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

**QUARTERLY REPORT**

**October-December 2019**

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# Advanced Science & Partnerships for Integrated Resource Development

## QUARTERLY REPORT FIRST QUARTER FY 2020

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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
CADI	Computer Assisted Development, Inc.
CoP	Chief of Party
COR	Contracts Officer's Representative
CJSC	Closed Joint Stock Company
DSS	Decision Support System
EA	Environmental Assessment
EE/RE	Energy Efficiency/Renewable Energy
EIA	Environmental Impact Assessments
EMIC	Environmental Monitoring and Information Center SNCO
EMMP	Environmental Mitigation and Monitoring Plan
ERGIS	Environmental Research and Geographic Information Systems
EU	European Union
FAO	Food and Agriculture Organization
FAR	Fund for Armenian Relief
F2F	Farmer to Farmer Project
GIS	Geographic Information System
GOA	Government of Armenia
HAAF	Hayastan All-Armenian Foundation
HMC	Hydrogeological Monitoring Center
ICARE	International Center for Agribusiness Research and Education
IR	Intermediate Result
ITF	Interagency Task Force
LOP	Life of project
ME&A	ME&A, Inc.
ME	Ministry of Environment
PMP	Performance Management Plan
PURE-Water	Participatory Utilization and Resource Efficiency of Water
SCADA	Supervisory Control and Data Acquisition
SEDF	Sustainable Energy Development Fund
SOW	Scope of Work
STTA	Short-Term Technical Assistance
SWCIS	State Water Cadaster Information System
3D	Three-dimensional
TO	Task Order
USAID	United States Agency for International Development
USGS	United States Geological Survey
WRMA	Water Resources Management Agency
WUA	Water user association
WUP	Water use permit

## 1. Executive Summary

This report describes the programmatic activities implemented by the Advanced Science and Partnerships for Integrated Resource Development (ASPIRED) Project during the first quarter of Year 5 of the project, from October 1 through December 31, 2019. The report reviews progress and achievements in each of the project areas during the reporting period, as well as 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, Inc. (ME&A) 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 sustainable levels.

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

1. Water Resource Data
2. Low Cost and Water Efficiency Technologies
3. Water Regulation and Enforcement
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

On November 8, the ASPIRED Project resubmitted Year 5 Work Plan to USAID for review and approval. USAID approved the Work Plan on November 29.

- Data component:
  - In October, the ASPIRED Project submitted the Report on Calculated Values of Water Balance, Water Supply and Demand Balance of the Ararat Valley as a project deliverable to USAID.
  - On October 16, the ASPIRED Project Basin Management Planning Specialist/Environmental Officer participated in the water sampling site visits for 6 wells in the Ararat Valley jointly with representatives of the Environmental Monitoring and

Information Center (EMIC) and Humboldt Institute, Germany, aimed at determining the groundwater age in the Ararat Valley aquifer.

- Technology component:
  - Launch of Khachpar Project.
  
- Legal Component:
  - On November 26, the Armenian President Armen Sargsyan signed the package of laws which stipulated amendments to the Water Code and Law on Administrative Offences. Thus, the adoption of the amendments enforced the legal package on Water Resources Protection in Recreation Zones developed by ASPIRED Project team.
  
- Outreach Component:
  - The December issue of the USAID newsletter included a story about recent legal improvements in the Armenian water sector and ASPIRED Project's efforts in promoting the enforcement of the requirements for protection of water resources in recreation zones.

## 2. Summary of Performance Indicators

Summary of performance indicators for the first quarter of FY 2020 (Year 5 of the project) is presented in the table below.

	Indicator <sup>1</sup>	Year 5 Target/Actual	Actual Q1 Year 5	LOP Target/Actual	Notes: Descriptions/Comments/Assumptions
<b>IR 1: Establish a comprehensive, user-friendly, open data system that is accessible to all stakeholders.</b>					
<b>Sub-IR 1.1: Ararat Valley Geocoded, real-time, publicly accessible data system that incorporates water resource, groundwater, and hydrological datasets from multiple stakeholders built and shared with the GOA</b>					
<b>Indicators</b>					
1.1.1	Percent (of total) of datasets for the Ararat Valley publicly accessible	30/0	0	80/50	This indicator refers to the datasets related to the water resources in the Ararat Valley which will be accessible for the general public. 80% of all datasets on the Ararat Valley will be made publicly available, which accounts for 100% of all the data that can be available to the public according to the Armenian legislation.
1.1.2	Percent (of total) wells mapped in the Ararat Valley.	N/A	N/A	100/100%	Completed in Year 2
1.1.3	Number of stakeholders engaged in the data collection activities	N/A	-	16/16 <sup>2</sup>	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 met planned targets for this indicator in Year 4.
<b>Sub-IR 1.2: An online tool for hydrogeological modelling and decision-support for the Ararat Valley that incorporates hydrologic, economic, energy, social equity and environmental data generated</b>					
<b>Indicators</b>					

<sup>1</sup> Indicators are presented on a cumulative basis. Non-cumulative indicators are marked separately.

<sup>2</sup> ME with its 2 subdivisions, PEER grantee, Institute of Water Problems, USGS, EU Water Initiatives Project, Ministry of Agriculture, State Hydromet Service, Scientific Center of Zoology and Hydro ecology, Metsamor power plant which are/were involved in the data collection process, fisheries: Alex Grig, Interaqua, Golden Fish, Max Fish, State Hydromet Service, the Center of Zoology and Hydroecology, Water Committee.

