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ADVANCED SCIENCE & PARTNERSHIPS FOR INTEGRATED RESOURCE DEVELOPMENT PROJECT

QUARTERLY REPORT

January-March 2018

April 2018

This publication was produced for review by the United States Agency for International Development. It was prepared by Mendez England & Associates.

Advanced Science & Partnerships for Integrated Resource Development

QUARTERLY REPORT SECOND QUARTER FY 2018

April 2018

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

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List of Acronyms

AHGW	Arc Hydro Groundwater
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
GSM	Groundwater Management System
HMC	Hydrogeological Monitoring Center
ICARE	International Center for Agribusiness Research and Education
IEE	Initial Environmental Examination
IFB	Invitation for Bids
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
RA	Republic of Armenia
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 second quarter of Year 3 of the project. It covers the period from January 1 through March 31, 2018. 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 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 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:
 - Started the pilot project on installation of flow meters and data loggers in the fisheries of the Ararat Valley. Following a competitive bidding process, ASPIRED selected local sub-contractor Hybrid Telematica as the service provider for this pilot project.
 - Conducted a one-week training course on the stratigraphic and groundwater modeling using advanced tools such as Arc Hydro Groundwater (AHGW), Groundwater Management System (GSM), and MODFLOW for the specialists of the Environmental Monitoring and Information Center (EMIC), Water Resources

Management Agency (WRMA) of the Ministry of Nature Protection (MNP), and other research institutions.

- Technology component:
 - Completed 90% of the pumping station in Sayat-Nova project and coordinated with the partners activities towards construction of the electricity sub-station and supply of pipes
 - Approved the ATTC design and selected the sub-contractor for the implementation of the project.
- Legal component:
 - Provided comments to the Strategy and the Roadmap for Improved Legislation on Participatory, Transparent and Accountable Water Resource Management, prepared by the Participatory Utilization and Resource Efficiency of Water (USAID PURE-Water) Project.
 - Provided expert opinion to the Government of Armenia concerning the program of measures of the RA (Republic of Armenia) National Water Program.
- Communication and Donor Coordination component:
 - Streamlined the cooperation with the Sustainable Energy Development Fund (SEDF). ASPIRED and SEDF will draft and sign the cooperation agreement next quarter.

2. Summary of Performance Indicators

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

	Indicator	Planned/ Actual Target for Year 3	Quarter 2	Life of project (as of Q2/2018)	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, publically 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	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. Spatial dataset on land cover/use classification in the Ararat Valley will be publicly accessible next quarter.
1.1.2	Percent (of total) wells mapped in the Ararat Valley.	N/A	N/A	100%	This indicator corresponds to an activity that the project team successfully completed during Year 1 i.e. inventory of the wells, natural springs and fish farms in the Ararat Valley. Therefore, the project is no longer tracking this indicator for the remainder of the project.
1.1.3	Number of stakeholders engaged in the data collection activities	5/0	0 ¹	9 ²	This indicator refers to the stakeholders engaged in the groundwater-related data collection activities in the Ararat Valley from different sectors – government, private, and public.

¹ The project on installation of online groundwater use monitoring systems started at four fisheries of the Ararat Valley in April 2018; this indicator will be reported after the completion of the project and functioning of the SCADA system at the fisheries.

² 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 will complete development of decision support tools for the Ararat Valley by the end of Year 3.
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	5/4	4	4	In April 2018, ASPIRED began implementing the project on installation of online groundwater use monitoring systems at four large fisheries within the Ararat Valley. Since the names of the participating fisheries are known, ASPIRED can report on this indicator. ASPIRED is scheduled to complete this project by the end of Year 3.
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	8/0	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 in the Ararat Valley. ³ This indicator depends on the progress with the implementation of Indicator 1.3.1. Currently, ASPIRED implements a project on installation of these systems at 20 water extraction points across 4 fisheries. ASPIRED will report on this indicator after the completion of the pilot project.
IR 2: Introduce locally appropriate, cost effective technologies to improve water resource management					
Sub-IR 2.1: Technologies developed, piloted, and evaluated at different-sized fish farms with the objective of improving water resources management					

³ 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.

