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ADVANCED SCIENCE & PARTNERSHIPS FOR INTEGRATED RESOURCE DEVELOPMENT PROJECT

QUARTERLY REPORT

July-September 2018

October 2018

This publication was produced for review by the United States Agency for International Development. It was prepared by ME&A, Inc.

Advanced Science & Partnerships for Integrated Resource Development

QUARTERLY REPORT FOURTH QUARTER FY 2018

October 2018

Contract No. AID-OAA-I-14-00070/AID-111-TO-15-00001

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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.
CARD	Center for Agribusiness and Rural Development Foundation
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
ERGIS	Environmental Research and GIS
ESS	Environmental Scoping Statement
EU	European Union
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
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
PURE-Water	Participatory Utilization and Resource Efficiency of Water
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
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 fourth quarter of Year 3 of the project. It covers the period from July 1 through September 30, 2018. The report reviews progress and achievements in each of the project areas during the reporting period, as well as describes planned activities for the next quarter. The report also highlights challenges and actions taken to address these challenges.

1.2 ASPIRED Project Summary

On September 29, 2015, the United States Agency for International Development (USAID) awarded ME&A (formerly Mendez England & Associates) a contract to implement the ASPIRED Project under the Water and Development IDIQ. 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 on 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 public and private sectors, 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:
 - The ASPIRED team completed testing and debugging of the Hydrological model of the Decision Support System (DSS), designed for the advanced users and decision-makers. The DSS has been used to calculate the annual values for 2016 and calculated multiannual average values of water balance components of the Ararat Valley for the period of 1961-2016.
 - The ASPIRED team finalized development of the three-dimensional (3D) model of the Ararat Valley structure. It was developed with application of the ArcHydro Groundwater tools, using data of about 2800 groundwater wells compiled during

- inventory for groundwater wells, fish farms and natural springs conducted in 2016
- The ASPIRED completed refurbishment of selected groundwater monitoring wells in the feeding zone of the Ararat Valley
 - Technology component:
 - Completed water reuse and irrigation improvement project in Sayat-Nova community.
 - Completed well optimization and irrigation improvement project in Sipanik community.
 - Started water projects in Yeghegnut and Aratashen communities.
 - Legal component:
 - The ASPIRED technical team prepared the first draft of the government decision on establishment of requirements for protection of water resources in recreation zones as part of the ASPIRED Project's legal assistance to the Ministry of Nature Protection (MNP).
 - Communication and Donor Coordination component:
 - Signing of the memorandum of collaboration with the Sustainable Energy Development Fund (SEDF) on July 11.
 - Collaborated with the community of Sipanik for the implementation of the well optimization and irrigation improvement project.

2. Summary of Performance Indicators

Summary of performance indicators for the fourth quarter of FY 2018 (Year 3 of the project) is presented in the table below.

	Indicator	Planned/ Actual Target for Year 3	Quarter 4	Life of project (as of Q4/2018)	Notes: Descriptions/Comments/Assumptions
IR 1: Establish a comprehensive, user-friendly, open data system that is accessible to all stakeholders.					
Sub-IR 1.1: Ararat Valley Geocoded, real-time, publicly accessible data system that incorporates water resource, groundwater, and hydrological datasets from multiple stakeholders built and shared with the GOA					
Indicators					
1.1.1	Percent (of total) of datasets for the Ararat Valley publicly accessible	20/23	0	43	By the end of the project life cycle, ASPIRED will make 80% of all datasets available on Ararat Valley public, which accounts for 100% of all the data that can be available to the public according to the Armenian legislation. During Y3, ASPIRED finalized and made available three sets of data, including: <ul style="list-style-type: none"> - Data on Land cover/use classification of the Ararat Valley; - CN raster curve and datasets on precipitation/run-off generation for the Ararat Valley; and - Hydrogeological structure of the Ararat Valley.
1.1.2	Percent (of total) wells mapped in the Ararat Valley.	N/A	N/A	100%	This indicator corresponds to the inventory of the wells, natural springs and fish farms in Ararat Valley, which the project team successfully completed during Year 1. Therefore, collecting data for this indicator has been completed for the project..
1.1.3	Number of stakeholders engaged in the data collection activities	5/3	0	12 ¹	This indicator refers to the number of stakeholders engaged in the groundwater-related data collection activities in the Ararat Valley from different sectors – government, private, and public. ASPIRED installed the system in 3 fisheries: Alex Grig, Interaqua, and Golden Fish.

1. 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

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					
Indicators					
1.2.1	GIS-based decision support tools for Ararat Valley developed	1/0	0	0	ASPIRED completed the Hydrological Model of the DSS for the Ararat Valley during Quarter 4 of Year 3. The projects anticipates completion of the Groundwater Flow Model for the Ararat Valley by the end of Year 4.
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					
Indicators					
1.3.1	Number of fisheries with automatic data system installed	5/3	0	3	In April 2018, the project initially started installation of online groundwater use monitoring systems at four large fisheries proposed by MNP (out of the planned five) in the Ararat Valley – Alex Grig, Interaqua, Maxfish, and Golden Fish. By the end of Quarter 4 of Year 3, ASPIRED completed the project in three fisheries out of the four proposed fisheries, since Maxfish dropped out from the project. MNP is currently researching potential fisheries who are interested in committing to the installation of the remaining flow meters and data loggers.
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					
Indicators					
1.4.1	Percent (of total) coverage of the groundwater extraction points monitored	8/5	0	5	This indicator measures 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 ² . By July 2018, ASPIRED installed 15 groundwater monitoring systems, This indicator also includes 3 groundwater monitoring systems installed under the European Union’s Water Initiative + Project. As of the end of Quarter 4 of Year 3, installation of the new monitoring systems is pending. See comments under Indicator 1.3.1 for more details.
IR 2: Introduce locally appropriate, cost effective technologies to improve water resource management					

² 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.