1.2.1	GIS-based decision support tools for Ararat Valley developed	2/0	0	2/2	ASPIRED completed the DSS and 3-dimensional model for the Ararat Valley in Year 4. Groundwater flow model for the Ararat Valley will be completed in Year 5.
<b>Sub-IR 1.3: A publicly accessible system that maximizes the use of open source technology and produces reports based on high-quality, real-time monitoring data created</b>					
<b>Indicators</b>					
1.3.1	Number of fisheries with automatic data system installed	N/A	N/A	4/4	Indicator was dropped based on year 5 approved Work Plan.
<b>Sub-IR 1.4: Plan for decentralized, sustainable data collection methods to monitor groundwater resources and strengthened implementation capacities of partners developed in partnership with the Government of Armenia (GOA) and local stakeholders</b>					
<b>Indicators</b>					
1.4.1	Percent (of total) coverage of the groundwater extraction points monitored	18.2/0	0	50/31.8	This indicator refers to the percentage of groundwater extraction wells monitored by the online automated system that the ASPIRED Project installed versus the total number of 336 operational groundwater wells available in the fisheries. The actual LOP results refer to the systems installed by the ASPIRED Project (on 19 groundwater wells), groundwater monitoring systems installed by the Water Initiatives Plus Project and 80 wells monitored by EMIC with the equipment provided by the ASPIRED. The Year 5 indicator refers to the number of extraction points monitored by Ministry of Environment's (ME) subdivisions. The data will be collected and reported by the end of Year 5.
<b>IR 2: Introduce locally appropriate, cost effective technologies to improve water resource management</b>					
<b>Sub-IR 2.1: Technologies developed, piloted, and evaluated at different-sized fish farms with the objective of improving water resources management</b>					
<b>Indicators</b>					
2.1.1	Number of groundwater extraction reduction technologies piloted and evaluated	2/0	0	8/6 <sup>3</sup>	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 for the indicator 2.1.2. The Year 5 results refer to efficient pumping technology in Vedi and irrigation project in Pokr Vedi.
2.1.2	Thousands of cubic meters of water saved annually in Ararat Valley	11,412/0	0	11,412/16,358 <sup>4</sup>	This indicator measures the amount of water savings from the application of innovative water saving technologies, done by the ASPIRED Project, at fish farms and other water use points. It also accounts for 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-Water Project). Year 5 results will include recurrent savings provided by completed projects as well as results of projects pending completion (Vedi, Pokr Vedi, Yeghegnut, Khachpar, etc). In Vedi and

3 The data refers to the Water Reuse Project in Hayanist, Well Sealing (with motor pumping) and Well Optimization technologies in Sipanik village, Well Sealing Project with (electric pumping or drift irrigation) in Hovtashat, and Drinking water Project (efficient pumping combined with metering) in Aratashen.

4 The first figure of the cell refers to the cumulative cubic meters of water to be saved as a result of the ASPIRED Pilot Projects by the end of year 5, while the second figure refers to the actual cumulative cubic meters of water saved as a result of ASPIRED pilot projects to-date.



Yeghegnut, the ASPIRED completed its part of the project pending that the communities complete their part of the work.

**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	2/0	0	3/1	This indicator refers to water-use related EE/RE technologies to be piloted during project implementation. LOP results refer to efficient pumping in Aratashen. Year 5 projections include efficient pumping in Yeghegnut and solar projects in Vedi. In both projects, ASPIRED completed its part of construction and expect both communities to complete theirs as follows: in Yeghegnut, the community continues installation of water meters and household connections and in Vedi, the community is expected to install the solar panels during the second quarter of Year 5.
2.2.2	Megawatt hour of energy saved annually	796/0	0	796/276 <sup>5</sup>	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 and will be reported on an annual basis upon completion of the programmatic year. Year 5 targets consider recurrent savings from Hayanist and Aratashen projects, plus savings expected from projects scheduled for completion during Year 5: ATTIC, Yeghegnut, Vedi and Pokr Vedi.
2.2.3	Clean energy generated annually, MWh	33/0	0	33/0	This indicator refers to the clean energy generation capacity resulting from the introduction of RE technologies aimed at minimizing extraction of the groundwater. The ASPIRED team adjusted the indicator for clean energy generation as the RE component has been removed from the ATTIC. The expected result will be provided by the Urban Irrigation project in Vedi.
2.2.4	Gains in the reduction of GHG emissions as a result of USG assistance, in metric tons	2,002/0	0	2,002/1,255.4 <sup>6</sup>	GHG emissions reduction-related data will be calculated in metric tons/year based on the kilowatt-hours of savings resulting from application of energy saving technologies by the factor of 0.473 t CO <sub>2</sub> per megawatt-hour of energy. In addition to the GHG emission reduction occurring from the energy savings, ASPIRED also accounted for the CO <sub>2</sub> reductions from the irrigated farmlands. Data is reported on an annual basis. Year 5 targets include recurrent savings from completed projects as well as projects to be completed during Year 5 (Yeghegnut, Khachpar, Vedi, Pokr Vedi).
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.	22,144/0	0	26,615/4,471 <sup>7</sup>	Qualitative improvements <sup>8</sup> of the water resource resulting from the infrastructure projects implemented by ASPIRED Project. The term “water users” refers to households, local farmers, and other groups benefitting from these improvements. (Gender disaggregated). Year 5 target includes projects scheduled to be completed in Year 5: drinking water project in Yeghegnut; and irrigation projects in Vedi, Pokr Vedi, and Khachpar communities.
	Men	10,127	0	12,007/1,880	

<sup>5</sup> LOP data refers to Hayanist project during 3 years of operation (24 MWh/year) and Aratashen project (204 MWh) completed in Year 4.