Indicators					
2.1.1	Number of groundwater extraction reduction technologies piloted and evaluated	3/0	0	2 ⁴	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 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	9000/950	475 ⁵	2525	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 PURE Project). The data is cumulative and includes recurrent savings provided by completed water projects (Hayanist 1.1 mln, Sipanik 1.9 mln). During the reporting period, ASPIRED initiated the Water Reuse Project in Sayat-Nova village and the ATTC, the data for which will be reported after their completion.
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 the project implementation. Renewable technologies (photovoltaic and biogas) will be installed at the ATTC to be reported after completion of the project. Currently, ASPIRED and SEDF are collaborating on the installation of the photovoltaic system in Vedi and Sayat-Nova projects.
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

⁴ The data refers to the Water Reuse Project in Hayanist⁴ and the Well Sealing Project in Sipanik village

⁵ Savings generated by Sipanik for a quarter period. Hayanist will be counted with the start of the irrigation season.

2.2.4	Gains in the reduction of GHG emissions as a result of USG assistance	40.8/0	0	11.4 ⁶	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.
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 ⁷ (200 women; 140 men)	Qualitative improvements ⁸ of the water resource resulting from the infrastructure projects implemented by ASPIRED ⁹ . The term “water users” refers to households, local farmers and others benefitting from these improvements. (Gender disaggregated whenever possible).
2.2.6	Number of water users experiencing improved efficiency of water resource use	8/0	0	3 ¹⁰	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.
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					
2.3.1	Number of successful technologies recommended and shared with the stakeholders and policy-makers	3/1 ¹¹	0	2	ASPIRED will pilot at least six technologies by the end of TO. During Year 5 of the project, ASPIRED plans to conduct an evaluation and provide recommendations regarding these technologies.
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	2/0	0	1	ASPIRED plans to pilot at least two well optimization/sealing projects during Year 3.

⁶ Data refers to Hayanist Project.

⁷ The LOP data refers to the beneficiaries of the water reuse projects in Sayat-Nova (98 households) and Hayanist (85 households, 340 people)

⁸ ASPIRED plans to conduct pre and post-implementation water tests to detect the qualitative changes in water.

⁹ Initially, this indicator referred only to the drinking water supply projects. Following the recommendation of USAID, ASPIRED will collect data 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.

¹¹ The owner of the Masis Dzuk fish-farm piloted a degassing and aeration technology on his own expenses, with the consultation from the ASPIRED project.

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	1	4	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. The Year 3 Quarter 2 data refers to the groundwater modeling course conducted by the ASPIRED Project in January 2018.
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.	15/19 (14 men; 5 women)	15 (12 men; 3 women)	67 (17 women and 50 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. The Quarter 2 data refers to the participants of the January 2018 groundwater modeling course and March 2018 EMMP training conducted by the ASPIRED Project.
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 /Quarter 2, therefore, ASPIRED has completed reporting on this indicator.
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	1	1	This indicator refers to the package of recommendations that the ASPIRED Project drafted and submitted to the GOA. Per Government request to USAID, ASPIRED submitted the expert opinion on program of measures in National Water Program.
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	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.	40/0	0	33 ¹²	This indicator refers to the total in-kind and financial contributions by ASPIRED partners versus the total contributions of the Project. Targets are not cumulative and refer to a particular year. The information on Sayat-Nova and ATTC projects will be reported upon their completion.
4.1.2	Number of partnerships made by ASPIRED with other organizations	4/3	0	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.
1. Portfolio-level indicators					
5.1	Percent of population living in targeted areas with improved water management	19/0	0	4.1 ¹³ (women – 2.1%; men -	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).

¹² 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. Based on the clarified results from Year 2, 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 the Sipanik project.

¹³ The Life of Project results refer to the population size of Sipanik, Hayanist & Sayat-Nova communities versus the total size of the population in the AAB.

				2%)	
5.2	Number of key implementation steps taken to improve water management in the Ararat Valley	2/1	1	5 ¹⁴	This indicator relates to policy, analysis, and other activities targeted towards improvement of water data-related activities, including training and pilot projects.
5.3	Number of private sector firms that have improved management practices or technologies as a result of USG assistance	6/1 ¹⁵	0	2 ¹⁶	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. Following a consultation with ASPIRED on use of new energy efficient technology on degassing and aeration, Masis Dzuk Fishery implemented a small pilot at its own expense; the fishery also plans to supply its outlet water to Sayat-Nova community.
5.4	Number of innovations supported through USG assistance.	3/0	0	1 ¹⁷	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 updated 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 Sayat-Nova community.

