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ADVANCED SCIENCE & PARTNERSHIPS FOR INTEGRATED RESOURCE DEVELOPMENT PROJECT

QUARTERLY REPORT

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Advanced Science & Partnerships for Integrated Resource Development

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List of Acronyms

AAF	Hayastan All-Armenian Foundation
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.
CARD	Center for Agribusiness and Rural Development Foundation
CoP	Chief of Party
COR	Contracts 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
EIA	Environmental Impact Assessments
EIMC	Environmental Impact Monitoring Center
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
MC	Hydrogeological Monitoring Center
ICARE	International Center for Agribusiness Research and Education
IR	Intermediate Result
ITF	Interagency Task Force
The Lab	U.S. Global Development Lab
LOP	Life of project
ME&A	ME&A, Inc.
MoA	Ministry of Agriculture
ME	Ministry of Environment
NGO	Non-Governmental Organization
PERSUAP	Pesticide Evaluation Report and Safe Use Action Plan
PIRS	Performance Indicator Reference Sheet
PMP	Performance Management Plan
PPR	Performance Plan and Report
PURE-Water	Participatory Utilization and Resource Efficiency of Water
SCADA	Supervisory Control and Data Acquisition
SEDF	Sustainable Energy Development Fund
SCWS	State Committee on Water Systems
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
USG	United States Government
USGS	United States Geological Survey
WRMA	Water Resources Management Agency

WUA
WUP

Water User Association
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 fourth quarter of Year 4 of the project, from July 1 through September 30, 2019. The report reviews progress and achievements under each of the four project areas during the reporting period, as well as describes planned activities for the next quarter. The report also highlights challenges and actions taken to address these challenges.

1.2 ASPIRED Project Summary

On September 29, 2015, the United States Agency for International Development (USAID) awarded ME&A, 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 the sustainable levels.

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

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

The ASPIRED Project places a strong emphasis on building partnerships with the public and private sectors, research organizations, and international donors to pilot innovative water and energy efficiency technologies, and to promote better water resource monitoring, planning and sustainable management.

1.3 Main Highlights from the Reporting Period

- On September 19, the ASPIRED Project submitted the Work Plan for Year 5 to USAID.
- Data component:
 - Completing calculations of the groundwater reserves or storage, natural groundwater resource recharge of the Ararat Valley groundwater basin, and the sustainable rate of the groundwater use.
 - Finalized (a) the report on the geo-spatial database of the Ararat Valley; (b) the format and outline of the Ararat Valley Atlas, submitted to USAID in August 2019.
- The ASPIRED Project hosted Dr. Tom Sheng, a representative of the Project's Subcontractor Computer Assisted Development, Inc. (CADI). Dr. Sheng reviewed and gave feedback on two technical reports, the groundwater flow and decision support models, as well as the groundwater modeling results for the Ararat Valley. He also provided recommendations for data sharing

protocols and deploying the State Water Cadaster Information System (SWCIS) under the ASPIRED Project's Water Resources Data Component.

- Technology component:
 - Completed Well Optimization Project in Hovtashat village.

2. Summary of Performance Indicators

Summary of performance indicators for the fourth quarter of FY 2019 (Year 4 of the project) is presented in the table below.

	Indicator	Year 4 Target/Actual	Actual Q4 Year 4	LOP Target/Actual	Notes: Descriptions/Comments/Assumptions
IR 1: Establish a comprehensive, user-friendly, open data system that is accessible to all stakeholders					
Sub-IR 1.1: Ararat Valley Geocoded, real-time, publicly accessible data system that incorporates water resource, groundwater, and hydrological datasets from multiple stakeholders built and shared with the (Government of Armenia) GOA					
Indicators					
1.1.1	Percent (of total) of datasets for the Ararat Valley publicly accessible	20/10	10	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%	This indicator corresponds to the inventory of the wells, natural springs and fish farms in Ararat Valley, which the project team successfully completed during Year 1. Therefore, data collection for this indicator has been completed for the project.
1.1.3	Number of stakeholders engaged in the data collection activities	1/4	-	16/16 ¹	This indicator refers to the number of stakeholders engaged in the groundwater-related data collection activities in the Ararat Valley from different sectors – government, private, and public. ASPIRED completed installation of the flow-meters and data loggers in a fishery owned by Max Fish. State Hydromet Service and Center of Zoology and Hydroecology, and Water Committee provide data to Data and Legal components.
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					

1. Ministry of Environment (ME) with its 2 subdivisions, PEER grantee, Institute of Water Problems, United States Geological Survey (USGS), EU Water Initiatives Project, Ministry of Agriculture (MoA), 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, Water Committee.