<sup>6</sup> LOP actual data refers to the recurrent savings provided by completed projects during the entire period of their performance (starting from their launch date) and projects completed during Year 5.

<sup>7</sup> The LOP data refers to the beneficiaries of the two water reuse projects in Hayanist and Sayat-Nova, the well optimization projects in Sipanik and Hovtashat, and the water project in Aratashen.

<sup>8</sup> ASPIRED will conduct pre- and post-implementation water tests to detect the qualitative changes in water.

	Women	12,017	0	14,608/2,591	
2.2.6	Number of water users experiencing improved efficiency of water resources	5/0	0	12/7 <sup>9</sup>	This indicator tracks the communities/individuals that are being benefited by improved efficiency in 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. Year 5 projections refer to pending projects in Yeghegnut, Vedi, Pokr Vedi, Khachpar and ATTC. Results will be reported upon their completion. In Yeghegnut and Vedi, the ASPIRED team completed its part of the projects, and the communities are implementing their commitments.
<b>Sub-IR 2.3: Based on the pilot process and available research, recommendations developed for successful water and energy technologies for policy-makers and stakeholders shared</b>					
<b>Indicators</b>					
2.3.1	Number of successful technologies recommended and shared with the stakeholders and policy-makers	3/0	0	10/7 <sup>10</sup>	ASPIRED will pilot at least six technologies by the end of the project, conduct an evaluation and provide recommendations during Year 5 of the project. Planned targets for Year 5 refer to ATTC, Vedi and Pokr Vedi Projects. The data will be reported upon their completion.
<b>Sub-IR 2.4: Technology or method to permanently close illegal and/or abandoned wells, developed, piloted, and evaluated</b>					
<b>Indicators</b>					
2.4.1	Number of piloted technologies to permanently close illegal or abandoned wells	0/0	0	3/3	ASPIRED Project piloted one well sealing technology in Sipanik and two well optimization technologies in Sipanik and Hovtashat communities.
<b>IR 3: Introduce new policies and regulations to improve integrated water resource management.</b>					
<b>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.</b>					
<b>Indicators</b>					
3.1.1	Number of trainings for building capacity of ME in groundwater monitoring	4/0	0	9/5	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, oversight systems and decision support tools.

<sup>9</sup> The results refer to Aratashen, Hovtashat, Sipanik community, water reuse projects in Hayanist and Sayat-Nova communities ((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),...

<sup>10</sup> Aeration technology piloted in Masis Dzuk fish-farm; Hayanist water reuse project; Sayat-Nova irrigation; Sipanik well sealing project; and Sipanik well optimization project, water project in Aratashen (efficient pumping/billing & metering), Hovtashat well optimization project.

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. (not cumulative)	10/2	2	126/118	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; and environmental compliance procedures and efficient water use trainings for the beneficiaries of the communities. This indicator is not cumulative and is reported on a quarterly basis. Quarter 1 result refers to the water service training conducted by the ASPIRED Project engineer in Yeghegnut in December 2019.
	Women	1	1	31	
	Men	1	1	87	
<b>Sub-IR 3.2: Rigorous, evidence-based analysis of optimal water fee levels completed, shared with engaged stakeholders and recommendations provided to the GOA</b>					
<b>Indicators</b>					
3.2.1	Number of workshops and consultations with stakeholders to discuss water fee levels	N/A	N/A	9/9	The target for this indicator was met during Year 2 /Quarter 2; therefore, ASPIRED has completed data collection under this indicator for the project.
<b>Sub-IR 3.3: Water permitting monitoring and enforcement measures assessed and publicly available and recommendations, including development of regulations, provided to the GOA.</b>					
<b>Indicators</b>					
3.3.1	Package of recommendations to address water permitting monitoring and enforcement measures provided to GoA.	1/0	0	4/3 <sup>11</sup>	This indicator refers to the package of recommendations that the ASPIRED Project drafted and submitted to the GOA. Year 4 result refers to the draft Government decree on the establishment of requirements for the protection of water resources in the recreational zones submitted to the ME. The package of laws stipulating enforcement of requirements for the protection of water resources in recreational zones has been signed by the Armenian President on November 26, 2019. During Year 5, the ASPIRED team will submit the Draft Government decree/resolution on the adoption of the method for assessing self-purification capacity of rivers.
<b>IR: Ensure communications and coordination with stakeholders to avoid duplication of efforts</b>					
<b>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</b>					
<b>Indicators</b>					
4.1.1	Number of international and local organizations participating in the system mapping activities	1/0	0	26/25	This indicator refers to newly identified stakeholders and points of influence in water and water-energy nexus for the ASPIRED Project.

11 (1) The ASPIRED team opinion on Program of Measures in National Water code to USAID; (2) the Strategy for Policy and Regulatory Improvements and a Road Map for Improved Participatory Management of Water Resources developed under the USAID's PURE Project; (3) the draft Government decree on establishment of the requirements for the protection of water resources in the recreational zones submitted to the ME.