Sub-IR 2.1: Technologies developed, piloted, and evaluated at different-sized fish farms with the objective of improving water resources management					
Indicators					
2.1.1	Number of groundwater extraction reduction technologies piloted and evaluated	3/1	1	3 ³	This indicator refers to technologies introduced at fish farms or other water use points that contribute to the reduction of the groundwater extraction by users. This indicator also provides information on annual water saved, measured in cubic meters. During Quarter 4 of Year 3, ASPIRED completed well optimization/irrigation improvement project in Sipanik.
2.1.2	Thousands of cubic meters of water saved annually in Ararat Valley	9000/5385	5385	8385 ⁴	This indicator measures the amount of 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 (AAB) affected by the shortage of groundwater resource (in collaboration with PURE Project). The data is cumulative and includes recurrent savings provided by completed water projects (Hayanist 1.1 mln, Sipanik well sealing 1.9 mln, Sayat-Nova 1.92mln and Sipanik well optimization 465,000). In Q4, ASPIRED started projects in Yeghegnut and Aratashen, the data for which would be reported after their completion in 2019. The deviation in indicators is due to the delayed start of these projects, with the lack of water use permits in the communities for the operation of wells leading to these delays. Given that the water permitting process is potentially time-intensive and involving many steps, which may result in critical delays for the Project, ASPIRED received USAID concurrence to start the projects as soon as the communities submitted their applications to the Water Resources Management Agency (WRMA).
Sub-IR 2.2: Technologies with the objective of increasing energy efficiency and/or renewable energy generation of water users developed, piloted, and evaluated					
Indicators					
2.2.1	Number of energy efficiency and/or renewable energy (EE/RE) technologies piloted and evaluated	3/0	0	0	This indicator refers to water-use related EE/RE technologies to be piloted during project implementation. The project will install renewable technologies (photovoltaic and biogas) at the Aquaculture Technology Transfer Center (ATTC). Data for this indication will be available after completion of the ATTC Project.
2.2.2	Megawatt hour of energy saved annually	125/24	24	48 ⁵	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. Year 3 Quarter 4 data refers to the Hayanist water reuse project. The discrepancy between the planned and actual figures due to the delays in the implementation of water projects in

³ The data refers to the Water Reuse Project in Hayanist³ and the Well Sealing Project in Sipanik village

⁴ This includes total amount of savings generated from ASPIRED pilot projects.

⁵ LOP data refers to 2 years of operation of Hayanist project.

					collaboration with the USAID-funded PURE Project. The major portion of savings for 2018 was to be provided by the ATTC and water supply projects in Aratashen and Yeghegnut. ASPIRED postponed the implementation of water projects in Yeghegnut and Aratashen communities (PURE Projects), the reasons for which are explained in Indicator 2.1.2.
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, as tracked under Indicator 2.2.1
2.2.4	Gains in the reduction of GHG emissions as a result of USG assistance, in metric tone	40.8/461	461 ⁶	472,4 ⁷	GHG emission reduction quantities are estimated based on the kilowatt hour of savings resulting from application of energy saving technologies in metric tons/year. In addition, since Year 3 Quarter 4 and in concurrence with USAID, ASPIRED started counting the CO2 reductions resulting from irrigated farmlands of Hayanist, Sayat-Nova, and Sipanik villages
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.	5700/646	646 (300 women; 346 men)	986 ⁸ (500 women; 486 men)	This indicator tracks qualitative improvements ⁹ of the water resource resulting from the infrastructure projects implemented by ASPIRED ¹⁰ . The term “water users” refers to households, local farmers, and other groups benefitting from these improvements. (Gender disaggregated whenever possible). Year 3 Quarter 4 data refers to two pilot projects: the water reuse project in Sayat-Nova and the well optimization project in Sipanik. This deviation is due to the delayed start of PURE infrastructure projects. Reasons for delay are explained under Indicator 2.1.2.
2.2.6	Number of water users experiencing improved efficiency of water resource use	8/2	2	5 ¹¹	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. The data collected for Year 3 Quarter 4 refer to the project in Sayat-Nova and Masis Dzuk fishery. To avoid double-counting, ASPIRED did not report data for the Sipanik well optimization project under this indicator during the reporting period.
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					
Indicators					

⁶ Gains in the reduction of GHG emissions from installed systems and irrigated farmlands in Hayanist, Sayat-Nova, and Sipanik projects.

⁷ Data refers to Hayanist, Sayat-Nova, and Sipanik projects.

⁸ The LOP data refers to the beneficiaries of the two water reuse projects in Hayanist and Sayat-Nova and the well optimization project in Sipanik.

⁹ Pre and post-implementation water tests will be taken to detect the qualitative changes in water.

¹⁰ Initially, this indicator referred only to the drinking water supply projects. Following 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.

¹¹ The results refer to Sipanik community, water reuse projects in Hayanist and Sayat-Nova communities, including communities and the fish-farm owners. Based on the results of Hayanist and Sayat-Nova projects (a) two communities avoided drilling of wells for irrigation needs; (b) two fisheries, Samvel Lablajyan’s fish farm and Masis Dzuk fishery, became more efficient water users.