Indicators					
1.2.1	GIS-based decision support tools for Ararat Valley developed	1/1	1	2/2	This indicator refers to the GIS-based water resource management tools to be developed by the ASPIRED Project on the Ararat Valley. The team completed the customization of DSS for Ararat Valley and the 3D model of the AV groundwater basin. The Groundwater Flow Model will be completed in Year 5.
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	1/1	-	6/4 ²	By the recommendation of the ME, ASPIRED installed the remaining set of flow meters and data loggers in a fishery owned by Max Fish during Quarter 2 of Year 4.
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	1.7/31.8	30.6	50/31.8	This indicator measures the percentage of the groundwater extraction wells monitored with the use of the online automated system installed by the ASPIRED Project versus the total number of the operational groundwater wells available in the fisheries ³ . The results for Year 4 refer to the systems installed by the ASPIRED Project (on 19 groundwater wells), + 80 wells monitored by EMIC with the equipment provided by the ASPIRED Project. The results for the life of project (LOP) were updated based on the changes made in Year 5 workplan in terms of LOP projections.
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					
Indicators					
2.1.1	Number of groundwater extraction reduction technologies piloted and evaluated	4/3	1	7/6 ⁴	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. Information on annual water saved, measured in cubic meters is provided in Indicator 2.1.2). The Year 4 results refer to Aratashen Water Project (efficient pumping combined with metering) and Hovtashat Well Optimization Project.

² The ASPIRED team installed online groundwater use monitoring systems in the Alex Grig, Interaqua, and Golden Fish fisheries during Year 3 and Max Fish during Year 4.

³ During the latest inventory of the groundwater wells, natural springs, and fish farms of the Ararat Valley, ASPIRED inventoried a total of 2,807 wells in the Ararat Valley, of which 1,795 were found to be operational. Out of 1,795 functioning wells, 336 are reportedly located in the fisheries of Ararat and Armavir marzes.

⁴ The data refers to the Water Reuse Project in Hayanist and the Well Sealing and Well Optimization Projects in Sipanik village.

2.1.2	Thousands of cubic meters of water saved annually in Ararat Valley	8,777/7416	7416	11,187 ⁵ /16,358 ⁶	This indicator measures the amount of water savings from the demonstration of innovative water saving technologies by the ASPIRED Project at fish farms and other water use points, as well as the implementation of water rehabilitation projects in the communities of the Ararat Artesian Basin (AAB) affected by the shortage of groundwater resource (in collaboration with PURE-Water Project). The annual data for Year 5 counts recurrent savings provided by completed projects (Hayanist 1.1 mln, Sipanik well sealing 1.9 mln, Sayat-Nova 1.92mln and Sipanik well optimization 465,000) as well as new projects in Aratashen (557 000) and Hovtashat (1,474,000).
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	3/1	1	4/1	This indicator refers to water-use related EE/RE technologies to be piloted during project implementation. Year 4 results refer to efficient pumping in Aratashen.
2.2.2	Megawatt hour of energy saved annually	453/228	228	500/276 ⁷	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. The result refers to energy savings in Aratashen during Year 4 and Hayanist Project completed during Year 2
2.2.3	Clean energy generated annually, MWH	82/0	0	82/0	This indicator refers to the clean energy generation capacity resulting from the introduction of RE technologies aimed at minimizing extraction of the groundwater. The data of this indicator depends on the implementation of EE/RE technologies, tracked under Indicator 2.2.1
2.2.4	Gains in the reduction of Greenhouse Gas (GHG) emissions as a result of USG assistance, in metric tons	1,414 ⁸ /783	783	1,440/1,255.4 ⁹	GHG emission reduction quantities are estimated based on the kilowatt hour of savings resulting from application of energy saving technologies in metric tons/year. Since the 4 th quarter of Year 3, ASPIRED, in concurrence with USAID, started counting the CO2 reductions resulting from irrigated farmlands of the implemented projects. Data is reported on an annual basis. Year 4 result refers to Aratashen, Sayat-Nova, Hayanist, Sipanik and Hovtashat project impact. Deviation between the actual/planned results is because of the delay in implementation of Yeghegnut, ATTC and Vedi Projects.

5 Refers to water savings to be achieved by the ASPIRED Project by year 5.

6 This includes total amount of savings generated from ASPIRED pilot projects over 5 years.

7 LOP data refers to 2 years of operation of Hayanist project (24 MWh/year).

8 Year 4 data refers to Hayanist & Sayat-Nova projects (along with the GHG emissions from farmlands, solar installations at Masis-Dzuk, Vedi, ATTC, as well as GHG reductions from Yeghegnut and Aratashen savings).