4.1.2	Number of partnerships made by ASPIRED with other organizations	1/0	0	19/18 <sup>12</sup>	This indicator refers to partnerships, collaboration with other public and private sector organizations, donors for the implementation of joint projects and/or other initiatives contributing to the accomplishment of ASPIRED objectives.
<b>Sub-IR 4.2: A transformative partnerships model to respond to needs for research, pilots, analysis and other coordinated efforts that is demand-driven, flexible, and has a plan for financial sustainability created</b>					
<b>Indicators</b>					
4.2.1	Percent of total funding leveraged from stakeholders for water resources management activities. (not cumulative)	35/0	0	35/40 <sup>13</sup>	This indicator refers to the total in-kind and financial contribution by ASPIRED partners versus the total contribution of the ASPIRED Project for a given year. Targets are not cumulative and refer to a specific year of the project cycle. For Year 5, ASPIRED will count the cost-share contribution of the communities of Yeghegnut, Pokr Vedi, Vedi, and Khachpar.
<b>1. Portfolio-level indicators</b>					
5.1	Percent of population living in targeted areas with improved water management	52/0	0	52/20 <sup>14</sup>	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). The results will count the population of affected communities who benefitted from the projects completed both during the previous years and in Year 5. The projects in Yeghegnut, Pokr Vedi, Vedi and Khachpar will be reported upon completion.
	Women	28		28/11.5	
	Men	24		24/8.5	
5.2	Number of key implementation steps taken to improve water management in the Ararat Valley	2/3	3	12/13 <sup>15</sup>	This indicator refers to policy, analysis, and other activities targeted towards improvement of water data-related activities, including training and pilot projects.

<sup>12</sup> ASPIRED's partnerships with Hayanist community, Samvel Lablajyan LLC, UNDP/GEF SGP, ERGIS NGO, CCHBCA, Satagro, Arnavir Farmer LLC (ATTC), SME DNC, FAR, Sayat-Nova community, Sipanik, SEDF, Aratashen, Hovtashat, Vedi, F2F, AAF and UNDP/Climate Change Program.

<sup>13</sup> This figure represents the actual cost-share of partners versus the total cost of the projects. Since the ASPIRED Project has different share in different projects, the total percentage of the leveraged funding may be lower than that for a particular year.

<sup>14</sup> The results refer to the population size of Sipanik, Hayanist, and Sayat-Nova communities versus the total size of the population in the AAB.

<sup>15</sup> This figure refers to: (1) Inventory of the Groundwater wells, natural springs and fisheries of the Ararat Valley (2) The Report presented to the GOA - Achieving Sustainable Groundwater Use in the Ararat Valley: the Role of the Fisheries Sector; (3) ASPIRED was involved into the Interagency Task Force (ITF) 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. (4) Pilot projects (5) Installation of the automated online groundwater use monitoring system in the fisheries of the Ararat Valley; and (6) DSS with its hydrologic, climate change and water quality assessment models; (7) Groundwater flow model; (8) 3D model of the Ararat Valley groundwater basin; (9) Capacity building activities, (10) Billing and metering system introduced in the communities with drinking water projects; (11) Water balance, water supply and demand balance estimates for the Ararat Valley for 2016, (12) Estimated Values of natural GW reserves, recharge and sustainable rate of GW use in the Ararat Valley (13) Preparation of legal package for adoption of the requirements for the water resources in recreational zones of Armenia.

5.3	Number of private sector firms that have improved management practices or technologies as a result of USG assistance	2/0	0	9/7 <sup>16</sup>	This indicator refers to (a) the number of fisheries with automated groundwater use monitoring systems installed; and (b) fisheries which have adopted innovative water or energy efficiency (including renewable) technologies.
5.4	Number of innovations supported through USG assistance	2/0	0	7/5 <sup>17</sup>	This indicator refers to innovative technologies, management/monitoring tools or practices introduced by the ASPIRED team in fish farms, at water use points and/or communities of the Ararat Valley which contribute to the reduction of the groundwater use.
5.5	Number of innovations supported through USG assistance with demonstrated uptake by private and/or public sector firms	1/0	0	5/4 <sup>18</sup>	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.

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16 The LOP result includes seven fisheries with improved water management practices: four 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).

17 The data refers to the (1) practice of the secondary use of outlet water from fisheries for irrigation purposes, which has never been practiced at a community scale; (2) well sealing/optimization activities; (3) installation of the online monitoring system in the fisheries; (4) use of inverter pumping technology in Aratashen; (5) decision support tools developed by the ASPIRED Project

18 Replication of the water reuse project in Hovtashat community (with assistance from ERGIS NGO) and Sayat-Nova community, secondary use of Masid Dzuk outlet water for fish-breeding, extension of the drinking water network in Aratashen by the community's resources.

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## 3. Program Implementation

### 3.1 Water Resource Data

#### SWCIS Enhancement

In October, the ASPIRED team worked with the Water Resources Management Agency (WRMA) on clarifying the latter's request on re-programming the selected tabular components and reporting forms of the SWCIS Data Warehouse. On November 7, the Agency provided the final scope for additional improvements to the SWCIS Data Warehouse, based on the WRMA's priorities. According to the WRMA, these additional improvements will further facilitate data input and generation of reports in the cadaster.

The Project team evaluated the additional time and level of effort required for finalizing the Data Warehouse programming based on the priority technical tasks and amended the Scope of Work of the short-term Database Programmer to accommodate the WRMA's request. The ASPIRED expert will work on programming the additional tasks in the cadaster through April 2020.