¹⁴ (1) ASPIRED completed the inventory of groundwater wells and springs 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 village (launched in May 2017) and well conservation project in Sipanik village; (5) installation of the automated online groundwater use monitoring system in the fisheries of the Ararat Valley,

¹⁵ The Year 3 Quarter 2 data refers to the project on installation of the automated online groundwater monitoring systems in fisheries of the Ararat Valley.

¹⁶ The data refers to Mr. Samvel Lablajyan's fish farm where the pumping station is installed for channeling water to the community of Hayanist.

¹⁷ 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, the ASPIRED team completed the first stage of enhancing the SWCIS data warehouse. The first stage involved re-programming existing components into a format of inline databases and programming new components of the data warehouse into a format agreed upon by the WRMA.

ASPIRED prepared the technical report which documents the concepts, requirements, and processes for development of the SWCIS and describes the first stage activities on the enhancement of the SWCIS data warehouse, including the baseline situation, the new structure and components of the enhanced data warehouse. The ASPIRED team will continue working on the technical report after completion of the second stage of SWCIS data warehouse enhancement. Stage two activities include installing the data warehouse on the MNP's server; populating the datasets; and programming, testing, and debugging the data queries and reports.

By the end of the reporting period, ASPIRED's installation of the programmed databases of the SWCIS on the MNP's server was pending. Although the Coca-Cola Hellenic Bottling Company delivered the server to the MNP during the reporting period, MNP's initial launch of the server has been postponed to April 2018.

Decision Support Tools

Decision Support System (DSS): In the past quarter, the ASPIRED team completed the calibration and debugging of the Hydrological model of the DSS, which calculates the water balance of the Akhuryan, Metsamor, Qasakh, Hrazdan, Vedi and Azat river basins of the Ararat Valley catchment area for 2015 and 2016. ASPIRED currently programs two components of the precipitation: runoff curves for calculating the natural surface and deep flows in the Ararat Valley.

The ASPIRED team made progress with programming of the simplified interface of the Hydrological Model of the DSS, following the menu and user interface for the DSS non-technical users developed in consultation with Dr. Tom Sheng. The ASPIRED team discussed the possibility of simplifying and automating the DSS computations.

In February, the ASPIRED team initiated a review of the monitoring data on quality of the surface water resources of 5 rivers basins of the Ararat Valley catchment area and quantitative monitoring data for the groundwater resources in the Ararat Valley. The EMIC of the MNP provided these datasets by the request of the ASPIRED team. The ASPIRED DSS Programmer and Water quality specialist designed a format for the reprogramming of the Water Quality Assessment component to accommodate the needs of the main stakeholders to visualize the river sections within the Ararat Valley, based on the water use norms for drinking and irrigation purposes.

Groundwater modeling tools:

From January 15 to 19, 2018, the training course on stratigraphic and groundwater modeling using advanced tools such as Arc Hydro Ground Water (AHGW), Groundwater Management System (GSM) and MODFLOW took place in the GIS lab of the AUA. The training was facilitated by Mr. Alan Lemon, a software engineer of AQUAVEO consulting firm, a U.S.-based company and lead developer of AHGW. Training participants included the specialists from the ASPIRED Project, as well as representatives from the EMIC, WRMA of the MNP, Acopian Center for the Environment of the American University of Armenia, International Agribusiness Teaching Center/ of the National Agrarian University, Yerevan State University, and the Institute of Geological Sciences of the National Academy of Sciences of Armenia.