2.3.1	Number of successful technologies recommended and shared with the stakeholders and policy-makers	3/1	1	3 ¹²	ASPIRED will pilot at least six technologies by the end of project cycle, as well as conduct an evaluation and provide recommendations during Year 5 of the project. Year 3 Quarter 4 data refers to the well optimization/irrigation improvement project in Sipanik.
Sub-IR 2.4: Technology or method to permanently close illegal and/or abandoned wells, developed, piloted, and evaluated					
Indicators					
2.4.1	Number of piloted technologies to permanently close illegal or abandoned wells	2/1	1	2	ASPIRED initially planned to pilot at least two well optimization/sealing projects during Year 3. ASPIRED has submitted a letter of inquiry to MNP regarding recommended wells for closure and is waiting for a response. During Year 3 Quarter 4, the ASPIRED completed the well optimization project in Sipanik.
IR 3: Introduce new policies and regulations to improve integrated water resource management.					
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	1/2 ¹³	0	4	This indicator refers to trainings on the 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.
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.	15/43 (38 men; 5 women)	14 ¹⁴ (14 men)	91 (17 women and 74 men)	This indicator refers to 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. The Year 3 Quarter 4 data refers to number of participants of the sustainable farming training for Sayat-Nova farmers.
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					

¹² Aeration technology piloted Masis Dzuk fish-farm; Hayanist water reuse project; Sipanik well optimization project.

¹³ In December 2017, ASPIRED conducted a two-week GIS course for the WRMA and EMIC staff. In January 2018, the groundwater modeling course was conducted for the specialists of MNP and academic centers.

¹⁴ Participants of the sustainable farming training in Sayat-Nova.

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 /Quarter 2; therefore, ASPIRED has completed data collection under this indicator for the project.
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	1/1	0	1	This indicator refers to the package of recommendations that the ASPIRED Project drafted and submitted to the GOA. Per the GOA's request, ASPIRED submitted the expert opinion on program of measures in national Water code to USAID.
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 ¹⁵	0	24	This indicator refers to newly identified stakeholders and points of influence in water and water-energy nexus for the ASPIRED Project.
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					
Indicators					
4.2.1	Percent of total funding leveraged from stakeholders for water resources management activities.	40/35 ¹⁶	35	30 ¹⁷	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 specific year of the project cycle. As of Year 3 Quarter 4, the data includes cost-shares of Sayat-Nova and Sipanik projects versus the total cost of the projects.

¹⁵ Refers to SEDF.

¹⁶ The figure represents cost share of the partners versus the cost-share of the ASPIRED project in pilots during the particular year, in this case Year 3.

¹⁷ The actual cost-share of partners (Coca-Cola HBC, ERGIS and Hayanist community –for Hayanist project; VALML LLC for Sipanik, Sipanik community for well optimization; PRP, FAR and Sayat-Nova community for water reuse project in Sayat-Nova) versus the total cost of the projects. Since ASPIRED project has different share in different projects, the total percentage of the leveraged funding may be lower than that for a particular year.

4.2.2	Number of partnerships made by ASPIRED with other organizations	4/7 ¹⁸	2	13	This indicator refers to partnerships and collaborations 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. During Year 3 Quarter 4, the ASPIRED Project signed a collaboration agreement with SEDF and implemented a joint project with the Sipanik community.
1. Portfolio-level indicators					
5.1	Percent of population living in targeted areas with improved water management	19/4.1	4.1 (women -2.1%; men 2%)	8.2 ¹⁹ (women - 4.2%; men - 4%)	The geographical target area is the Ararat Artesian Basin (AAB), a territory of 13,075 hectares with a population of 58,373 people (28,392 men; 30,345 women). Year 3 Quarter 4 data refers to Sayat-Nova community data.
5.2	Number of key implementation steps taken to improve water management in the Ararat Valley	2/2 ²⁰	0	6 ²¹	This indicator refers to policy, analysis, and other activities targeted towards improvement of water data-related activities, including training and pilot projects. ASPIRED completed the customized Hydrological Model of the DSS for the Ararat Valley and installed online monitoring systems in fish-farms
5.3	Number of private sector firms that have improved management practices or technologies, as a result of USG assistance	6/5 ²²	1	6 ²³	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. By the end of Year 3, ASPIRED equipped three fisheries with online monitoring systems and two fish-farms participate in two infrastructure projects: ATTC Project and Water Reuse for Irrigation Project.

¹⁸ Results for Year 3, refer to PRP, FAR, SEDF, CARD, Armavir Farmer LLC, Sayat-Nova and Sipanik communities.

¹⁹ The LOP results refer to the population size of Sipanik, Hayanist & Sayat-Nova communities versus the total size of the population in the AAB.

²⁰ Y3 results: (1) ASPIRED completed the customized Hydrological Model of the DSS for the Ararat Valley; (2) installed online monitoring systems in fish-farms.

²¹ (1) The inventory of groundwater wells and springs was completed in September 2016. (2) USAID presented two reports to the GOA - 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. (5) Installation of the automated online groundwater use monitoring system in the fisheries of the Ararat Valley, (6) hydrological model of the DSS.

²² The data includes Armavir Farmer LLC, Masis Dzuk and 3 fish-farms with online monitoring systems.

