Gender disaggregated whenever possible). ASPIRED will report on the data from Sayat-Nova after completion of the pilot project.
2.2.6	Number of water users experiencing improved efficiency of water resource use	8/0	0	3 <sup>10</sup>	This indicator tracks improved efficient use of water resulting from the pilot projects implemented under the ASPIRED Project. Examples of such projects can potentially reduce water abstraction by fish farms due to new technologies installed. ASPIRED will report on the data on the ATTC, Sayat-Nova and other pilot projects upon their completion.
<b>Sub-IR 2.3: Based on the pilot process and available research, recommendations developed for successful water and energy technologies for policy-makers and stakeholders shared</b>					
<b>Indicators</b>					
2.3.1	Number of successful technologies recommended and shared with the stakeholders and policy-makers	3/1	1	2	ASPIRED will pilot at least six technologies by the end of TO, with their evaluation and recommendations to be provided in the last year of the project. Masis Dzuk fish-farm , piloted a degassing and aeration technology on his own expenses, based on the consultations provided by the ASPIRED Project Engineer .
<b>Sub-IR 2.4: Technology or method to permanently close illegal and/or abandoned wells, developed, piloted, and evaluated</b>					
<b>Indicators</b>					
2.4.1	Number of piloted technologies to permanently close illegal or abandoned wells	2/0	0	1	ASPIRED plans to pilot at least two well optimization/sealing projects during Year 3.
<b>IR 3: Introduce new policies and regulations to improve integrated water resource management.</b>					

7 The current data includes water users (85 households) – beneficiaries of the water reuse project in Hayanist - 200 women; 140 men.

8 Pre and post-implementation water tests will be taken to detect the qualitative changes in water.

9 Initially, this indicator referred only to the drinking water supply projects. By the recommendation of USAID, the data will be taken from all water supply projects (both potable and irrigation water supply) which resulted in the improved service quality for the beneficiaries.

10 The results refer to Sipanik and Hayanist projects. Based on the results of Hayanist project, (a) the community avoided drilling of an additional well for irrigation needs; (b) the fishery became a more efficient water user by providing water to the community instead of dumping to the drainage water and gaining a possibility to use the existing pump for the recirculation of water, thus reducing its water abstraction from the groundwater well.

**Sub-IR 3.1: Trainings to build groundwater monitoring capabilities, capacity strengthening, and knowledge of how to use equipment; and follow-up assessments to test knowledge on groundwater monitoring and analysis of the basin management organizations (BMOs) and relevant water management agency officials to improve enforcement.**

**Indicators**

3.1.1	Number of trainings for building capacity of MNP in groundwater monitoring	1/1	1	3	This indicator refers to the trainings on enhanced up-to-date State Water Cadaster Information System (SWCIS) and Management Information System (MIS) for the Ararat Valley and on enhanced transparent water use permitting, control, and oversight systems and decision support tools. In December, ASPIRED conducted a two-week GIS course for the WRMA and EMIC staff.
3.1.2	Number of people educated on tools, approaches, and/or methods for water security, integrated water resource management, water source protection and sustainable water use as a result of USG assistance.	15/4	4 (2 men; 2 women)	52 (14 women and 38 men)	This indicator refers to the trainings on enhanced up-to-date SWCIS and MIS for the Ararat Valley; enhanced transparent water use permitting, control and oversight systems; environmental compliance procedures and efficient water use trainings for the beneficiaries of the communities. This indicator is not cumulative and is reported on an annual basis. Year 3 Quarter 1 data refers to the participants of the GIS training in November 28-December 2, 2017

**Sub-IR 3.2: Rigorous, evidence-based analysis of optimal water fee levels completed, shared with engaged stakeholders and recommendations provided to the GOA**

**Indicators**

3.2.1	Number of workshops and consultations with stakeholders to discuss water fee levels	N/A	N/A	9	The target for this indicator was met during Year 2 /Quarter2 ; indicator dropped from reporting for the remainder of the project.
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**Sub-IR 3.3: Water permitting monitoring and enforcement measures assessed and publicly available and recommendations, including development of regulations, provided to the GOA.**

**Indicators**

3.3.1	Package of recommendations to address water permitting monitoring and enforcement measures provided to GoA	1/0	0	0	This indicator refers to the package of recommendations that the ASPIRED Project drafted and submitted to the GOA.
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**IR: Ensure communications and coordination with stakeholders to avoid duplication of efforts**

**Sub:IR: 4.1 Systems-mapping to gain and apply knowledge of points of influence, incentives, and resources of stakeholders in water and the water-energy nexus completed and shared**