The training combined lectures with the practical exercises on the use of the software applications for hydrogeologic modeling. The participants learned how to build and customize an AHGW geodatabase, import data, produce maps of temporal data such as water levels and water quality, manage and visualize borehole data, build 3D hydrogeological models inside ArcGIS including construction of 2D and 3D cross sections and volume models, and import, edit, visualize, and create workflows with MODFLOW models inside ArcGIS. Using knowledge and skills gained, as well as input data on the Ararat Valley available at the ASPIRED Project, the training participants created a preliminary simple model of the Ararat Artesian Basin. During this specific training exercise, participants utilized ArcHydro Groundwater Tools to generate cross-sections and 3D volumes of the main hydrogeological units in the Ararat Valley, as well as created a sample model of the groundwater flow for the first confined layer of the Ararat Valley groundwater basin using the GSM and MODFLOW tools. The GIS layers on the thicknesses of the 9 hydrogeological units created by the USGS as a part of the study on Hydrogeological Framework of the Ararat Basin, as well as the 30-meter DEM raster image of the Ararat Valley were used as input data for generation of the 3D volumes under the AHGW Tools. For construction of a sample groundwater flow model under the GSM software, the team used the lithological structure data collected during the inventory for more than 2800 wells in the Ararat Valley. The preliminary simple model created by the training participants will be used as a starting point for modeling the aquifers of the Ararat Artesian Basin. Based on the results of the training, ASPIRED prepared and submitted to USAID the report on the customized training on groundwater modeling, including the materials produced during the training.

Following the recommendations made by Mr. Lemon on the software needs for modeling Ararat Valley groundwater resources, ME&A purchased three sets of the licenses and software activation keys for the AHGW, GSM and MODFLOW. The ASPIRED team, EMIC and WRMA will utilize these licenses and software activation keys during development of the groundwater model for the Ararat Valley.

The ASPIRED team continued working on the simple model for the Ararat Valley created during the January 2018 training program, enhancing it to the level of generating three-dimensional structure of the aquifers of the artesian basin and estimating volumes.

Applying Remote Sensing Technologies for Data Analysis

In order to improve the runoff estimation for the Ararat Valley using the results of land cover/use maps, the ASPIRED team worked on obtaining infiltration rates in the Ararat Valley. The ASPIRED team consulted with leading field experts such as the specialists from the Scientific Center for Soil Science, Agro-chemistry and Land Reclamation, and the Institute of Water Problems, Hayjrnakhagits Institute, as well as hydrogeologists from the EMIC. Since none of the above-mentioned institutions possessed the data on infiltration rates, they redirected the ASPIRED team towards suggested sources of literature where this information could be obtained from.

Introduction of Automated Online System for Groundwater Use Monitoring

In February and March 2018, ME&A released an international tender for the procurement and installation of flow meters and data loggers in the selected fisheries in the Ararat Valley. ME&A received three bids from local companies that represented foreign producers of the flow meters. ASPIRED organized site visits of the interested companies to the selected fish farms for measurements and observations needed to prepare the proposals, held pre-bid-meetings, and summarized the questions asked and clarifications provided during the pre-bid meetings. ASPIRED posted a summary of the pre-bid meeting Q&A on the project web page.

Based on a review of the submitted proposals, the technical evaluation committee selected Hybrid Telematica LLC, a local company, as the successful bidder for this international tender. The committee determined that the bid presented by Hybrid Telematica LLC is technically sound and responsive to the requirements of the invitation for bids (IFB), presents the lowest responsive and reasonable price offer; and the company possesses the relevant skills and experience to implement the requirements of the SOW under the IFB. ASPIRED, jointly with Hybrid Telematica, had introductory visits to the fish-farms participating in the pilot projects. The directors/owners of the fish-farms expressed their commitment to support the installation of online monitoring systems at their fisheries.

ASPIRED drafted an SOW for the development of SCADA software for online groundwater use monitoring in the Ararat Valley. ASPIRED plans to discuss the draft SOW with the MNP during the next reporting period .

Extending the national reference groundwater monitoring network in the Ararat Valley:

During Year 3 Quarter 2, the ASPIRED team collaborated closely with the EMIC in defining the cooperation framework for improving groundwater monitoring and data analysis for the Ararat Valley. The main directions for creating more integrated quantitative and qualitative monitoring and assessment of groundwater resources in the Ararat Valley are (1) extension of the national reference groundwater monitoring network in the Ararat Valley (2) support to the EMIC in enhancing the hardware and software, and (3) capacities of the personnel for data collection and analysis. ASPIRED met with the head and the technical staff of the EMIC several times to identify the representative groundwater monitoring wells in the transit, feeding zone of the Ararat Valley, including the equipment needs for in-situ and ex-situ monitoring of groundwater resource

quality and quantity, and further needs for building capacities of the personnel for assessment of groundwater resources by applying modern tools for mapping and modeling.