9 Data refers to Hayanist, Sayat-Nova, and Sipanik projects starting from the date of their completion to date.

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.	9,814/4,471	1,271	12,000/4,471 ¹⁰	This indicator tracks qualitative improvements ¹¹ of the water resource resulting from infrastructure projects implemented by ASPIRED ¹² . The term “water users” refers to households, local farmers, and other groups benefitting from these improvements (gender disaggregated whenever possible). Q4 results refer to the completed project in Aratashen village. The deviation in indicators is explained due to the delay in implementation of pilot projects, in Yeghegnut and Vedi.
	Men	1,880	600	1,880	
	Women	2,591	671	2,591	
2.2.6	Number of water users experiencing improved efficiency of water resources	7/2	1	13/7 ¹³	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. Q4 results refer to Hovtashat Project and Aratashen project (reported during the last quarter).
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	6/2	1	11/7 ¹⁴	ASPIRED will pilot at least six technologies by the end of the project as well as conduct an evaluation and provide recommendations during Year 5 of the project. Year 4 results include the project in Aratashen (efficient pumping/billing and metering technology) and well optimization in Hovtashat (pumping with mobile diesel generator).
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	1/1	1	3/3	ASPIRED initially planned to pilot at least two well optimization/sealing projects during Year 3. During Quarter 4 of Year 4, the ASPIRED team completed the well optimization project in Hovtashat.
IR 3: Introduce new policies and regulations to improve integrated water resource management					

¹⁰ The LOP data refers to the beneficiaries of the two water reuse projects in Hayanist and Sayat-Nova, well optimization projects in Sipanik and Hovtashat, and drinking water project in Aratashen.

¹¹ ASPIRED will conduct pre- and post-implementation water tests to detect the qualitative changes in water.

¹² 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.

¹³ The results refer to Aratashen, Hovtashat, Sipanik community, water reuse projects in Hayanist and Sayat-Nova communities, including communities and the fish-farm owners. Based on the results of Hayanist and Sayat-Nova projects (a) two communities avoided drilling of wells for irrigation needs; (b) two fisheries, Samvel Lablajyan’s fish farm and Masis Dzuk fishery, became more efficient water users.

¹⁴ Aeration technology piloted Masis Dzuk fish-farm; Hayanist water reuse project; Sayat-Nova irrigation; Sipanik well sealing project; and Sipanik well optimization project, water project in Aratashen, Hovtashat well optimization project.

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 ME in groundwater monitoring	1/1	0	6/5	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. Year 4 results refer to the GIS training held April 15-19, 2019.
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.	25/22	0	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. Year 4 results refer to the trainings on ecological flow, GIS, and water service management training in Aratashen.
	Women	9	0	27	
	Men	13	0	91	
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	9/9	The target for this indicator was met during Year 2 /Quarter 2; therefore, ASPIRED has completed data collection under this indicator for the project.
Sub-IR 3.3: Water permitting monitoring and enforcement measures assessed and publicly available and recommendations, including development of regulations, provided to the GOA					
Indicators					
3.3.1	Package of recommendations to address water permitting monitoring and enforcement measures provided to GoA.	2/1	0	4/3 ¹⁵	This indicator refers to the package of recommendations that the ASPIRED Project drafted and submitted to the GOA. Year 4 results refer to the draft Government decree on establishment of the requirements for the protection of water resources in the recreational zones submitted to the ME. In Year 5, the ASPIRED team will submit the Draft Government decree/resolution on adopting the method of assessing self-purification capacity of rivers.
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					

¹⁵ The expert opinion on (1) 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.

Indicators					
4.1.1	Number of international and local organizations participating in the system mapping activities	1/1	0	26/25	This indicator refers to newly identified stakeholders and points of influence in water and water-energy nexus for the ASPIRED Project. The ASPIRED team identified Hayastan All-Armenian Foundation (AAF) as a donor of energy and water saving projects.
4.1.2	Number of partnerships made by ASPIRED with other organizations	3/6 ¹⁶	1	15/18	This indicator refers to partnerships, collaboration with other public and private sector organizations, donor projects for the implementation of joint projects and/or other initiatives contributing to the accomplishment of ASPIRED objectives.
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 resource management activities. (not cumulative)	35/40	34	35/40 ¹⁷	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. The data refers to the cost share leveraged for Aratashen and Hovtashat projects.
1. Portfolio-level indicators					
5.1	Percent of population living in targeted areas with improved water management	41.8/11.8	6	52/20 ¹⁸	The geographical target area is the Ararat Artesian Basin (AAB), a territory of 13,075 hectares with a population of 58,373 people (28,392 men; 30,345 women). Year 4 results refer to the projects in Aratashen and Hovtashat.
	Women	6.8	3.6	11.5	
	Men	5	2.4	8.5	
5.2	Number of key implementation steps taken to improve water management in the Ararat Valley	2/4	3	8/10 ¹⁹	This indicator refers to policy, analysis, and other activities targeted towards improvement of water data-related activities, including training and pilot projects. The results for Year 4 refer to the 3D model of the Ararat Valley groundwater basin, developed by the ASPIRED team, the capacity building for the ME, the DSS, and introduction of the billing/metering for water service in rural areas.

¹⁶ The indicator refers to partnerships with the communities of Aratashen, Hovtashat, Vedi, F2F, AAF and UNDP (under the data component).

¹⁷ This figure represents the actual cost-share of partners versus the total cost of the projects. Since the ASPIRED Project has a different share in different projects, the total percentage of the leveraged funding may be lower than that for a particular year.