²³ The LOE result includes 6 fisheries participating in the ASPIRED projects: three have been equipped with online monitoring systems and three fish-farms participate in the infrastructure projects – ATTC and water reuse for irrigation (Lablajyan and Masis Dzuk).

5.4	Number of innovations supported through USG assistance.	3/3	2	4 ²⁴	This indicator refers to the number of innovative technologies, management/monitoring tools or practices introduced by the ASPIRED team in fish farms, at water use points and/or communities of Ararat Valley which contribute to the reduction of the groundwater use. The data refers to well sealing/optimization activities, ATTC, and installation of the online monitoring system in the fisheries which the ASPIRED Project deployed innovative approaches to Armenia for increasing the efficiency and/or monitoring use of the groundwater resources in the Ararat Valley.
5.5	Number of innovations supported through USG assistance with demonstrated uptake by private and/or public sector firms	1/2	1	2	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. Year 3 results refer to the replication of the water reuse project in Hovtashat community (with assistance from ERGIS NGO) and the Sayat-Nova Water Reuse Project.

²⁴ The LOP data refers to the practice of the secondary use of that outlet water from fisheries for irrigation purposes, which has never been practiced at a community scale; well sealing/optimization activities; the ATTC and installation of the online monitoring system in the fisheries.

3. Program Implementation

3.1 Water Resource Data

SWCIS Enhancement

During the reporting period, the ASPIRED Project collaborated with the WRMA on finding solutions to the new server installation issue. Once this up-to-date server is operational, the ASPIRED Project can begin installing the programmed databases of the SWCIS. The WRMA technical personnel will populate the draft the SWCIS data warehouse and test it with actual data, so the ASPIRED Project team can begin debugging of the programmed databases and continue working with the WRMA on the next steps of the SWCIS data warehouse improvement.

Following the WRMA's written request, in September the ASPIRED Project hired a short-term IT specialist to install the server in accordance with technical requirements of the MNP. The specialist will collaborate with the MNP as required for obtaining all the necessary permissions for operationalization of the server. When operational, this up-to-date server will host the enhanced SWCIS and data of the centralized online groundwater use monitoring system through the Supervisory Control and Data Acquisition (SCADA) software.

Decision Support Tools

DSS: The ASPIRED team completed testing and debugging of the Hydrological model of the DSS, designed for the advanced users and decision-makers. The DSS has been used to calculate the annual values for year 2016 and calculated multi-annual average values of water balance components of the Ararat Valley for the period of 1961-2016.

The ASPIRED team summarized the interim results of the hydrologic analysis for the Ararat Valley in a technical report submitted to USAID for review in September 2016. The report describes the methodology and data used for the calculation of the water balance or the hydrologic balance of the Ararat Valley and its separate components: precipitation, evapotranspiration, natural surface flow, and natural groundwater flow. It provides calculated annual values for year of 2016 and calculated multi-annual average values of water balance components for the period of 1961-2016. The report describes the limitations of the calculations, as well as provides next steps for finalizing the hydrologic and groundwater modeling for the Ararat Valley that are planned to be implemented within the framework of the ASPIRED Project.

In September, ASPIRED's data team participated with other water sector representatives in the workshop on river basin management planning, organized by the EU Water+ Initiative. During the workshop, the ASPIRED team facilitated a session on the decision support tools for management of surface and groundwater resources that are currently undertaken for the Ararat Valley. The ASPIRED team learned that the DSS has been calibrated for the river basins of the Hrazdan and Sevan basin management areas, for calculating water balance and ecological flow in these basins as a part of basin

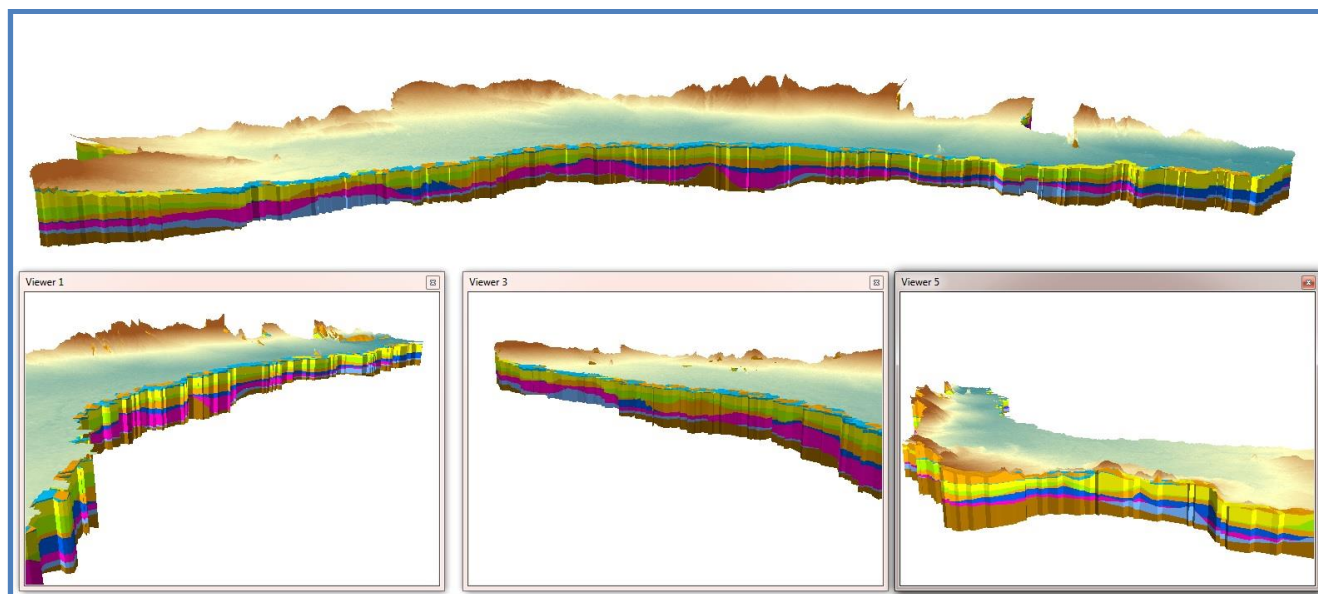
management planning activities supported by the EU Water Project. This demonstrates the sustainability of the technical tools created within USAID projects.