In March 2018, ASPIRED received the final list of 10 representative wells for monitoring groundwater levels and quality in the transit zone of the Ararat Valley – located in Akhuryan, Qasakh, and Hrazdan rivers catchment areas – that will be put into operation and included into the national reference groundwater monitoring network. The center also provided the final list for monitoring hardware and software equipment.

Low Cost and Water Efficiency Technologies

ATTC Project

In January 2018, ASPIRED approved the design of the ATTC facility prepared by the AYR Design LLC and initiated the procurement process for the construction services. In March 2018, ASPIRED completed a local tender, under which the project's selection committee identified a local company as the successful bidder to build the ATTC premises based on the available design blueprints under the supervision of the ASPIRED engineer and the owner of Armavir Farmer LLC.

Additionally, under the facilitation of the ASPIRED Project, the Sustainable Energy Development Fund (SEDF) will provide technical assistance in the installation of photovoltaic elements at the demo fish-farm. SEDF prepared the design of the photovoltaic system to be financed through the ACBA-Bank leasing instrument.

Water Reuse Project in Sayat-Nova

During the reporting period, the ASPIRED team started the first phase of the Water Reuse Project – construction of the pumping station. In February, ASPIRED fully-executed a contract with Yereky Mek Tegh LLC, the local firm selected for the construction of the pumping station building, with main activities including supply and installation of the pumps. The ASPIRED team continues to regularly monitor and coordinate the work with the sub-contractor, the community, and other relevant stakeholders.

Additionally, ASPIRED and the Water Reuse Project partners started the second phase of the project – construction of the water main. The SME DNC released the tender for the April 2018 supply and installation of its part of the polyethylene pipes . ASPIRED prepared the technical specifications and plans to initiate the procurement process during the next reporting period.

Based on the project concept and agreement signed between the partners, Sayat Nova village is responsible for ensuring the reliable power supply of the pumping station, which requires furnishing an independent power sub-station. The community obtained permission from the Electric Networks of Armenia and selected a sub-contractor for the construction of the electricity sub-station. Both the pumping station and power sub-station will be ready in the next quarter.

Design of New Projects

Following the preliminary site visits and proposal writing training for communities, the PURE-Water Project proceeded with the process of receiving proposals from the short-listed communities. As the implementer of infrastructure rehabilitation projects, ASPIRED team participated in the selection committee to conduct due diligence and evaluate proposals submitted by the communities. The selection committee short-listed the following projects for implementation: Yeghegnut and Aratashen for drinking water supply improvement; Khachpar, Vedi and Pokr Vedi for irrigation. In March, the ASPIRED engineers worked on the preparation of the project concepts as well as conducted meetings with the communities and completed initial field work. ASPIRED will submit concepts of new projects to USAID for review and approval during the next quarter.

Water Regulation and Enforcement

During the reporting period, the ASPIRED team provided support towards the activities undertaken by the PURE-Water Project team in addressing the water sector regulatory environment, including a review of relevant documents, participation in the legal task force activities and meeting with the decision-makers. More specifically, the ASPIRED Project staff participated in the discussions on the legal framework and operation of Water User Associations, the legal basis for water user permits as well as public participation in water management. ASPIRED and PURE teams discussed these issues with the representatives of the MNP and National Assembly's Committee on Territorial Administration, local Self-Government, Agriculture and Environment.

During the reporting period, the ASPIRED team reviewed and provided comments to the Strategy and the Roadmap for Improved Legislation on Participatory, Transparent and Accountable Water Resource Management. During the respective task force meeting, the ASPIRED team presented their comments to the PURE-Water Project counterparts, which were not included into the draft report presented to the stakeholders on March 29, 2018. However, the PURE-Water Project team assured that these comments will be incorporated into the final document. The ASPIRED team provided a copy of the document with comments to Marina Vardanyan, the USAID's Contracting Office Representative for the Project.

In response to the letter of the MNP addressed to USAID /Armenia Mission Director Deborah Grieser in February 2018, ASPIRED team submitted to MNP the official expert opinion on the program of measures for RA National Water Program.

Donor Coordination and Communications

Partnership Initiatives: During the reporting period, the ASPIRED team continued its collaboration with the Small and Medium Entrepreneurship Development National Center (SME DNC) and Fund for Armenian Relief (FAR) on the implementation of the Sayat-Nova Irrigation Improvement Project. During February and March, the ASPIRED team met separately with the partners, including the community, to provide updates on the project progress and streamline the procurement schedules for the water pipes.