**Indicators**

4.1.1	Number of international and local organizations participating in the system mapping activities	1/1	1	24	This indicator refers to newly identified stakeholders and points of influence in water and water-energy nexus for the ASPIRED Project. During the reporting period, ASPIRED identified the Sustainable Energy Development Fund (SEDF) as the new organization working on EE/RE projects, which may be implemented on the water-energy nexus as well.
<b>Sub-IR 4.2: A transformative partnerships model to respond to needs for research, pilots, analysis and other coordinated efforts that is demand-driven, flexible, and has a plan for financial sustainability created</b>					
<b>Indicators</b>					
4.2.1	Percent of total funding leveraged from stakeholders for water resources management activities.	40/0	0	33 <sup>11</sup>	This indicator refers to the total in-kind and financial contribution by ASPIRED partners versus the total contribution of the Project. Targets are not cumulative and refer to a particular year.
4.1.2	Number of partnerships made by ASPIRED with other organizations	4/3	3	9	This indicator refers to partnerships and collaboration with other donors, public and private sector organizations for the implementation of joint projects and/or other initiatives contributing to the accomplishment of ASPIRED objectives. For the past quarter the data refers to SME DNC, FAR and Sayat-Nova community.
<b>5. Portfolio-level indicators</b>					
5.1	Percent of population living in targeted areas with improved water management	19/0	0	4.2	The geographical target area is the AAB, a territory of 13,075 hectares with a population of 58,373 people (28,392 men; 30,345 women). The Life of Project results for Year 2 refer to the completed projects in Sipanik and Hayanist versus the total size of the population in the AAB.

<sup>11</sup> The reported figure is taken from the actual cost-share of partners (Coca-Cola HBC, ERGIS and Hayanist community –for Hayanist project and VALML LLC for Sipanik) in the implementation of the irrigation rehabilitation projects. As of Year 2 clarified results, the percentage of funds committed by partners decreased from 34% (as of August/September 2017) to 33% due to the overall increase of ASPIRED contributions to the pilot projects. ASPIRED was the major donor of Sipanik project.

5.2	Number of key implementation steps taken to improve water management in the Ararat Valley	2/0	0	4 <sup>12</sup>	This indicator relates to policy, analysis, and other activities targeted towards improvement of water data-related activities, including training and pilot projects. By the Government request, ASPIRED initiated activities towards installation of the automated online groundwater monitoring systems in fisheries during Year 3.
5.3	Number of private sector firms that have improved management practices or technologies as a result of USG assistance	6/1	1	2 <sup>13</sup>	This indicator refers to (a) the number of fisheries with automated groundwater use monitoring systems installed; (b) fisheries which have adopted innovative water or energy efficiency (including renewable) technologies. As a result of the consultation on use of new energy efficient technology on degassing and aeration, Masis Dzuk Fishery began implementing a small pilot at its own expense.
5.4	Number of innovations supported through USG assistance.	3/0	0	1 <sup>14</sup>	This indicator refers to innovative technologies, management/monitoring tools or practices introduced by the ASPIRED Project in fish farms, at water use points and/or communities of Ararat Valley which contribute to the reduction of the groundwater use.
5.5	Number of innovations supported through USG assistance with demonstrated uptake by private and/or public sector firms	1/1	1	1	This indicator refers to the uptake/replication by the public and/or private sectors of projects, technologies, innovations and/or practices introduced by the ASPIRED Project at fish farms, water use points and/or communities of the Ararat Valley. Quarterly results refer to the replication of the water reuse project in Hovtashat community with assistance from ERGIS NGO. Sayat-Nova Project is also an uptake to be reported upon completion of the project.

<sup>12</sup> (1) The inventory of groundwater wells and springs was completed in September 2016. (2) USAID presented to the GOA two reports - Achieving Sustainable Groundwater Use in the Ararat Valley: the Role of the Fisheries Sector and the Final Report on the Inventory of Groundwater Wells, Natural Springs and Fisheries of the Ararat Valley; (3) ASPIRED was involved into the Interagency Task-Force established by the Prime-Minister's assignment in January-February 2017. In May 2017, the Armenian Prime-Minister Karen Karapetyan approved the Program of Measures for Efficient Management of the Groundwater Resources of Ararat Valley. Developed with the expertise and data support of the ASPIRED Project, the Program envisages an array of regulatory, legislative, institutional and technical measures for a more rational use of water in the Ararat Valley for different purposes such as fish farming, irrigation, drinking, and drainage system; (4) ASPIRED launched implementation of pilot projects aimed at improving water management on the grassroots level by the communities, fish-farmers: irrigation improvement project in Hayanist (launched in May 2017), well conservation project in Sipanik.

<sup>13</sup> The data refers to Samvel Lablajyan's fish farm where the pumping station is installed for channeling water to the community of Hayanist.