In November, the ASPIRED team and the Participatory Utilization of Resource Efficiency of Water (PURE Water) Project, participated in the presentation of the online platform for submitting water use permits applications for the WRMA personnel. The platform was programmed by the USAID PURE-Water project's specialists in collaboration with the ASPIRED project's data specialists, and it is intended be set up on the ME's internal Mulberry system to facilitate the proper documentation flow within the Ministry for the permit applications.

#### Decision Support Tools

**Decision Support System (DSS):** In the reporting quarter, the ASPIRED team worked on programming the simplified, automated option of the DSS, which is intended for the use of decision-makers. It is based on the complex option of the DSS designed for the technical specialists and allows calculating the values of the water balance, water supply and demand balance, as well as ecological flow for the rivers. The simplified, automated option of the DSS will be finalized in the next quarter.

**Groundwater modeling tools:** The ASPIRED team continued working on the simplified groundwater flow model for the Ararat Valley in MODFLOW. The project team applied various coefficients in the model and presented it to the AQUAVEO experts during a skype call. Specialists checked various coefficients and parameters applied in the model and identified several values that need to be rechecked. AQUAVEO expert provided detailed guidance on diagnostics of the groundwater flow model and next steps with calibration. ASPIRED team worked on the follow up steps identified during the call and intends presenting the model for further discussion with AQUAVEO in January 2020.

In October, the ASPIRED Project submitted the Report on Calculated Values of Water Balance, Water Supply and Demand Balance of the Ararat Valley, one of the ASPIRED deliverables to USAID. The report provides the estimated values of the groundwater storage, recharge and sustainable volume of

the groundwater abstraction from the aquifers of the Ararat Valley, using the results of the Ararat Valley modeling. In November, the ASPIRED team presented the findings on the water balance, water supply and demand balance of the Ararat Valley, estimated values of groundwater reserves, recharge and sustainable rate of groundwater use to the Project Contracting Office Representative (COR). ASPIRED COR made a few recommendations on improving presentation of the findings in the report and analyzing scenarios for the decision-makers on covering the surface and groundwater resources deficit in the Ararat Valley. The COR recommended to collaborate with the ME's Working Group for determining the scenarios and input parameters.

At the same period, the ASPIRED team worked with Stanley Leake - an independent expert, who conducted a peer-review to validate methodology applied and results of the ASPIRED Project estimates on water balance, water supply and demand balance components of the Ararat Valley, value of groundwater storage and rates of recharge and sustainable groundwater use. Mr. Leake is a retired USGS Hydrologist, with extensive experience in regional groundwater investigations, groundwater modeling, development of groundwater simulation capabilities, among other areas.

Mr. Leake provided recommendations on improving presentation of the findings of the ASPIRED work, by adding more description in selected sections of the ASPIRED report. The most important recommendation is regarding the water yield coefficients applied in the study for water bearing units, which needs to be revised according to the guidance provided and to consider estimating water in non-water bearing units. ASPIRED team intends to finalize the report revisions in January 2020 for further peer-review by a Working Group to be established by the ME and United Nations Development Program (UNDP) experts.

### **Introduction of the automated online system for groundwater use monitoring**

During the reporting period, the ASPIRED team continued collaboration with the ME on hand-over of the installed flow meters and data loggers to the Ministry. Following the Ministry's request to finalize the hand-over process, the Project provided copies of written communication between the Ministry and ASPIRED Project on selection of the model of the flow meters, fisheries where the meters were installed, etc.

### **The Ararat Valley Atlas**

The ASPIRED Project team continued adjustment and verification of the geospatial datasets within the unified Ararat Valley geodatabase. Particularly, the team checked the new datasets on drainage and collector network of the Ararat Valley received from the Amelioration CSJC of the Water Committee in October. The team conducted groundwater quality analysis for 30 groundwater monitoring wells in the Ararat Valley for inclusion in the atlas. In particular, the vector layers of the Ararat Valley geospatial database were enriched with the relevant data on water quality monitoring, received from the

EMIC, and water discharge monitoring from the main canals in 2016-2017, received from Amelioration CSJC of the Water Committee.

The Project team started designing the individual maps for the Ararat Valley Atlas. At the same time, the team developed graphs, diagrams, and other relevant statistical information for each map of the Atlas.



*Water sampling in Aknalich with EMIC team and experts of the Humboldt Institute.*

On October 16, the ASPIRED Project Basin Management Planning Specialist/Environmental Officer participated at the site visit for water sampling from the 6 wells in the Ararat Valley jointly with representatives of EMIC and Humboldt Institute, Germany, aimed at determining the groundwater age in the Ararat Valley aquifers.



### 3.2 Low Cost and Water Efficiency Technologies

The table below summarizes the status of the pilot projects as of December 31, 2019.

Project Name/ Technology	Status	Total cost, USD	ASPIRED cost-share, USD	Partner cost-share, USD	Partner
Hayanist irrigation rehabilitation project	Completed in April 2017.	131,706	89,525	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
Sayat-Nova water reuse project	Completed in September 2018.	132,100	80,409	20,876	Partnership for Rural Prosperity Project
				14,395	Fund for Armenian Relief
				16,420	Sayat-Nova community