¹⁸ The results refer to the population size of Sipanik, Hayanist, and Sayat-Nova communities versus the total size of the population in the AAB.

¹⁹ This figure refers to: (1) Inventory of groundwater wells and springs in September 2016; (2) Inventory of groundwater wells, natural springs and fisheries of the Ararat Valley (3) The Report presented to the GOA - Achieving Sustainable Groundwater Use in the Ararat Valley: the Role of the Fisheries Sector; (4) ASPIRED involvement in 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); (5) Pilot projects; (6) Installation of automated online groundwater use monitoring system in the fisheries of the Ararat Valley; (7) Hydrological model of the decision support system (DSS); (8) Groundwater flow model; (9) 3D model of the Ararat Valley groundwater basin; and (10) Capacity building activities.

5.3	Number of private sector firms that have improved management practices or technologies as a result of USG assistance	2/1	0	8/7 ²⁰	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 efficient (including renewable) technologies. The reported figure refers to Max Fish fishery where the Project installed an automated monitoring system.
5.4	Number of innovations supported through USG assistance.	1/1	0	5/5 ²¹	Innovative technologies, management/monitoring tools or practices introduced by the ASPIRED team in fish farms, at water use points and/or communities of Ararat Valley which contribute to the reduction of groundwater use.
5.5	Number of innovations supported through USG assistance with demonstrated uptake by private and/or public sector firms	1/2	1	4/4 ²²	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. The Year 4 results refer to the secondary use of the outlet water of Masis Dzuk fishery by another fish farmer and the extension of the Aratashen water project to the remaining village streets made by the community using the project savings.

²⁰ The LOE result includes six 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).

²¹ 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; and (5) decision support tools developed by the ASPIRED Project.

²² 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.

3. Program Implementation

3.1 Water Resource Data

SWCIS Enhancement

During the reporting period, the ASPIRED team completed testing and debugging of all the program components of the SWCIS Data Warehouse, based on the bugs identified by personnel of the WRMA of the ME during data input. Personnel of the Water Cadaster and Water Use Permitting Divisions of the Agency already have their individual user names and passwords for operation and maintenance of the SWCIS Data Warehouse.

In August, Dr. Tom Sheng from CADI Inc. reviewed the enhanced SWCIS Data Warehouse and data sharing procedures currently applied by the WRMA. He also reviewed the draft report on the Technical Design and Architecture of the SWCIS Data Warehouse, and the User Manual on maintenance of the Data Warehouse prepared by the ASPIRED specialists. The Project team and Dr. Sheng met with Arman Shahnumbaryan, the Acting Head of the Water Resources Cadaster Division, to discuss the further improvement of the system and its use as a web-based application with authorization rights granted to different stakeholder institutions. The team also met with WRMA's Head, Edgar Pirumyan, and Deputy Head, Artyom Mkhitarian, to discuss the enhanced SWCIS Data Warehouse, decision support tools, and data sharing options via the web-based SWCIS. The parties discussed the establishment of a digital information system to be responsible for data integration and management, as well as the establishment of an information center to integrate and manage all digital data under the ME.

Dr. Sheng provided a set of recommendations for the ME on improving data sharing mechanisms via the SWCIS Data Warehouse and its online availability to facilitate implementing the open data concept. After review by USAID, the recommendations will be shared with the ME.

In September, the ASPIRED team finalized the project report on the Technical Design and Architecture of the Tabular Component of the SWCIS Data Warehouse. The report provides a common understanding of how datasets are stored in the system, describes the user interface of the system, and covers issues on user authorization and data backup. It is intended for operation, maintenance and upgrading the SWCIS Data Warehouse. The ASPIRED Project submitted the draft report to USAID for review and comments. After receiving USAID's feedback, the report will be shared with the ME.

Also, in September, the ASPIRED team received an additional request from the WRMA on re-programming selected tabular components and reporting forms of the SWCIS for better adjusting the SWCIS to daily operations of the WRMA. The ASPIRED team will discuss and agree with the WRMA on the scope of additional work requested by the Agency.

Decision Support Tools

DSS (Decision Support System): The ASPIRED Project finalized testing and debugging the key components of the DSS for the Ararat Valley, which are used to: (a) calculate the values of the ecological flow in the rivers of the Ararat Valley catchment area; (b) determine balance of water supply and demand in the Ararat Valley for the year 2016; (c) assess quality of water resources in the Ararat Valley, using monitoring data; and (d) analyze dynamics of change in precipitation, air temperature and natural river flow in the Ararat Valley during the period of 1991-2016, compared to the baseline period of 1961-1990, and assess the projected average values of air temperature, precipitation and natural river flow in the Ararat Valley for 2040, 2070 and 2100 under different scenarios and models of the Intergovernmental Panel on Climate Change (IPCC).