Groundwater modeling tools: During the quarter reported, the ASPIRED team finalized development of the three-dimensional (3D) model of the Ararat Valley structure. The project developed this model through the application of the ArcHydro Groundwater tools, using data of about 2800 groundwater wells compiled during the 2016 inventory for groundwater wells, fish farms, and natural springs.

As described in the conceptual model for the Ararat Valley groundwater modeling, prepared by the ASPIRED in June 2018, this is the first stage of creating the comprehensive groundwater flow model of the Ararat Valley basin. The 3D model provides the input data for calculating the volume of the groundwater reserve, the rates of groundwater recharge, and sustainable groundwater extraction rate in the Ararat Valley. The ASPIRED team plans to complete the comprehensive groundwater flow model in 2019.

During the reporting period, the ASPIRED team completed the preliminary version of the digital hydrogeologic map of the Ararat Valley, after digitizing hard-copy maps and geo-spatial datasets accumulated or produced by the ASPIRED Project. The digital hydrogeologic map also incorporates the findings of the 2017 scientific investigations report on the Hydrogeologic Framework and Groundwater Conditions of the Ararat Basin in Armenia, prepared by the U.S. Geological Survey (USGS).

Main features of the 3D model and preliminary version of the digital hydrogeologic map of the Ararat Valley were summarized in the project report. The report that also describes the conceptual model for the Ararat groundwater basin modeling, the datasets and sources of data used, and next steps for completing development of comprehensive groundwater flow for the Ararat Valley is intended for review by USAID and key stakeholders (i.e. MNP and its WRMA and Environmental Monitoring and Information Center (EMIC), other agencies) for the feedback.



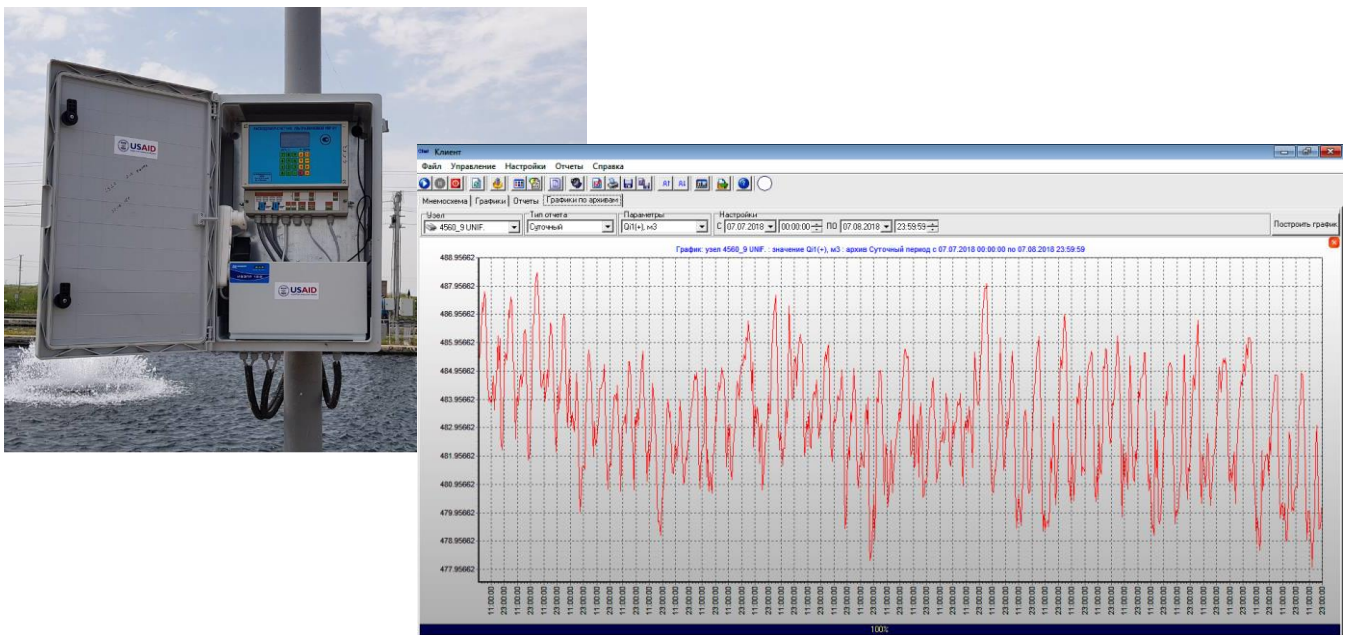
Hydro-geologic unit	General name	Water-bearing potential
1	Loam/clay	Low
2	Gravel	High
3	Clay	Low
4	Gravel	High
5	Thick basalt/clay	Low