Project Name/ Technology	Status	Total cost, USD	ASPIRED cost-share, USD	Partner cost-share, USD	Partner
Aratashen community water supply project	Completed in June 2019.	130,371	87,455	42,916	Aratashen community
Hovtashat well optimization project	Completed in September 2019	43,539	28,587	14,952	Hovtashat community
Aquaculture Technology Transfer Center (ATTC)	<p style="text-align: center;"><b>Ongoing</b></p> <ul style="list-style-type: none"> <li>• On October 28, the ME&amp;A Vice President on Operations Moenes Youannis met with the owner of the ATTC facility during which the latter admitted he won't be able to operate the project due to his resource limitations. The owner agreed to transfer the operation to a third party to be identified by the ASPIRED Project, with one-year grace period.</li> <li>• The issue was discussed with the rector of the National Agrarian University Vardan Urutyanyan who admitted the University was interested in operating the site as the training facility but lacks financial resources.</li> <li>• The ASPIRED team raised the ATTC issue during the meeting with the USAID Mission Director, Head of Sustainable Office, the COR and Contracting office representatives.</li> <li>• In November, the ASPIRED team presented the ATTC Project to the Deputy Minister of Economy, Tigran Gabrielyan and other Ministry specialists and discussed ways of transferring the operation of the ATTC to another fish-farmer. The Ministry representatives visited the site and met with the owner on November 15.</li> <li>• The ATTC Project technical consultant Karen Aghababyan provided justifications for selected technical solutions at the pilot project.</li> <li>• The ASPIRED Project and Armavir Farmer company owner discussed two options for the operation of the fishery: (1) independent expertise of the project; (2) the owner's terms of transferring the ATTC operation to the third party. The site owner provided his financial conditions for the operation of the ATTC by the third person. The ASPIRED team discussed with the Project lawyer the feasible legal framework for</li> </ul>	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
	<p>ensuring the launch of the ATTC with the third party's operation. All these issues were discussed during the meeting on December 24, at which participants agreed on the following:</p> <ul style="list-style-type: none"> <li>○ To select a qualified, independent international expert who will evaluate the ATTC aquaculture system. The expert opinion has to be final and binding for the Parties.</li> <li>○ Conditions for operation of the facility by a third party including financial aspects for 5 years. Preliminary agreement is 1-year grace period and for the next 4 years with an annual compensation.</li> <li>○ Parties agreed that the owner can take part in the selection process of both the expert and operator.</li> </ul> <p>The Lawyer prepared minutes of the meeting and shared it with the Owner of the ATTC and ASPIRED for signature.</p> <ul style="list-style-type: none"> <li>● ME&amp;A Headquarters is in the process of recruiting an Aquaculture Expert to provide expertise to the ATTC. The job announcements were posted on the ME&amp;A web site and iHire.</li> </ul>				
<p><b>Yeghegnut community water supply project</b></p>	<p style="text-align: center;"><b>Ongoing</b></p> <ul style="list-style-type: none"> <li>● In October 2019, the newly elected local council approved the budget allocation for trenchwork, which allowed the ASPIRED Project to resume the pipework.</li> <li>● From October through December 2019, nearly 98% percent of the pipework is complete. The remaining part will be finished after the New Year and Armenian Christmas holidays to prevent water cut-off in the village during the celebration days.</li> <li>● Simultaneously, the village started installation of the water meters.</li> <li>● In December 2019, ASPIRED team provided the water billing software and conducted the training of the local municipality specialists on the software use</li> </ul>	120,809	79,777	41,032	Yeghegnut community

Project Name/ Technology	Status	Total cost, USD	ASPIRED cost-share, USD	Partner cost-share, USD	Partner
<b>Vedi Urban Irrigation Project</b>	<p style="text-align: center;"><b>Ongoing</b></p> <ul style="list-style-type: none"> <li>• By the end of the reporting period, the Project had installed and tested the irrigation network, based on which the act of acceptance was signed with the sub-contractor Artashat ENC.</li> <li>• By the end of November, the ASPIRED Project completed its share of the project specified in the approved concept paper.</li> <li>• As the next step, the community must begin installation of the photovoltaic panels in February 2020.</li> </ul>	147,538	59,632	87,906	Vedi Municipality
<b>Irrigation Improvement Project in Pokr Vedi</b>	<p style="text-align: center;"><b>Ongoing</b></p> <ul style="list-style-type: none"> <li>• The ASPIRED Project approved the network design prepared by the sub-contractor Jrtuk LLC in October.</li> <li>• In November, the village received permission from the Ministry of Territorial Administration for the pipework along H11 road.</li> <li>• The ASPIRED Project and Hayastan All-Armenian Fund finalized the results of the construction tender and selected Shahart LLC as the sub-contractor. The sub-contractor will start the construction in January 2020.</li> <li>• Given that the lowest bid for the network installation was higher than the planned project budget, the ASPIRED Project discussed with the village the issue of sharing the extra cost in the amount of 6,665 USD. The local council agreed to provide the requested cost share.</li> </ul>	81,600	31,916	31,944	HAAF
				11,075	Artashat Water Users Association
				6,665	Pokr Vedi community
<b>Irrigation Improvement Project in Khachpar</b>	<p style="text-align: center;"><b>Ongoing</b></p> <ul style="list-style-type: none"> <li>• During the reporting period, the ASPIRED and PURE Water Project teams made efforts to obtain the commitment letter from the village municipality.</li> <li>• In November, the concept paper along with the environmental documentation and the commitment letter was submitted to USAID. The Project was approved in December 2019.</li> <li>• In December, the ASPIRED Project announced the tender for the network design among the local companies.</li> </ul>	93,478	60,005	33,473	Khachpar municipality

Project Name/ Technology	Status	Total cost, USD	ASPIRED cost-share, USD	Partner cost-share, USD	Partner
<b>TOTAL</b>		<b>1,135,269</b>	<b>701,673</b>	<b>433,596</b>	

### Identification of New Projects

The ASPIRED Project explored the possibility of implementing a well sealing project on one of the wells recommended by the ME. ASPIRED team visited a groundwater well in Noramarg together with the companies specializing in drilling/closure of wells – Artesia LLC, Ashok LLC and VALML LLC, to develop an estimate of the anticipated cost of sealing the well. The ASPIRED Project summarized the conclusions and cost estimates, taking into consideration the recommendations of these experts. The approximate cost of the well sealing project based on the estimates of these three companies will range between USD 104,000-125,000. Implementation of this activity is beyond the ASPIRED Project’s available budget. The ASPIRED project team will work with the specialists of the ME to identify another well for sealing.