ASPIRED also moved forward with the project initiatives to be pursued jointly with the SEDF, i.e. concept of installation of photovoltaic systems at the ATTC and Vedi irrigation project. The SEDF started working with the project counterparts – Armavir Farmer LLC and Vedi municipality – to make technical designs and cost estimates, as well as to provide support to obtain additional funding for the project. During the next quarter, ASPIRED and SEDF will sign an agreement that outlines the framework of the cooperation and commitments of both parties.

There was an agreement between ASPIRED and Farmer-to-Farmer (FTF) project to bring an aquaculture expert to work for the ATTC during May-June 2018. However, this activity is postponed, pending the additional funding from USAID to continue the project in FY 2019.

In February 2018, the ASPIRED communications specialist participated in a brainstorming event organized by PURE-Water Project and Coca-Cola Hellenic teams to formulate the key communication messages and possible communication actions of the public outreach campaign to be led by the PURE-Water Project.

Per PURE-Water Project's request ASPIRED team provided its materials (success stories, project fact sheets) to the PURE-Water team for use in preparation of their project PR-kit. On February 19, ASPIRED met with Hayastan Stepanyan to discuss ASPIRED's roles and responsibilities in the implementation of the PURE-Project during the second programmatic year, which will be incorporated into the PURE work plan. To this end, ASPIRED specialists will participate in the work planning retreat of the PURE team to advise on the activities of the components where ASPIRED input is anticipated.

Under the facilitation of USAID, the ASPIRED team met with the representatives of the Embassy of Japan in Armenia to discuss the grant opportunity of up to USD 90,000 offered by the Government of Japan in a wide array of focus areas. Although the grant funding is an opportunity for the ASPIRED Project to supplement existing funding, the ME&A Armenian branch is not eligible to apply. Since such grants are open to the local non-profit organizations and communities, USAID and ASPIRED are in agreement that ASPIRED will share this information among its partner communities.

During the past quarter, ASPIRED communications team posted all information related to tender announcements and updates for the tenderers on the project web site and Facebook pages. ASPIRED also updated the project web site's pilot projects and news sections with information concerning the progress with implementation of the Sayat-Nova irrigation project.

In February, ASPIRED responded to the MNP's request and prepared the information on the activities of the Project planned for the 2018 calendar year, including the quarterly budget allocations. The ASPIRED Project also prepared the information on project collaborations with the European programs in the water sector, focusing specifically on collaboration with the EU Water Initiative + Project as well as the data exchange and acquisition of the high-resolution satellite imagery Sentinel-2 from the Czech and Polish companies Sat-Agro, Geo-Pluse and Gisat under the Earth Observation for Eastern Partnership Project of the European Space Agency. During the March 19, 2018 presentation on annual crop area map and statistics in the Ararat Valley, the project implementers expressed their high appreciation of the input from the ASPIRED team on providing high-quality on-situ data for their research purposes.

4. General Administrative Issues

During the past quarter, ASPIRED hired Vahram Mkrtchyan for the position of the staff engineer to work on the infrastructure projects with the PURE-Water Project team.

ME&A headquarters conducted the first training on USAID procurement rules and policies for the ASPIRED administrative and pilot project staff. The second training is scheduled for the next quarter.

During the reporting period, ASPIRED and ME&A Headquarters administered the following three tenders:

- Supply and installation of data loggers and flow meters in the fisheries of the Ararat Valley: This tender was released as open to both local and international bidders. Based on the bid evaluation results, ASPIRED gave highest scores to Hybrid Telematica. ASPIRED and Hybrid Telematica fully-executed the project contract.
- The construction of pumping station for Sayat-Nova Irrigation Project: ASPIRED signed the contract with local service provider Ereky Mek Tegh LLC.
- The construction of the ATTC facility: ASPIRED announced the tender on March 7. ASPIRED selected Ashkar LLC as the successful bidder and signed a contract with Ashkar LLC during the preparation of this quarterly report in April 2018.

5. Environmental Compliance

On March 2, the ASPIRED basin management planning/environmental specialist conducted an environmental and social safeguards training for the staff of Ereky Mek Tegh LLC, the subcontractor for the construction of pumping station in Sayat-Nova village. The environmental specialist conducted several field trips to monitor the compliance of the activities on building pumping station with the requirements of the EMMP.