Hydro-geologic unit	General name	Water-bearing potential
6	Gravel	High
7	Dense basalt/clay	Low
8	Gravel/fractured basalt	High
9	Dense clay	Low

The 3D structures of the main hydrogeologic units in the Ararat Valley groundwater basin

Introduction of the automated online system for groundwater use monitoring

During the Quarter 4 of Year 3, ASPIRED worked with Hybrid Telematica, local subcontractor for installation of groundwater flow meters in selected fisheries, monitored the operation of the flow meters installed on 15 groundwater wells. Hybrid Telematica set up the process to accumulate flow measurement data in a temporary virtual space until MNP provides its feedback on the second component of the automated online groundwater monitoring system – SCADA software. By the end of the reporting period, ASPIRED was waiting for MNP’s feedback on the SCADA software and its technical requirements.



Data logger transmitting hourly data on groundwater flow in one of the wells in the selected fishery

In late September, the WRMA reached an agreement with the manager of Mkhchyn Fish large scale fishery for installation of the flow meters and data loggers (5 flow meters and data loggers were planned for installing in the MaxFish). Although a copy of the written agreement was provided to ASPIRED on September 28, the fishery manager changed his mind regarding the installation of the flow measuring equipment and Hybrid Telematica could not proceed with installing the remaining

flow meters and data loggers. During the next reporting period, ASPIRED will continue collaborating with the WRMA to identify acceptable solutions for the utilization of the remaining five flow meters and data loggers.

Extending the national reference groundwater monitoring network in the Ararat Valley

In September 2018, ASPIRED completed refurbishment of selected groundwater monitoring wells in the feeding zone of the Ararat Valley, following technical specifications developed jointly by the ASPIRED Project and EMIC. Starting Quarter 1 of Year 4, EMIC will include these wells in the national reference groundwater monitoring network where data on groundwater level and some quality parameters will be monitored.

During the reporting period, the ASPIRED Project received the groundwater level meters that were purchased for EMIC as part of the technical support towards integrated monitoring of groundwater resources in the Ararat Valley. The ASPIRED team handed over the devices to the acting head of the EMIC on August 23. Procurement of other requested items are in progress.

Additional assistance to the MNP

Following the MNP’s written request, the ASPIRED Hydrologist initiated on-the-job training for the newly appointed deputy head of the Water Cadaster and Monitoring Division of the WRMA. This training covers methods and procedures for calculating ecological flow in the rivers of Armenia. ASPIRED provides approximately 8 hours of individual coaching in September, and will continue facilitating on-the-job training through October and November 2018.

3.2 Low Cost and Water Efficiency Technologies

Project Name/Technology	Status	Total cost, USD	ASPIRED cost-share, USD	Partner cost-share, USD	Partner
Hayanist irrigation rehabilitation project	Completed in April 2017	131,705	89,524	27,212	Coca Cola HBC
				11,269	ERGIS
				3,700	Hayanist community
Sipanik well sealing	Completed in August 2017	51,546	47,823	3,723	VALML LLC
Well optimization Sipanik	Completed in September 2018.	24,554	22,002	2,552	Sipanik community

Project Name/Technology	Status	Total cost, USD	ASPIRED cost-share, USD	Partner cost-share, USD	Partner
	<p>In August 2018, following USAID approval, ASPIRED began implementation and completed the tender procedures, selecting two sub-contractors for the renovation of the well and installation of the irrigation network.</p> <p>Main infrastructure work on the renovation of the well tube, installation of valves and laying of irrigation pipes was completed during September.</p>				
Sayat-Nova water reuse project	<p>Completed in September 2018.</p> <p>ASPIRED completed the project in September 2018. From July through September 2018, ASPIRED completed installation of water pipes for the irrigation network and overall system performance tests; the village completed construction of a channel to connect the intake tank of the pumping station with the fish pond.</p>	132,091	80,409	20,876	Partnership for Rural Prosperity Project
				14,395	Fund for Armenian Relief
				16,420	Sayat-Nova community
ATTC	<p>Ongoing</p> <ul style="list-style-type: none"> Completed construction of the office building and installation of the steel frames for the enclosures of the bio-filter and phyto-filter ponds. 	178,028	114,542	63,486	Armavir Farmer LLC

Project Name/Technology	Status	Total cost, USD	ASPIRED cost-share, USD	Partner cost-share, USD	Partner
	<ul style="list-style-type: none"> Per ASPIRED's request, the contractor carries out additional improvements based on the amendment to the existing subcontract at the expense of the ATTC project savings. The ASPIRED Project and Armavir Farmer LLC signed an amendment to the ATTC agreement, transferring the financial responsibility over the installation of the PV element to Armavir Farmer LLC. 				
Yeghegnut	Preparation of the network design is underway.	120,809	79,777	41,032	Yeghegnut community
Aratashen	Preparation of the network design is underway.	125,365	87,455	37,910	Aratashen community
TOTAL		764,557	521,532	243,025	



Left to right: pumping station and water distribution points in Sayat-Nova.



Left to right: Before and after implementation of the Sipsanik well optimization project.

Design of New Projects

ASPIRED is currently working with USAID/Armenia's Participatory Utilization and Resource Efficiency of Water (PURE) Project on the finalization of the urban irrigation project in Vedi. Representatives from the ASPIRED and PURE projects visited the village to collect observations for the concept and EMMP. PURE is currently preparing the EMMP. ASPIRED plans to finalize the concept in October 2018.