<sup>14</sup> The LOP data refers to the practice of the secondary use of that outlet water from fisheries for irrigation purposes – which is an innovative approach and has never been practiced in Armenia at the community scale.

### **3. Program Implementation**

#### **Water Resource Data**

##### **State Water Cadaster Information System (SWCIS) Enhancement**

During the reporting period, ASPIRED team continued its collaboration with WRMA and EMIC specialists on enhancement of the SWCIS. ASPIRED elaborated and programmed the format of a new component of the data warehouse on the Hydropower plants. Furthermore, the ASPIRED and MNP teams agreed on the datasets and format of the table templates for the quantitative and qualitative parameters of groundwater resources, based on which the ASPIRED Project programmed the data input tables for groundwater resources.

In November, the ASPIRED team met with the EU's Water Initiative Plus (EU WI+) Project to discuss technical assistance approaches to the WRMA on the SWCIS development. The purpose of the discussion was to ensure that activities of both projects are complimentary rather than duplicating each other. ASPIRED and EU WI+ agreed that ASPIRED will continue assisting the WRMA in the data warehouse upgrading process, whereas the EU WI+ project will focus on establishing the data transfer tools between the stakeholder institutions of the SWCIS.

Following the recommendations of Dr. Tom Sheng concerning further improvement of SWCIS and its long-term sustainability, the ASPIRED team prepared a technical report which documented the necessary concepts, requirements, and processes for development of the SWCIS. Specifically, the report provides an analysis of the requirements for enhancement of the data repository, including the business processes and data flow analysis. The report also presents (1) the conceptual model (data entities), the logical model (data relationships diagram) and physical modeling (mapping to tables); (2) the processes of constructing the relational databases, including user interfaces, data entry, review, edit/ delete forms, queries, reports, import and export options; and (3) processes of programming the databases for online application and deploying the online databases on the WRMA/MNP website. ASPIRED plans to use this document for maintenance and further enhancement of the data warehouse and will help to ensure its long-term sustainability.

##### **Decision Support Tools**

During the reporting period, ASPIRED focused on the following activities for the design of the decision support tools for the Ararat Valley.

- Generation of annual values for the river basins of Ararat Valley basin
- Adaptation of the Decision Support System (DSS) for different users
- Capacity building of the MNP staff in the use of the GIS and other advanced software tools

By the end of December, ASPIRED completed generation of the annual values of natural flow for Hrazdan, Qasakh, Metsamor, Akhuryan, Vedi and Azat river basins of the Ararat Valley catchment area for the period of 1961-2016, utilizing the hydrological monitoring and water use/abstraction data received from Hydromet Service and WRMA. The DSS Programmer

debugged the Hydrological Balance component of the DSS based on the errors identified during the calculations.

The ASPIRED Project's Short-Term Water Quality Specialist initiated the process of identification of the types of data on quality of surface and groundwater resources in the Ararat Valley that are needed for assessment and classification of water resources. ASPIRED drafted a letter to the MNP to request the datasets needed for the period of 2015-2017 for surface water resources, and 2009-2017 for groundwater resources, which will allow assessing water quality dynamics.

Dr. Sheng raised concerns that the current version of the model looks too complicated to present to potential users, particularly to non-technical specialists. Based on Dr. Sheng's recommendations, the developing team decided to provide two versions of the DSS: one intended for advanced users (field experts, technical specialists), as well as a second version for decision-makers. Field experts will use the current version of the DSS, which requires multiple inputs from users. The more simplified and automated second version, which will not require multiple inputs, can provide data assessments in the form of reports, diagrams, maps on water balance, water supply and demand balance to non-specialists or decision makers. The ASPIRED team, jointly with Dr. Sheng, elaborated a preliminary menu and user interface for the DSS for non-technical staff/decision-makers, based on which the ASPIRED programmer started the design of the simplified version. Additionally, the ASPIRED team worked on the design of the new simplified interface of the Water Quality Assessment tool of the DSS to be finalized during the next quarter.

On November 28, ASPIRED conducted a two-week introductory course on GIS for the staff of the WRMA and EMIC. The purpose of the course was to strengthen participants' capacities to work with the geodatabases, ArcCatalog, ArcMap, and ArcToolbox packages of the ArcGIS for mapping and analysis. The course structure combined presentations with practical exercises, using data from pilot areas in Armenia, including the Ararat Valley. A report will be prepared, describing the topics of the training program, results of the pre- and post-evaluation of the participants' skills, as well as recommendations made by the participants.