*Installation of the irrigation network in Yeghegnut village.*



*Pumping station in Yeghegnut village.*

### **3.3 Water Regulation and Enforcement**

During the reporting period, the ASPIRED Project continued the development of the method of assessment of self-purification capacity of rivers. The working group held ten meetings during which the members discussed the following topics:

- Overview of the work progress;
- The principle of the correlation of hydrologic, chemical and biological indexes;
- Calculations of the chemical and hydrologic indexes using the data from at least two observation points on Kasakh river;
- Planning and details of the peer review.

During the reported quarter, the experts of the Environmental Monitoring and Information Center, Scientific Center of Zoology and Hydroecology, and ASPIRED hydro-morphologist, conducted three field trips to Kasakh River basin for seasonal samplings. More specifically, the experts collected hydro-morphological and hydrobiological data from Ashtarak observation point and made morphological measurements at the mouth of Kasakh River during the trips. Based on the existing data, the experts were able to estimate the self-purification index from the chemical perspective.

In December, the Ministry of Territorial Administration and Infrastructure nominated Gevorg Aloyan, Deputy Head of Monitoring and Analysis Department and Sona Hayrapetyan, Leading Specialist of Irrigation Collector-Drainage Systems Department from Water Committee, to the working group on the development of the method for assessment of self-purification capacity of rivers. The two new members represent the Water Committee, which became part of the Ministry of Territorial Administration and Infrastructure after recent government restructuring.

On November 26, the Armenian president Armen Sargsyan signed the package of laws which stipulated amendments to the Water Code and Law on Administrative Offences. The adoption of the law will result in the enforcement of the requirements of protection of water resources in recreation zones of Armenia to be defined by the Ministerial Resolution.

### 3.4 Donor Coordination and Communications

During the reporting period, the ASPIRED team arranged a series of interviews and video shootings on the project sites in Vedi and Yeghegnut and during the water sampling field trips. In October, the shooting team made interviews with the Mayor of Vedi about the impact of the municipal irrigation infrastructure on the town.

The following publications were made by the outreach team through the reporting period which can be found both on the ASPIRED Project web page and the ME&A Headquarters’ web site:

- Success story about the water project impact in Aratashen community (via the link <http://bit.ly/2NP8AR2>). In October, the ASPIRED team visited Aratashen community to interview the village mayor and the beneficiaries of the project and collected information about the post-implementation results of the project. The community earned significant savings over the first three months of the water system operation and extended the network to the remaining three streets of the village. The ASPIRED team shared the success story with USAID.
- A story about ASPIRED Project’s participation in The Coca Cola Stakeholder’s Forum in Athens (via the link <http://bit.ly/2PxC86N>)
- A story about the restarting of the drinking water project in Yeghegnut along with the photos (via the link <http://bit.ly/38vqOR2>)
- ME&A Inc. Headquarters submitted a Water Article to the Small Business Association for International Companies (SBAIC) “Small Business- Creating a Better Environment for the Future” newsletter to highlight the work done in Armenia through the ASPIRED Project.



*ASPIRED Project Chief of Party, Magda Avetisyan and the Project COR, Marina Vardanyan participating in the Coca-Cola Stakeholder’s Forum in Athens in October 2019.*

- The December issue of the USAID newsletter included a story about recent legal improvements in the Armenian water sector and ASPIRED Project's efforts in promoting the enforcement of the requirements for protection of water resources in recreation zones.

In the reporting period, the outreach coordinator visited the communities of Vedi, Yeghegnut and Pokr Vedi for monitoring purposes and collection of video and photo materials. On November 26, the ASPIRED team met with the mayor of Pokr Vedi and local council members aimed at discussing the community's possible cost-share in the irrigation project implemented in their community. The community agreed to dedicate about USD 6,600 from their local budget and implement part of the pipework specified in the concept paper.

During the reporting period, the Project continued collaboration with the partners. On October 15, the project presented its results at the 18th Meeting of the Steering Committee of the National Policy Dialogue on Integrated Water Resources Management in Armenia.

On December 6, the ASPIRED team met with the Fund-Raising Specialist of Hayastan All-Armenian Fund to discuss current project and further collaboration with the Fund. The ASPIRED team presented the urban irrigation project in the town of Vedi, requesting assistance of the Fund to the municipality in installation of the solar photovoltaic panels at the local sports school.

In December, the ASPIRED team participated in the Water Sector Vulnerability Seminar, organized by the UNDP Climate Change Program team in Yerevan. The Project Basin Planning Specialist joined the Project COR to attend the donor coordination meeting hosted by the World Bank under the auspices of the Armenian Government to discuss the water sector development issues for inclusion in the Government's agenda.