Groundwater modeling tools: During the reporting period, the ASPIRED team completed calculations of the groundwater reserves or storage, natural groundwater resource recharge of the Ararat Valley groundwater basin, and the sustainable rate of the groundwater use. The estimates use the results of the Ararat Valley's 3D structure modeling, water balance and water supply and demand balance calculations for year 2016. The preliminary estimates were discussed with Dr. Tom Sheng in August.

At the same time, the ASPIRED team continued work on calibrating the simplified groundwater flow model for the Ararat Valley in MODFLOW, in collaboration with the U.S. based AQUAVEO company, which will continue during the next quarter.

The ASPIRED team summarized its findings on water availability in the Ararat Valley (water or hydrologic balance) and its correlation with demand for various water use sectors (water supply and demand balance). It also included the estimated values of groundwater reserves or storage, natural groundwater resources recharging the Ararat Valley groundwater basin and the sustainable rate of groundwater use from the aquifers in the project report titled, "Calculated values of water balance and water supply and demand balance in the Ararat Valley, using modeling of the Ararat Valley groundwater basin". The report was submitted to USAID for review. After receiving USAID feedback, the ASPIRED team will present and discuss the report with the Working Group established by the ME, technical representatives of the WRMA and EMIC, and other stakeholders to finalize the report for further presentation to the GoA.

Introduction of the automated online system for groundwater use monitoring

In the reported quarter, the ASPIRED team worked with the ME on hand-over of the installed flow meters and data loggers to the ME. A draft hand-over act was provided to the Ministry for review and signature in August, followed by a meeting with the representatives of the ME and WRMA in September to further discuss the issue of material and technical responsibility for equipment maintenance, raised by the Ministry. The Ministry has not yet decided the ownership nor maintenance of the system by fish-farms. The Ministry will internally discuss the legal basis for the title transfer of

the online monitoring system, after which the installed flowmeters and data loggers can be transferred to the Ministry.

The Ararat Valley Atlas

In July, the ASPIRED team received comments from the ME on draft content and structure of the Ararat Valley Atlas. The Ministry's feedback contained several recommendations on the inclusion of comparative analytical maps in the Atlas showing Ararat Valley's hydrogeology and groundwater availability. In response to the request, the ASPIRED team requested the ME provide datasets and information needed for the comparative analysis, as well as additional datasets, if available, for the years 2017-2018 to prepare the tabular and spatial comparative analyses. The ASPIRED team hasn't received the requested information at the time of preparing this report but will proceed with analyses as soon as the data becomes available.

Based on the ME's comments and results of the meetings and discussions with representatives of other stakeholder institutions, the ASPIRED team finalized (a) the report on the geo-spatial database of the Ararat Valley and (b) the format and outline of the Ararat Valley Atlas, which was submitted to USAID in August.

Additional assistance to the ME

USAID assistance in creating a web-based platform for online application for water permits: In the reporting period, ASPIRED and PURE-Water Projects' specialists together programmed the web-based platform for online application for permits, based on the technical description developed during the previous quarter by the projects' teams and WRMA personnel.

3.2 Low Cost and Water Efficiency Technologies

The table below summarizes the status of the pilot projects as of September 30, 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.	131,705	89,524	27,212	Coca Cola HBC
				11,269	ERGIS
				3,700	Hayanist community
Sipanik Well Sealing	Completed in August 2017.	51,546	47,823	3,723	VALML LLC
Well Optimization Sipanik	Completed in September 2018.	27,461	24,909	2,552	Sipanik community
Sayat-Nova Water Reuse Project	Completed in September 2018.	124,871	80,409	20,876	Partnership for Rural Prosperity Project
				14,395	Fund for Armenian Relief
				16,420	Sayat-Nova community
Aratashen Community Water Supply Project	Completed in June 2019.	130,371	87,455	42,916	Aratashen community

Project Name/ Technology	Status	Total cost, USD	ASPIRED cost-share, USD	Partner cost-share, USD	Partner
Hovtashat Well Optimization Project	<p>Completed in September 2019</p> <ul style="list-style-type: none"> ASPIRED's sub-contractor, Yereky Mek Tegh LLC, completed installation of the pumping station and the valve chamber. The village installed the pipes for channeling water to the designated area. On September 2, all the systems were tested and handed over to the Community. 	43,539	28,587	14,952	Hovtashat community
Aquaculture Technology Transfer Center (ATTC)	<p>Ongoing</p> <ul style="list-style-type: none"> The ASPIRED Project and the ATTC owner discussed the follow-up actions on finalization of the ATTC project and population of fish points. Although the fishery owner accepted the technical recommendations from the ASPIRED Project, he has resource limitations to proceed with the approved plan. The owner of the fish farm agreed to, with the suggestion of the ASPIRED team, the system being operated with/by the third party. Currently the ASPIRED Project is contacting interested companies to take over the operation of the ATTC. 	178,028	114,542	63,486	Armavir Farmer LLC
Yeghegnut Community Water Supply Project	<p>Ongoing</p> <ul style="list-style-type: none"> On September 29, the community held elections of the local council. The project is pending the approval of the budget by the newly local council. 	120,809	79,777	41,032	Yeghegnut community
Vedi Urban Irrigation Project	<p>Ongoing</p> <ul style="list-style-type: none"> In July, the ASPIRED Project signed the contract with the selected sub-contractor for the for the pipework. In August, the municipality started the trenchwork and nearly 80% was completed by the end of September. Artashat ENC installed the pipes on all those sections where the trenchwork was completed. The construction will be completed in November. 	147,538	59,632	87,906	Vedi Municipality
Irrigation Improvement Project in Pokr Vedi	<p>Ongoing</p> <ul style="list-style-type: none"> The joint selection committee of the ASPIRED Project and Hayastan All-Armenian Fund selected Jrtuck LLC for the preparation of the irrigation network design. In early September, the sub-contractor submitted the blueprints to the village and the ASPIRED Project. 	74,935	31,916	31,944	AAF
				11,075	Artashat Water Users Association