The current training is a basis for a more advanced course on the groundwater modeling planned in January 2018. In December, ME&A finalized a Purchase Order with AQUAVEO – an American company providing solutions for modeling and visualizing groundwater & surface-water hydrology and hydraulics – to provide a customized training program on groundwater modeling tools (such as the Arc Hydro Groundwater, MODFLOW, etc.) to 11 trainees representing the ASPIRED Project, WRMA, EMIC, and several local academic institutions. The ASPIRED team coordinated with the AQUAVEO experts to finalize the technical content, agenda, and logistical arrangements (venue, translation services, invitations, etc.) of the training program, scheduled for January 15-19, 2018.



**Shots of the GIS course conducted by Aram Gevorgyan, the ASPIRED Project's GIS Specialist. Certificate holders, left to right: Victoria Terteryan, WRMA, Arag Gevorgyan, ASPIRED Project, and EMIC specialists Armine Hakobyan, Harutyun Yeremyan and Gegham Muradyan.**

### **Applying Remote Sensing Technologies for Data Analysis**

During the reporting period, ASPIRED prepared the draft map on land use/land cover in the Ararat Valley and generated the draft CN (curve number) curve raster image which have been generated from the land cover supervised classification. ASPIRED performed a visual inspection of the land cover/use image for about 20 randomly selected locations by superimposing the results over a Google Earth Map. Visually, the land cover/use classes agreed with the Google Earth image.

In December, the ASPIRED Remote Sensing Specialist finalized supervised classification of land cover/land use in the Ararat Valley. Before applying the classified results for the runoff estimation, the ASPIRED team conducted an accuracy assessment of the classification land cover/use map, using the statistical Error Matrix technique recommended by Dr. Sheng. The results indicated almost 90% of the classification accuracy.

In order to improve the runoff estimation for the Ararat Valley using the results generated at this stage, the ASPIRED team will work with the stakeholder agencies in obtaining additional data on infiltration rates in the Ararat Valley. If necessary, the ASPIRED team will conduct field measurements during spring 2018 to determine infiltration rate in the selected point.

### **Introduction of Automated Online System for Groundwater Use Monitoring**

Installation of the automated online system for groundwater use monitoring was initially planned at four large fisheries of the Ararat Valley, recommended by the MNP. This task experienced delays mainly due to the technical design of the RFP for installation of equipment (flow meters and data loggers), the time needed to ensure the technical specifications aligned with the requirements of the MNP, a lack of potential bidders in the local market place who demonstrating the necessary competencies to carry out this activity, selection of the fisheries, and the difficulties faced by bidders to obtain access to the fisheries for measurement purposes.

Due to interested bidders' inability to visit the fisheries to conduct measurements, ASPIRED received no proposals by the initial proposal deadline of November 9, 2017. Therefore, ASPIRED extended the deadline for the proposals submission to December 1, 2017. After a



review of the two proposals received by the December 1 deadline, ASPIRED determined that neither of the proposals fully met the technical requirements of either the MNP or the ASPIRED Project. In addition ASPIRED and USAID determined that the integrity of the procurement was compromised during the process and decided to cancel the procurement and develop a new procurement document with more clear specifications and evaluation criteria. ME&A will release a new procurement announcement that addresses the above concerns and will be open for interested local and international companies.

## **Low Cost and Water Efficiency Technologies**

### **ATTC Project**

USAID approved the RFA package, based on final water test results taken from the new surface water intake to be used for the ATTC Project. As a result of the competitive bidding, ASPIRED contracted AYR Design LLC for the design of the facilities and infrastructures of the ATTC with assistance from the ASPIRED engineer. The fish farm owner prepared the site for measurements and further constructions. The sub-contractor submitted the initial design of all premises and infrastructures, (including the 3D models) to the ASPIRED team for review and approval in December.



*3D model of the ATTC premises.*

### **Water Reuse Project in Sayat-Nova**

In December, ASPIRED received USAID approval of the Water Reuse Project in Sayat-Nova village. The following four partners will implement the pilot project under a cooperation agreement signed on December 25, 2017: ASPIRED, SME DNC/ USAID PRP Project, FAR and Sayat-Nova community. The objective of the project is to ensure the irrigation of 60 ha of community farmlands with the use of the outlet water from Masis-Dzuk fish farm. The pilot project includes the following activities:

- Pumping station to be built in the premises of Masis-Dzuk fish farm with its infrastructure, that will be used to pump water for irrigation of the nearby fields;
- Extension of a pipeline from the pumping station to the upper part of the old irrigation system, so that the water can flow back through the existing aqueducts by gravity; and
- Rehabilitation of the existing irrigation network and clean-up of existing earth and concrete ditches.

Following USAID approval of the pilot project, ASPIRED initiated procurement of the pumping equipment and services for construction of the pumping station at Masis Dzuk fish-farm. Following the cancellation of the first procurement notice on December 19, the ASPIRED team shared the technical specifications and draft RFP documents with ME&A's Home Office for review prior to reissuing the tender.