During the reporting period, the ASPIRED Project summarized information on annual indicators and collected the necessary documentation and evidences supporting each indicator result. The team also provided input on the Project's outcome-level indicators required for the USADI's portfolio-level reporting.

#### 4. General Administrative Issues

On November 29, USAID approved the ASPIRED Project work plan for Year 5.

From October 27 to November 2, ME&A's Vice-President for Operations Moenes Youannis visited the ASPIRED Project office. The purpose of the visit was to work with the team on the budget realignment, to finalize Year 5 work plan, to address the COR's comments, to consult and support the team in finding the solution for the ATTC project operation. Mr. Youannis also met with the USAID, WRMA leadership and the project beneficiaries. He also discussed the ATTC project launch issues with the USAID Armenia leadership in Yerevan and with the Contracting and Agreement Officer in Tbilisi.

The following bids were announced during the reporting period:



- Construction sub-contract for the irrigation project in Pokr Vedi, jointly with Hayastan All-Armenian Fund;
- Design contract for the irrigation project in Khachpar.

The ASPIRED Project team extended the contract of the Database Programmer based on the ME's request for additional tasks to finalize the State Water Cadaster Information System's Data Warehouse.

## 5. Environmental Compliance

During this quarter, the ASPIRED project conducted environmental and social compliance monitoring of the activities implemented in Vedi town for the improvement of the municipal irrigation network. The Project Environmental Specialist provided the environmental and social compliance instructions to the supervisor of the ArmPlast company before beginning the trenchwork and pipes installation in the community of Yeghegnut, and monitored implementation of the safeguards.

In December, the Project Environmental Specialist collaborated with the PURE Water Project team on developing the environmental review documentation for the Khachpar irrigation project. The Project provided recommendations for the Project EMMP related to the mitigation measures for maintaining water quality at the level that is suitable for irrigation purposes according to the FAO norms.

During next quarter, the team will be monitoring the ongoing projects in Vedi, Pokr Vedi and Khachpar communities. The Team will also provide Environmental and social safety trainings to the representatives of subcontractors, partner communities administration, and Water User Associations.

## 6. Existing Problems or Issues

The major challenge is finalization of the ATTC project. The ASPIRED team is working both with the Project legal advisor and owner of Armavir Farmer CJSC to identify feasible solutions.

## 7. Activities for the Next Quarter

### 7.1 Data

- Develop the new technical improvements in the SWCIS Data Warehouse per WRMA's additionally requested tasks;
- Finalize and share ASPIRED Project's recommendations on full operationalization of the SWCIS Data Warehouse with the ME, including improved data sharing mechanisms online and data availability for stakeholder online;
- Discuss the Project recommendations on online operation and maintenances of the SWCIS Data Warehouse with the ME representatives and to initiate the processes for online operation of the data warehouse in collaboration with the ME;
- Finalize the revisions in the estimates of the values of the groundwater reserves or storage,

natural groundwater resource recharging the groundwater basin and sustainable rate of groundwater use from the Ararat Valley aquifers based on Stanley Leake's recommendations and to present the final estimated values to the Working Group established by the ME for further discussions.

- Continue the calibration of the steady-state groundwater flow model of the Ararat Valley groundwater basin, jointly with AQUAVEO experts. Once calibrated, the model can be used for determining the impact of water abstractions on changes in levels of aquifers. It will be a useful tool for decision-makers in issuance of groundwater use permits in the Ararat Valley.
- Finalize programming and calibration of the simplified, automated option of the DSS for the decision-makers and non-technical specialists to conduct various hydrologic calculations for the Ararat Valley.
- Finalize the DSS User Manual.
- Collaborate with the ME on selecting participants of the training programs on application of the Decision Support tools for determining water balance, water supply and demand balance.;
- Work on construction of maps of the Ararat Valley Atlas according to the agreed structure of the Atlas;
- Collaborate with the ME on hand-over of the installed flow meters and data loggers.

## **7.2 Pilot Technologies**

- Complete the design work and start construction under Khachpar Project;
- Complete all construction work under Yeghegnut Project;
- Start and complete construction work under Pokr Vedi Project;
- Explore more options for operating the ATTC including announcing a tender for selection of a third party operator for the ATTC facility.

## **7.3. Legal and Policy Issues**

- Make additions and revisions to the requirements of protection water resources in the recreation zones by the ME request;
- Conduct peer review on the method of development of determination of self-purification; capacity of rivers in Yerevan University Environmental Law Resource Center;
- Continue working with group meetings;
- Conduct regular field trips with the Environmental Monitoring and Information Center and Scientific Center of Zoology and Hydroecology on monthly basis.

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

- Prepare and conduct the outreach event for Yeghegnut drinking water project;
- Start preparations for the outreach events of completed irrigation projects (Hovtashat, Vedi, Pokr Vedi);
- Conduct site visits to the pilot project sites, schedule the visits of the shooting team to the project sites, arrange interviews with the beneficiaries;

- Produce stories and other outreach materials (fact-sheet on Khachpar Project);
- Maintain and update the Project web site and Facebook page.

### **7.5 Environmental Compliance**

- Monitor the ongoing projects in Yeghegnut, Pokr Vedi and Khachpar communities;
- Provide the environmental and social safety trainings to the subcontractors and partner communities.

### **7.6 Project Management**

- Announce bidding for the supply of materials and installation services in Khachpar;
- Follow-up with implementation of the sub-contractor agreements;
- Perform budget and financial monitoring and reporting.