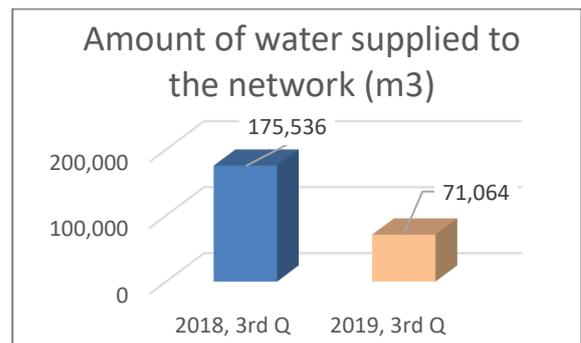
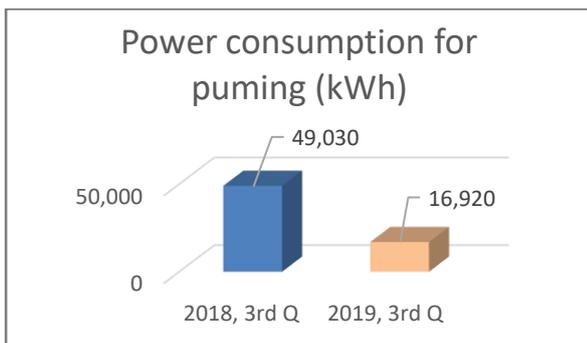
Project Name/ Technology	Status	Total cost, USD	ASPIRED cost-share, USD	Partner cost-share, USD	Partner
	<ul style="list-style-type: none"> Since part of the pipeline was to be laid along H11 road, according to the design, the mayor of Pokr Vedi submitted a letter to the Ministry of Territorial Administration and Infrastructure asking for permission to carry out the installation. The village and the ASPIRED Project are both waiting for the permission, in order to be able to start the construction. 				
TOTAL		955,185	609,752	345,433	

Design of New Projects

Over the reporting period, the ASPIRED and PURE-Water Project teams jointly worked out solutions for the irrigation project in Khachpar village which were discussed with the village administration. The topography data and Water Committee experts confirmed that the village will receive the requested 250 liters/second of water via a 500 mm pipeline. In addition, the water quality test results confirmed the water is usable for irrigation. The ASPIRED team has prepared the concept paper, which also requires a commitment letter from the community in the submission package for USAID. The PURE Water Project team is working on obtaining the commitment letter from the village to finalize the submission.

Follow-up of Completed Projects

Over the past quarter, the ASPIRED team obtained results for the performance of the newly installed drinking water system in Aratashen. The village saved about 3 mln Armenian drams over three months of performance, from July to September 2019. The results for July-September showed that the village spent almost three times less electricity and money on pumping as compared to the same period in 2018 -- 727,779 and 2.2 mln drams, respectively. The figures also indicate there is two times less water supplied through the network than before due to the reduction of losses and more efficient pumping.



Installation of the irrigation network in Vedi



Pumping station in Hovtashat village

3.3 Water Regulation and Enforcement



Field trip with participation of the ME team.

During the reporting period, the ASPIRED Project initiated replacements in the working group to include relevant specialists from the Water Committee instead of representatives from the Ministry of Territorial Administration and Infrastructure, given that the Committee is now part of the Ministry.

From July through September, the working group on the development of the assessment method on self-purification capacity of rivers made several site visits to Kasakh river basin for collection and analysis of water samples. The experts visited five observation points located on Halvar, Gegharot and Kasakh rivers. The flow rate was measured with flow meter. The results compared against the results provided by hydro-morphologist which are calculated using the formula of Chézy (formula to determine flow velocity and rate, etc.). ASPIRED short-term experts discussed the progress and tested the efficiency of the suggested formulas using the data provided by EMIC and

Scientific Center of Zoology and Hydro ecology. Following data collection, input, and analysis, the working group determined chemical, biological and hydro-morphological indexes.