The village council decided to allocate funds from the contingency budget to pay for installation of the transformer station. The Electric Networks of Armenia is expected to complete the installation by late-January 2018.



*ASPIRED engineer Hayk Petrosyan explains the new irrigation network to the beneficiaries of Sayat-Nova village.*

### **Design of New Projects**

During the reporting period, ASPIRED continued the process of identifying opportunities for potential pilot projects. Based on a shortlist developed by the PURE Project, the ASPIRED and PURE teams jointly visited seven communities of Ararat and Armavir marzes (Yeghegnut, Aratashen, Griboyedov, Khachpar, Berqanush, Burastan and Vedi) to observe the feasibility of pilot projects suggested by the communities. Taking funding limitations into consideration, ASPIRED plans to finance 5-7 water projects, which should meet the criteria and objectives of both ASPIRED and PURE. In November, communities participated in a two-day training course on proposal preparation, during which ASPIRED introduced criteria for pilot project selection.

ASPIRED explored the possibility of implementing a new pilot project on installation of solar photovoltaic panels at Samvel Lablajyan's fish farm. Although the project may provide a partial co-funding, the remaining funds need to be provided by the fish farm owner. ASPIRED facilitated a meeting between Lablajyan and SEDF representative to discuss the possibility of project financing with available lending instruments, particularly ACBA leasing at 9.8% annual interest rate. If the owner decides to proceed, SEDF will provide assistance towards preparing the estimates and application documents.

### **Introduction of Efficient Degassing and Aeration (EDA) Technology in Masis Dzuk:**



*The EDA technology installed at Masis*

In cooperation with the owner of Masis Dzuk fish-farm, the ASPIRED team developed and piloted an EDA technology in one of the ponds at the fish-farm. The EDA system is used for pretreating the incoming water at the fish farm, decreasing the concentration of carbon dioxide and increasing the concentration of dissolved oxygen. This system is particularly useful for the fish-farms of the Ararat Valley, where the water source is mainly artesian and has low level of dissolved oxygen and relatively high rate of carbon dioxide.

The initial assessment of the technology by an independent aquaculture expert was positive. Field measurements showed that the level of dissolved oxygen has increased by 30% and the level of dissolved carbon dioxide reduced by 32% at the fish pond due to the installed EDA technology. It appears to be much more efficient than commonly used paddle aerators, both in terms of its low investment and maintenance costs. Thus, for example, the investment cost of the installation of the paddle-wheel aerators varies between USD 16,000-18,000 in a fish farm similar to Masis Dzuk, whereas the installation of EDAs costs around USD 1500. Based on this assessment, the ASPIRED team and the fish farm owner are discussing the possibility of a full-scale project under with financial assistance of the ASPIRED Project.

## **Water Regulation and Enforcement**

The activities under the ASPIRED Project's legal component are aligned with those of the PURE Project. Specifically, the ASPIRED Project's Legal Coordinator worked on the following legal issues and documents over the past quarter:

- Review of the Advocacy Strategy of PURE Project, particularly the legal sections of the document;
- Involvement in the activities and meetings of the informal network on public advocacy created by PURE Project
- Involvement in the PURE Project's legal task force;
- Analysis of existing gaps in the legal sector, and involvement in the discussion of legal terms and definitions of the Water Code requiring further clarification and/or improvement; and
- Research of the best practices of public monitoring in the water sector.

During the reporting period, the ASPIRED team was involved in the legal task force created by the PURE Project and participated in meetings aimed at discussing the legal gaps in the water sector legislation. In December, ASPIRED participated in several round-table discussions of the PURE Project, during which the Ecological Law Educational Center of the Yerevan State University – a consortium member with the Urban Institute – shared its analysis of the water sector legislation. Particularly, ASPIRED suggested referring to the legal gap analysis report developed under USAID's Clean Energy and Water Program, which tackled many issues currently under discussion (e.g. financial guarantees for conservation of the wells, ecological flow, etc.). Issues discussed included the need to separate irrigation and drinking water issues, as well as the need to develop irrigation water standards, with the corresponding amendments in the water legislation.

As a member of the informal network on promoting public advocacy, the ASPIRED team reviewed and provided comments on the proposed advocacy strategy of the PURE Project, particularly its legal aspect. An important outcome of these round-tables was that many terms and their definitions currently used in the Water Code need to be either removed or clarified/updated. The members of the advocacy network recommended amendments of 23 term definitions currently used in the Water Code, such as “water bodies”, “free water use”, “ecological flow”, etc.