3.3 Water Regulation and Enforcement

During Quarter 3 of Year 3, USAID tasked the ASPIRED Project with assisting the GOA in the elaboration of the requirements for the protection of water resources in the recreational zones and assessment of self-purification capacity of rivers. This activity is part of the technical assistance of the ASPIRED Project to the MNP for implementation of the Priority Measures towards Effective Management of Ararat Basin and activities outlined in Appendix 2 of the corresponding GOA resolution.

The ASPIRED team planned to complete activities towards elaboration of the requirements for the protection of water resources in recreational zones by September 2018. To this end, the Project formed a working group consisting of field experts – a hydrologist, water quality expert, lawyer, and representatives of the MNP and Ministry of Agriculture (MOA). During the reporting period, the working group conducted series of meetings to discuss their activities, the format and schedule of deliverables, the main concepts and approaches to be addressed by the experts under these reports.

In mid-September, the legal expert submitted the final draft of the government decision on establishment of requirements for protection of water resources in recreation zones to the ASPIRED technical team for review. Initially the decision was intended to cover only water basins of the Ararat Valley. However, during the drafting process, the working group modified the scope of regulation of the government decision for it to be applicable to other water basins of Armenia.

The draft decision is based on the research of the international practice on classification of recreation zones, the review of the existing legislation, the formulation of the list of requirements for protection of water resources in recreation zones provided by the field experts. ASPIRED elaborated the definitions of “recreation zone” and other new terms which are used in the Government decision. Prior to finalization, the document underwent several peer review cycles, including a review by the following field experts from the academic sector: Trahel Vardanyan, Dean of the Faculty of Geography and Geology; and Aida Iskoyan, Head of the Environmental Law Research Center at the Yerevan State University.

Once ASPIRED completes its review of the document, the project team will submit the draft Government decision to USAID for further submission to the MNP.

3.4 Donor Coordination and Communications

Partnership Initiatives. During the reporting period, ASPIRED fully-executed a Memorandum of Collaboration with the Sustainable Energy Development Fund (SEDF) on July 11. The memorandum highlights the partnership initiatives of the ASPIRED and SEDF on the use of the solar technologies in the pilot projects. Rather than provide cost-share, SEDF will offer consultancy services to the project beneficiaries in various aspects, such as feasibility, cost-benefit assessment, and support in obtaining financing for solar technologies.

In July, ASPIRED cooperated with the Center for Agribusiness and Rural Development (CARD) Foundation to organize the sustainable farming training of the beneficiaries of the Sayat-Nova Project. While the CARD hosted the training in its Agricultural Support Center in Darakert, the specialists of the organization presented their services available for farmers, such as leasing of machinery and tools, availability of high-quality seeds and fertilizers, and other farmer support services. The information on the training along with the photos is available on the ASPIRED Project web site.

As part of our collaboration with the PURE Project, the ASPIRED team is involved in the various activities of PURE Project, including joint pilot project site visits, sharing responsibilities with respect to enforcement of environmental compliance requirements, and membership in the informal advocacy network under the legal component. During the reporting period, ASPIRED participated in PURE’s evaluation committee to review and select small grants proposals, as well as help facilitate the grant award ceremony in August 2018.

During this period, the ASPIRED team continued to promote collaboration with the Armenian academic sector, namely with universities and research centers under different tasks. Two researchers from the Yerevan State University, Trahel Vardanyan and Aida Iskoyan, supported the project by reviewing the draft government decision on the establishment of requirements for the protection of water resources in recreation zones, the scope of which has been expanded from the Ararat Valley to include other rivers across the territory of Armenia.

Communications and Outreach. In September, the ASPIRED team started preparations for the community event in Sayat-Nova village dedicated to the completion of the water project in the community. Usually, such events involve community support in providing the venue for the event, ensuring participation of the community and readiness of the project site for the event. The ASPIRED team visited the community to discuss event logistics with the mayor and the community for input.

Other communications tasks during the reporting period included updating the ASPIRED web site, namely [section on pilot projects](#) with the information on new Aratashen, Yeghegnut and Sipanik projects along with their photo galleries, posting of news and tender announcements in the ASPIRED web site and Facebook page.

In the reporting period, the team updated the PMP in preparation for Year 4 of the project, having adjusted the indicators for 2019 and 2020. In August, ASPIRED prepared the Performance Indicator Reference Sheet (PIRS) for the third year of the Project.

4. General Administrative Issues

The ASPIRED team submitted the first draft of the Year 4 Work Plan for USAID review and approval. The ASPIRED team had also presented the Year 4 Work Plan and results of the previous year to representatives of USAID/Armenia on September 10.

The ASPIRED Project team also provided a shorter version of the draft Work Plan to the Ministry of Nature Protection (MNP) for review and comments.

On September 19 the final draft of the Year 4 Work Plan was submitted to USAID for approval.

ASPIRED recruited two short-term experts – a hydrologist/hydromorphologist and a legal expert – to work on the establishment of the requirements for protection of water resources in recreation zones of the Ararat Valley under the legal and regulatory component of the ASPIRED Project.

During reporting period, the ASPIRED Project administered the following tenders for the pilot projects:

- Selection of the sub-contractor for the design of two water supply systems in Yeghegnut and Aratashen villages, including the designer’s supervision services;
- Supply of pipes and fitting and installation of pipeline for the well optimization project in Sipanik; and
- Repair of the irrigation well and construction of a valve chamber for the well optimization project in Sipanik.