The data on discharge and flow rate will be used for calculating the self-purification index from the water quality perspective.

In September, the experts compared several methods of assessment of the self-purification capacity of rivers. This included calculation of the indexes using the Streeter-Phelps equation and method simulation for two observation points in Kasakh river basin.

In October, the ASPIRED team will discuss and agree on the structure and content of the report for working group experts to provide their inputs. Over the rest of the next quarter, the working group will further develop the structure of the report based on their analyses and suggestions for development of the assessment method for self-purification capacity of rivers.

3.4 Donor Coordination and Communications

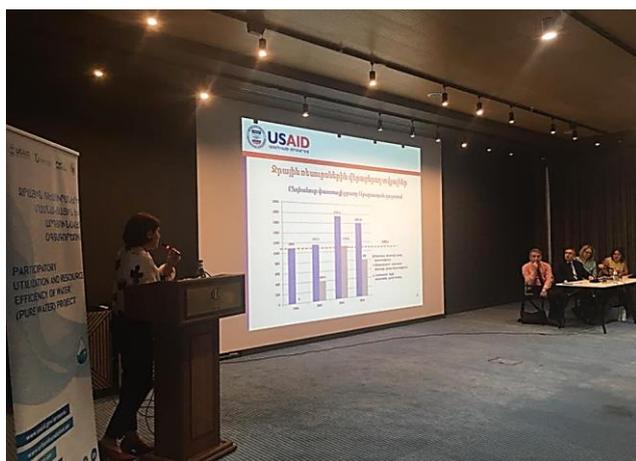
In August, the ASPIRED team fully executed the contract with the E-motion company on video coverage of the pilot projects and activities carried out by the ASPIRED Project as well as preparation of the videos. The ASPIRED team provided the list of activities to be covered in the scope of work. Also in August, the team conducted a trip to Hovtashat pilot project site to capture videos and photos of the installation process of pumps and equipment. The next planned activities include recording the water sampling process in Kasakh river and the installation of the pipes in Vedi Project.

In September, the ASPIRED team prepared an article about the project for USAID’s Global Waters web site. Upon internal review and editing, the ASPIRED team will send it to the Project COR who will provide it to the Global Waters team for publication.

On September 30, the ASPIRED team discussed collaboration opportunities with ACBA-Credit Agricule Bank’s Federation representatives. The ACBA Federation implements a series of projects in the rural sector and is potentially interested in co-financing water projects in the rural communities during the next calendar year. Since the ASPIRED Project is not planning new pilot projects for year 5, the parties discussed possible involvement of the Federation in the farmer trainings organized by the ASPIRED team. The Federation will use the knowledge of the bank’s local branch offices for understanding the demand of the local farmers for the consultancy services if any and preparing relevant information for presentation at the trainings.

Updates on completed projects in Sipanik, Hovtashat, and the current status of Vedi Project can also be accessed on the Project web site. Photos and updates are available in both the photo gallery <http://www.aspired.wadi-mea.com/en/photo-gallery/> and pilot projects section of the web site <http://www.aspired.wadi-mea.com/en/pilot-projects/>. Over the reporting period, the ME was interested in the water savings and other details about Sipanik project and circulated the information via the Ministry’s Facebook page. The field office also posted the tender announcement and pre-bid meeting notifications via the Project web site and Facebook page, making sure the information is accessible to the stakeholders.

Over the reporting period, the ASPIRED team has been coordinating implementation of joint projects with the PURE Water Project and All-Armenian Fund through information exchange, joint site visits and meetings to discuss existing issues and challenges. The ASPIRED and PURE Water teams had several discussions on Khachpar irrigation project and a joint site visit to the village of Khachpar.



ASPIRED team presents the project results to the stakeholders.

In August and September, the ASPIRED team participated in a series of events organized by PURE Water Project. Following discussion of the Draft Law on Water User Associations, initiated by PURE Water Project on August 17, the ASPIRED team participated in revision of the Law and provided comments and recommendations to the PURE Water Project. At the PURE Water Project’s event on September 30, the ASPIRED team presented activities on the protection of groundwater resources of the Ararat Valley, namely the 3-D modeling work, the DSS and Ararat Valley Atlas.

On August 20, the ASPIRED team discussed with EU's Water Initiative Plus Project the assistance both projects provide to the stakeholder agencies, specifically the ME. The purpose of the discussion was to avoid duplication of efforts and streamline the process of establishing databases and capacities of the agencies that contribute data to the SWCIS Data Warehouse.

4. General Administrative Issues

During the reporting period, the ASPIRED Project fully executed the agreements with the following sub-contractors:

- Erekly Mek Tegh LLC for construction activities under the Hovtashat Well Optimization Project.
- Aratshat ENC LLC for the construction works under the Vedi Urban Irrigation Project.
- Jrtuk LLC for the design of the irrigation network in Pokr Vedi.

On September 19, the ASPIRED Project submitted the Year 5 Work Plan to USAID for review and comments. The ASPIRED team also addressed the comments of the ME which were provided to the Project on August 16.