By the request of PURE Project, ASPIRED conducted a desk study on best practices of public monitoring in the water sector. The research showed that the term “public monitoring” is not appropriate and should be replaced with the term “public participation in monitoring process.” Based on the desk review results, ASPIRED completed the first draft of the Report on Public Participation in Water Management in December 2017. The draft report contains a review of the local and international practices of public participation, mechanisms, drivers, and obstacles to stakeholder engagement. After the internal review, ASPIRED will share the report with the PURE Project in during the next reporting period. It is also planned that the ASPIRED Project’s Legal Coordinator will develop a presentation of the best practices in public monitoring after finalizing the Report during the next quarter.

## Donor Coordination and Communications

**Completion of Sipanik Project:** On November 3, 2017, ASPIRED celebrated the completion of the Sipanik Well Sealing Project. Event preparations in October included visits to the community and the site, coordination of the event with the community, submission of input for the briefer for the Mission Director, preparation of the press release, media invitations, story board, and logistical arrangements.

Attendees of the project completion event included USAID Mission Director Deborah Grieser, First Deputy Minister of Nature Protection Erik Grigoryan, other representatives of the MNP, regional government, and the local residents. USAID Mission Director Deborah Grieser and Deputy-Minister Grigoryan were among the keynote speakers who emphasized that protection of the groundwater resources in Ararat Valley is a top priority for Armenia and closure of unused and abandoned wells will contribute to their conservation. During the



*VALML LLC received a certificate of acknowledgement from the ASPIRED Project during the celebration event. Right to left: USAID Mission Director Deborah Grieser, Executive Director of VALML LLC Vagharshak Petrosyan.*

event, the ASPIRED COP Magda Avetisyan presented a Certificate of Acknowledgement to the sub-contractor VALML LLC for its high quality of work and readiness to overcome the challenges of the project. After the official ceremony in the community school, participants were guided to the project site to observe the sealed well.

Two days earlier on November 1, the Minister of Nature Protection Mr. Artsvik Minasyan visited the Sipanik and Hayanist project sites during his business trip to Ararat province, accompanied by the Governor, the MNP staff, and media representatives. The ASPIRED team joined Minister Minasyan during his tour to explain the details of the projects in Hayanist and Sipanik<sup>15</sup>.

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<sup>15</sup> <https://www.youtube.com/watch?v=uMS2L2-Fu9c>  
<https://news.am/arm/news/418905.html>  
<http://ararat.mtad.am/news/item/2017/11/03/Ararat378/>

**Partnership Initiatives:** During the reporting period, the ASPIRED team conducted negotiations with USAID's PRP Project and FAR regarding their participation in the water reuse project in Sayat-Nova village, Ararat marz. On November 14, 2017, the ASPIRED team met with the active group of farmers and the mayor of Sayat-Nova community to present the potential funding of the project at a reduced scale, as well the involved parties and the buy-in of the community members in the pilot project. The ASPIRED team emphasized the community's cost-share obligation in the project and the need for farmers' commitment to resume cultivation of the farmlands after the project. Following the meeting, the community sent a commitment letter to the ASPIRED Project, confirming their cost share of USD 14,500 for the pilot project. The Partnership Agreement was signed between the ASPIRED Project, PRP, FAR and the community on December 25, 2017.

During the reporting period, the ASPIRED team continued meeting with different organizations on an ongoing basis in an effort to build partnerships for the project initiatives. More specifically:

- In November-December, ASPIRED met with the SEDF to discuss several possible projects on installation of solar photovoltaic panels or solar pumping systems and technical assistance of the FSE in preparing calculations and helping fish farms to obtain financing. Initial discussions mostly referred to the potential projects on installation of solar photovoltaic panels at Samvel Lablajyan's fish farm, ATTC project, as well as installation of solar pumping systems and photovoltaic panels in Vedi.
- ASPIRED agreed with Farmer to Farmer (FTF) Armenia that the latter will contribute consultants for the ASPIRED pilot projects, ATTC and Sayat-Nova, on a volunteer basis in spring-summer 2018. The respective scope of work was drafted by the ASPIRED team and provided to the FTF.
- On December 22, 2017, the ASPIRED team met with UNIDO to discuss a potential collaboration under the ATTC Project. UNIDO shared that its own project financing has expired, but that the team can assist in promoting the project on available platforms for further financing by private or international donors. Following the meeting, ASPIRED sent the ATTC project concept paper to the UNIDO team.
- The ASPIRED and PURE teams met with the Water Sector Project Implementation Unit (PIU) of the State Committee of Water System under the Ministry of Energy Infrastructures and Natural Resources to discuss collaboration opportunities for implementation of the water supply projects in the communities of Ararat Valley. Discussions mainly focused on the water projects to be implemented under the PURE Project and the possible overlap of community-level infrastructure activities to be implemented by the PIU. PIU will finalize the specific activities and costs of rehabilitation of irrigation networks in the communities in spring 2018, after which PURE and ASPIRED can reconsider activities to avoid duplication with the PIU.