The ASPIRED Project also prepared a package of environmental documentation, including the environmental review checklist and EMMP for installation of flow meters and data loggers in the selected four fisheries of the Ararat Valley.

2. Existing Problems or Issues

The ASPIRED team anticipates some challenges related to the installation of flow-meters and data loggers, specifically concerns from some owners of fisheries regarding the effects of the project on their work. To ensure smooth implementation of the project, ASPIRED will continue to work closely with the MNP which promised to settle any issues/disputes with the fisheries.

7. Planned Activities for the Next Quarter

7.1 Data

- Install the draft version of the SWCIS data warehouse on the server provided to MNP. Provide authorization rights to the technical staff member of WRMA to populate the draft Data Warehouse with data and test it operationally. Continue improving the system

based on the WRMA comments on the draft Data Warehouse, programming query and reporting forms.

- Finalize the calibration of the DSS for the river basins of the Ararat Valley Catchment Area, particularly precipitation/runoff curves for estimating natural surface and groundwater flows.
- Complete the design of the simplified, automated interface for the DSS for the non-technical users/decision-makers of the DSS.
- Conducting a training program for the technical staff of WRMA and EMIC, and the representatives of academia on the DSS data organization and customization of the Hydrological Model of the DSS for the Akhuryan, Metsamor, Hrazdan, Vedi and Azat river basins.
- Finalize the land cover GIS map for the Ararat Valley in A1 format and presenting to the main stakeholders of the project both in electronic and printed format.
- Complete the improvement of the surface water quality assessment component of the DSS.
- Complete a conceptual model of the Ararat Valley groundwater flow using the MODFLOW tools and GMS software and presenting it to the EMIC and MNP.
- Finalize the 3-dimensional model of the Ararat Valley aquifers for the nine main hydrogeological units, including generation of 3D-volumes for each unit using the AHGW Tools.
- Complete the installation and testing of groundwater flow meters and data loggers for automated groundwater use monitoring system at the 20 groundwater abstraction wells across four major fish farms of the Ararat Valley.

7.2 Pilot Technologies

- Tender for the supply and installation of pipes for Sayat-Nova irrigation project.
- Work with the sub-contractor for supply of pipes and fittings, and construction of the irrigation pipeline under Sayat Nova water reuse / irrigation project;
- Complete the construction of the pumping station under Sayat Nova water reuse / irrigation project;
- Start the construction under the ATTC project;
- Prepare the draft project concepts and expenditure estimates for the four PURE projects: Aratashen, Yeghegnut, Vedi, and Khachpar.

7.3. Legal and Policy Issues

- Follow-up on the finalization of the Strategy and the Roadmap for Improved Legislation on Participatory, Transparent and Accountable Water Resource Management;
- Per request from GOA, assist MNP in development of the method for assessment of self-purification capacity of rivers and its enforcement mechanisms, and establishment of requirements for protection of water resources in recreation zones.

7.4 Performance Management, Communication and Donor Coordination

- Draft the cooperation agreement with the SEDF.

- Coordinate the partnership with the SME DNC, FAR and the community of Sayat-Nova during the implementation of the project.
- Participate in the monitoring visits to the project sites and schedule the upcoming outreach events, particularly related to the completion of the Sayat-Nova project and installation of the online groundwater use monitoring system in the fisheries of Ararat Valley.
- Regular web site updates, preparation of the project materials.
- Follow-up on the PMP updates and prepare weekly highlights, monthly reports.

7.5 Environmental Compliance

- Work with the Engineers, PURE-Water activity 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 for the ATTC project before the launch of the construction works.
- Conduct monitoring of the ongoing pilot project activities, and works on installation of flow meters and data loggers.

7.6 Project Management

- Conduct financial management of the program.
- Sign the contracts with the winning bidders
- Follow-up on the implementation of the contractual commitments by the sub-contractors
- Conduct a procurement of services for development of SCADA software for the automated groundwater use monitoring system. Selecting the local company to implement the assignment.
- Conducting a procurement of services for rehabilitating 10 groundwater wells in the Ararat Valley aimed at extending the national reference groundwater monitoring network.