5. Environmental Compliance

In the past quarter, the ASPIRED environmental specialist conducted regular environmental compliance monitoring of the ongoing ATTC and Sayat-Nova pilot projects. The ASPIRED team provided instructions to the subcontractors on implementation of the EMMP requirements, particularly on the proper and safe disposal of the construction debris and safety norms to be maintained at the project sites. The environmental specialist documented the observations made during the monitoring visits in the field observations checklists and provided instructions to the ASPIRED subcontractors and other implementing parties.

The Project specialist worked with the engineer on identification of the groundwater well optimization projects that could be piloted by the ASPIRED Project. The ASPIRED team prepared the environmental documentation (including the environmental review checklist and EMMP on the well optimization project in Sipanik community), as well as provided a training to the ASPIRED Subcontractor to ensure environmentally sound and safe implementation of this project. Before the beginning of the project, ASPIRED checked the quality of the well water, including the physical and chemical monitoring of water to make sure it is suitable for irrigation in accordance with the FAO-recommended quality norms.

On July 10, ASPIRED conducted the training of Sayat-Nova land users on sustainable farming practices and covered the following topics: application of high-value crops and their nutritional value; modern irrigation practices; safe use and disposal of fertilizers; common pests and diseases damaging plants; and Pesticide Evaluation Report and Safer Use Action Plan (PERSUAP) requirements.

During the quarter reported, the ASPIRED Project also prepared the record of compliance with activity-specific EMMPs for the water reuse project in Hayanist village and well sealing project in Sipanik village.

2. Existing Problems or Issues

- The MNP continued searching for potential large fisheries who would be interested in receiving installation of the remaining five sets of flow meters and data loggers of the online ground water monitoring system. ASPIRED will continue to work with MNP on this during Year 4.
- ASPIRED is still waiting for a written feedback from MNP on the need for SCADA software. The project plans to follow up with MNP on this topic during the next reporting period.

7. Planned Activities for the Next Quarter

7.1 Data

- Complete installation and operationalization of the MNP's new server, and install the draft version of the SWCIS data warehouse on the server by the end of October.
- Work with the WRMA on a new timeline and scope of responsibilities for implementing separate activities for enhancing the SWCIS data warehouse.
- Initiate the testing and debugging of the data warehouse of the SWCIS, after WRMA populates the programmed databases with actual data.
- After receiving USAID's concurrence on the Project deliverables on hydrological balance, preliminary hydrogeologic map and 3D model of the Ararat Valley, present the main findings for the key stakeholders.
- Start customizing the water supply and demand balance component of the DSS, particularly reprogramming of the ecological flow calculation component.
- Complete compiling, reviewing and ensuring data inter-operability/homogeneity for the relevant data of the 7 meteorological stations in the Ararat Valley, namely Ararat, Artashat, Armavir, Urtsadzor, Ashtarak, Yerevan Agro, Yerevan Arabkir, as well as the Aragats high mountainous meteo-station.
- Complete testing and debugging of the enhanced surface water quality assessment component of the DSS.
- Initiate the design of the numeric groundwater flow model for the Ararat Valley, using the GMS software, building up on the 3D model completed in September 2018.
- Continue working with the WRMA on pending issues for completing installation of the 5 flow meters and development of SCADA software for storage and analysis of online groundwater monitoring data.
- Complete procurement of equipment for enhancing the EMIC's capacities in qualitative and quantitative monitoring of groundwater resources.
- After receiving a list of trainees from the WRMA, design and conduct a training program for the technical staff of WRMA and its BMOs, representatives of the Ministry of Agriculture on calculation of ecological flow in the rivers of Armenia. The training will include modules on MS Excel and GIS, that will be designed based on assessment of the skills of the trainees.

7.2 Pilot Technologies

- Conduct inspection of the construction and installation work at the ATTC and meet with the fish farm owner, the designer, and the construction contractor to identify and discuss any concerns regarding the construction of the facility.
- Finalize the project concepts and expenditure estimates for Vedi project and submission to USAID;
- Begin the construction work in Aratashen and Yeghegnut after receiving and approval of water systems designs from the sub-contractor company;
- Prepare the project concept and expenditure estimate for Hovtashat well optimization project.

7.3. Legal and Policy Issues

- Participate the regular round table discussion of Public Advocacy Network organized by PURE Project.
- Submit the draft package of the governmental decision to the RA Government for adoption.
- Establish the working group for the implementation of the second assignment envisaged under the Governmental Decision No 338-N, namely development of the method for assessment of self-purification capacity of rivers and its enforcement mechanisms.

7.4 Performance Management, Communication and Donor Coordination

- Conduct the closing event of Sayat-Nova water reuse / irrigation project on October 22, 2018 and related follow-up activities
- Prepare the success stories on Sayat-Nova and Sipanik projects
- Update the program web site and facebook pages
- Follow-up on the implementation of the project PMP: submit information for the fiscal year 2018 for the mission portfolio report

7.5 Environmental Compliance

- Conduct health and environmental safety training programs for the project implementing partners for the upcoming drinking water supply improvement Projects in the Yeghegnut and Aratashen communities.
- Conduct regular monitoring of the ongoing pilot project activities in Metsamor (ATTC) and other upcoming projects sites.

7.6 Project Management

- Release tenders for the supply of materials and installation services under Yeghegnut and Aratashen projects.
- Follow-up on the implementation of the contractual commitments by the sub-contractors.