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[http://finport.am/full\\_news.php?id=32159&lang=3](http://finport.am/full_news.php?id=32159&lang=3)

[http://yerkirmedia.am/haxordumner/?list=PLaidpbWcSRG6pyR4pgeZETJQHtgQSecVH&id=eCVSW-h9\\_as](http://yerkirmedia.am/haxordumner/?list=PLaidpbWcSRG6pyR4pgeZETJQHtgQSecVH&id=eCVSW-h9_as) - starting from 21:53 minutes

[https://www.youtube.com/watch?v=AB65C\\_CIIh8](https://www.youtube.com/watch?v=AB65C_CIIh8)

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## 4. General Administrative Issues

During the reporting period, ASPIRED announced several competitive bids, namely:

- Procurement notice for the design of the ATTC facility in October 2017, with the contract awarded to the Ayr Design based on the bid evaluation results. The tender was announced through the local newspapers and posted on the project web site.
- Procurement notice for the acquisition of equipment and software for the central control hub of the MNP, the announcement for which was posted by the ASPIRED Project, while the procurement process was to be administered by the Coca-Cola Hellenic Bottling Company (Coca-Cola HBC). ASPIRED assisted Coca-Cola HBC on determining the hardware and software specifications needed for the central control hub of the MNP and made the bid announcement.
- Notice for receiving bids for the installation of automated online groundwater use monitoring systems in the selected fisheries of Ararat Valley, the deadline for which was twice extended by the ASPIRED (November 20, 2017 and December 1, 2017 respectively) in concurrence with the MNP and USAID, and cancelled afterwards upon consultations with USAID and the ME&A head office. Initially, ASPIRED extended the proposal submission deadline due to the inability of potential bidders to have access to the fish farms for measurements required for the preparation of proposals. ASPIRED insisted that the MNP facilitate access of potential bidders to the premises of fish farms. A schedule of visits was prepared and sent to the potential bidders who were accompanied by the ASPIRED and MNP representatives. On December 1, ASPIRED received sealed proposals from bidders for the procurement and installation of flow meters and data loggers in the selected fisheries of Ararat Valley to be evaluated by the committee consisting of the ASPIED and MNP representatives. ASPIRED sent questions to the bidders requesting further clarifications to their proposals on December 5 and request for additional information on December 8. Unfortunately, none of the proposals fully met the requirements of the MNP or ASPIRED, particularly their technical approaches to the flow measurement in semi-full pipes. Although clarifications had been requested in the preceding week, there was no sufficient information provided by the bidders for making a final decision. On December 12, 2017, ASPIRED participated in the MNP-initiated meeting with the bidders to discuss their proposed technical solutions for more accurate water flow measurement. USAID and ASPIRED determined that the integrity of the procurement was compromised during the process and decided to cancel the procurement and develop a new procurement document with more clear specifications and evaluation criteria. On December 18, ASPIRED announced the cancellation of the bidding process, with prior written notification sent to the MNP. ME&A head office will revise the bidding documentation and announce a new international tender. ME&A will release a new procurement announcement that addresses the above concerns and will be open for interested local and international companies
- On December 4, 2017 ASPIRED announced a tender for construction of a pumping station under the water reuse project in Sayat-Nova. The procurement process was cancelled on December 19, pending the revision of the procurement documentation by the ME&A Home Office.

Following the cancellation of the two major procurement notices, ASPIRED administration provided the tender documentation to ME& A Home Office for review.

In regards to a program management system, ASPRIED underwent a quality assurance audit of its project performance monitoring system and availability of supporting information behind the data reported on the indicators. Overall, no drawbacks were identified, but recommendations were provided to the ASPIRED team on the type of collected information for the beneficiary-related indicator that ASPIRED team readily took into consideration. Additionally, ASPIRED provided input on a series of the project indicators for USAID's Performance Plan and Report for FY 2017.

During the reporting period, the ASPIRED team selected a Water Engineer to work on the water supply projects proposed by PURE Project, pending USAID approval.

## 5. Environmental Compliance

**Sipanik Well Closure:** ASPIRED team conducted site visits to Sipanik well sealing site to check the compliance of the site to the Environmental Mitigation and Monitoring Plan (EMMP) requirements. The team members cleaned the site of any construction garbage and left-overs. Additionally, the ASPIRED Environmental Specialist helped the Mayor of Sipanik community to prepare an application for the Water Use Permits on 4 groundwater wells.

**Sayat-Nova Village Water Reuse Project:** In November, ASPIRED prepared the environmental documents, namely the environmental review checklists and EMMP to be submitted to USAID along with the technical proposal and cost estimate. The Environmental Officer examined the feed stock of Masis Dzuk fish farm in terms of its quality and content and assigned the EMIC to sample and analyze water quality. Findings on the water quality analysis and feed stock were summarized in a memo and submitted to USAID in November.