5. Environmental Compliance

During this quarter, the ASPIRED team conducted environmental and social compliance training for sub-contractors' and community representatives in Hovtashat and Vedi. The Project's Environmental Specialist identified specific measures to be taken by the local sub-contractor and the municipality to ensure construction safety and compliance to environmental and social safety regulations at the construction sites.

The team also provided regular monitoring of construction work compliance with requirements of project-specific Environmental Mitigation and Monitoring Plans (EMMP).

ASPIRED continued collaboration with PURE-Water on reviewing the baseline environmental conditions in selected project sites. Particularly, the ASPIRED Environmental Specialist reviewed the results of water quality analysis for Khachpar irrigation project water source, and recommended mitigation measures to be implemented by the community for maintaining water quality at the level suitable for irrigation purposes according to FAO norms.

6. Existing Problems or Issues

Turning over of the ATTC project to the partner fishery poses challenges to the ASPIRED Project. Although the project was essentially completed except for minor proposed system improvements and is available for operation, the partner fishery is reluctant to accept the facility claiming that it will not

operate successfully. Despite continued negotiations, the partner of the Project admitted he is unable to complete his part of the project due to personal financial difficulties. The ASPIRED team has been discussing different options and will continue to seek other solutions for ensuring successful operation of the facility.

The water project in Yeghegnut is pending the approval of the budget at the local council meeting in October which will follow the elections on September 29. As soon as the funding is approved by the local council, the village will proceed with the project.

7. Activities for the Next Quarter

7.1 Data

- Finalize the scope of reprogramming selected tabular components and reporting forms of the SWCIS with the WRMA and implement further improvements.
- Share Dr. Sheng's recommendations on improved data sharing mechanisms via SWCIS with the ME and WRMA, and ensure online availability of the SWCIS in collaboration with the WRMA.
- Present and discuss the ASPIRED Project's findings on water balance, water supply and demand balance of the Ararat Valley for 2016, and the estimated 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 with the Working Group established by the ME.
- 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.
- Work on the construction of maps of the Ararat Valley Atlas according to the agreed structure of the Atlas.
- Collaborate with the ME on finalizing the handover of installed flow meters and data loggers.
- Participate at the Annual Stakeholder's Forum organized and hosted by ASPIRED Partner Coca-Cola Hellenic Bottling Company.

7.2 Pilot Technologies

- Complete implementation of the Vedi Urban Irrigation Project and monitor the sub-contractor's work.
- Prepare the technical specifications for the construction phase of the Pokr Vedi Project and start project implementation after sub-contractor's selection.
- Prepare concept papers for Khachpar Irrigation Project based on the topography conclusions and submit to USAID for approval.
- Meet with the ATTC partner fish farmer to discuss turning over the facility for the fish farm for operation and at the same time explore other options including engaging a third party for short-term operation.

- Resume implementation of Yeghegnut Project as soon as budget is approved by the local council
- Work with WRMA on well closure opportunities in the Ararat Valley.

7.3. Legal and Policy Issues

- Field trip of working group experts to Kasakh river basin for seasonal sampling in October.
- Conduct a regular working group meeting of the ASPIRED short-term experts.
- Continue the hydro-morphological measurements in four observation points on the Kasakh River.
- Summarize the hydro-morphological results by the end of October 2019.
- Schedule a meeting with the experts of the National Assembly's Standing Committee on Territorial Administration, Local Self-Government, Agriculture and Environment to present the ASPIRED Project's achievements and activities within the scope of assistance to the Armenian government in the water sector.
- Conduct field trips with relevant specialists from EMIC and the Scientific Center of Zoology and Hydroecology to Kasakh river basin for regular samplings in November and December.

7.4 Performance Management, Communication and Donor Coordination

- Schedule the visits of the photographer/videographer team to the project sites, and arrange interviews with the beneficiaries.
- Conduct site visits to project sites and update the photo archive of the Project;
- Maintain and update the Project web site and Facebook page.
- Visit Aratashen to obtain beneficiary feedback and prepare a success story based on the success indicators of the project.
- Fill in the data for USAID's annual portfolio review and Performance Plan and Report.

7.5 Environmental Compliance

- Monitor the ongoing projects in Metsamor (ATTC), Vedi and Pokr Vedi communities.
- Provide the environmental and social safety trainings to the subcontractors and partner communities.

7.6 Project Management

- Receive approval on Year 5 Work Plan and address the comments from the COR, if any;
- Perform budget realignment for the remaining Project period;
- Follow-up with finalization of the ATTC and Yeghegnut Projects;
- Arrange the procurement process for the construction phase of Pokr Vedi project based on the approved designs;
- Complete ongoing projects and ensure their handover to the communities/beneficiaries. Arrange trip to Armenia, all meetings with counterparts and site visits to project sites for Moenes Youannis, Vice President for Operations at ME&A.