## 6. Existing Problems or Issues

The major challenges of the project for the past quarter were the ultimate cancellation of the two procurement notices issued by the ASPIRED: (a) for the installation of the automated online groundwater use monitoring system (flow-meters and data-loggers) and (b) for the construction of the pumping house in Sayat-Nova village. ASPIRED provided all the tender documents to the ME&A headquarters for review and preparation of the new solicitations. The new tender for the installation of the flow-meters and data-loggers in fisheries will be open to both local and international bidders as well, thus providing an opportunity for a larger pool of qualified companies to apply and a higher volume of interested bidders is evaluated. Since the re-announcement of tenders may cause delays in the implementation of the pilot projects, the ASPIRED team will coordinate actions to ensure that project deadlines are met.

## 7. Planned Activities for the Next Quarter

### 7.1 Data

- Finalize the technical report that documents the conceptual and logical models, requirements and processes for constructing the enhanced SWCIS.

- Install the programmed databases of the SWCIS on the MNP's server, and work with the WRMA on the type and format of the export/import functions, queries and reports, after the relevant datasets are organized in the data warehouse by the WRMA.
- Develop precipitation/runoff curve(s) for the Ararat Valley, using outcomes of the supervised classification of the Ararat Valley land cover/land use.
- Continue programming of the simplified, automated interface for the DSS for the non-technical users/decision-makers, including the water balance and water quality assessment components of the Hydrological Model.
- Organize a 5-day on customized training on groundwater modeling, to be conducted by the AQUAVEO expert Alan Lemon on January 15-19, 2018, for 11 participants representing ASPIRED, WRMA, EMIC of the MNP, AUA, ICARE/ATC and Yerevan State University.
- Prepare a project report on the training program, describing the topics covered and training materials.
- Work on the 3-dimensional model of the Ararat Valley aquifers, using the Hydrogeologic Framework prepared by the USGS Dakota team.
- Collaborate with the MNP's EMIC on design and implementation of the action plan for extending the national reference groundwater monitoring network in the Ararat Valley.
- Collaborate with ME&A HQ and MNP on implementation of the SOW on installation of the groundwater use monitoring system on the 20 groundwater abstraction points in the selected fisheries.

## 6.2 Pilot technologies

- Preparation of RFP package for selection of a contractor under the ATTC Project and announcement of the tender;
- Completion of the tender for construction of the pumping station under Sayat Nova water reuse / irrigation project and signing of a contract with the successful bidder;
- Preparation of a draft project concept for optimization of a community-owned irrigation well (probably in Sipanik);
- Preparation of a draft project concept for introduction of the EDA technology in Masis Dzuk fish-farm;
- Review and initial assessment of the draft pilot project proposals presented by PURE (if any).

## 6.3. Legal and Policy Issues

- Finalize the report on best practices of public monitoring in water sector "Public participation in water management". The final report will be submitted to USAID for their consideration. After the approval, ASPIRED will forward the report to the PURE team.
- STF meetings will be conducted on January 15 and 16, 2018. The topics for discussion are: the legal framework related to activity of Water User Associations and WUA unions; legal basis of water use permits and public participation in water management.
- Prepare a presentation on public participation in water management for the "Public Advocacy in the Water Sector" informal network.
- The ASPIRED team will review the report of "Legal Gap Analysis" prepared by the PURE



Project, as well as ensure that the report of “Towards Improved Integrated Water Resources Management in Armenia” (prepared by USAID CEW Program team in 2015) and the report of “Legal Gap Analysis” (prepared by the PURE Project) are consistent and complementary.

#### **6.4 Performance Management, Communication and Donor Coordination**

- Develop collaboration with Sustainable Energy Development Fund on clean energy projects.
- Follow up on collaboration with the FAR, SME DNC and Sayat-Nova community on the implementation of the community irrigation project.
- Work towards identification of new partnerships.
- Conduct outreach and communications activities of the project.
- Follow-up on the PMP updates and prepare weekly highlights, monthly reports.

#### **6.5 Environmental Compliance**

- Work with the Engineers on examination of the baseline environmental conditions at the selected project sites and proposed solutions; prepare environmental review documentation, including the EMMPs for the pilot project concepts.
- Conduct health and environmental safety training programs for the project implementing partners before the launch of the construction works.
- Resume site monitoring visits at the start of the construction season

#### **6.6 Project Management**

- Conduct financial management of the program.
- Follow up on the procurement notices for the approved and new pilot projects
- Provide technical information to the headquarters required for the preparation of the tender package of documents.
- Administer contractual procedures with the new contractors and STTAs.