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ADVANCED SCIENCE & PARTNERSHIPS FOR INTEGRATED RESOURCE DEVELOPMENT PROJECT

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List of Acronyms

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

1. Executive Summary

This report describes the programmatic activities implemented by the Advanced Science and Partnerships for Integrated Resource Development (ASPIRED) Project in the fourth quarter of Year 2 of the project. It covers the period from July 1, 2017 through September 30, 2017. The report reviews progress and achievements in each of the project areas during the reporting period, and describes planned activities for the next quarter. The report also highlights challenges and actions taken to address these challenges.

1.2 ASPIRED Summary

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

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

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

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

1.3 Main Highlights from the Reporting Period

- Data component:
 - Completion of the draft hydrogeologic framework by the USGS Dakota team and organization of the webinar on the groundwater framework for the ASPIRED team and Armenian specialists.
 - Completion of ground-truthing and verification of the GPS coordinates for 674 sites which resulted in the creation of the geo-referenced databased with the clarified status of the sites.
- Technology component:
 - Completion of the project on permanent sealing of the groundwater well in Sipanik village.
 - Reinforcement of the drainage canal walls in Samvel Lablajyan's fish farm to ensure security of the pumping station for the irrigation system of Hayanist village.

- Legal component:
 - Support to the PURE Project and involvement in the revision of legal analysis report and the public advocacy strategy drafted by PURE.
- Communication and Donor Coordination component:
 - Video shootings and interviews with the farmers of Hayanist to support USAID's outreach initiatives.

2. Summary of Performance Indicators

Summary of performance indicators for the third quarter of FY 2017 (Year 2 of the project) is presented in the table below.

	Indicator	Planned/ Actual Target for Year 2	Quarter 4	Life of project (as of end Year 2)	Notes: Descriptions/Comments/Assumptions
IR 1: Establish a comprehensive, user-friendly, open data system that is accessible to all stakeholders.					
Sub-IR 1.1: Ararat Valley Geocoded, real-time, publically accessible data system that incorporates water resource, groundwater, and hydrological datasets from multiple stakeholders built and shared with the GOA					
Indicators					
1.1.1	Percent (of total) of datasets for the Ararat Valley publicly accessible	20/20	20	20	80% of all datasets available on Ararat Valley will be made public, which accounts for 100% of all the data that can be available to the public according to the Armenian legislation. The achieved target refers to the inventory data which has been publicized by the ASPIRED and progress achieved by the team with the cadaster design.
1.1.2	Percent (of total) wells mapped in the Ararat Valley.		-	100%	Indicator completed during Year 1
1.1.3	Number of stakeholders engaged in the data collection activities	8/10	-	10	This target refers to the stakeholders engaged in the groundwater-related data collection activities in the Ararat Valley from different sectors – government, private, public. For the LOP, the target is reported on a cumulative basis starting from Year 1 onwards ¹ .
Sub-IR 1.2: An online tool for hydrogeological modelling and decision-support for the Ararat Valley that incorporates hydrologic, economic, energy, social equity and environmental data generated					
Indicators					

¹ Four GOA agencies and the Partnership for Enhanced Engagement and Research (PEER) grantee, the USGS, the Institute of Water Problems which are engaged in data collection activities. The result for Year 2 referred to the Metsamor Power Plant, the Ministry of Agriculture, reportedly involved in the data collection on the groundwater supplies in the Ararat Valley, as well as the European Union (EU) Water Initiatives + Project.

1.2.1	GIS based DSS for the Ararat Valley developed	-	-	-	The DSS will be available starting from Year 3. No data to report for this indicator during Year 2.
Sub-IR 1.3: A publicly accessible system that maximizes the use of open source technology and produces reports based on high-quality, real-time monitoring data created					
Indicators					
1.3.1	Number of fisheries with automatic data system installed	5/0	-	-	This activity was contingent upon Government's action to pursue installation of the automated systems for the groundwater use monitoring in fisheries. By the request of the GOA, the ASPIRED will initiate this activity during Year 3. ²
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	4/0	-	-	The indicator refers to the percentage of the groundwater extraction wells monitored with the use of the online automated system installed by the ASPIRED Project versus the total number of the operational groundwater wells available in the fisheries ³ . There is no data to report on this indicator due to the delay with installation of the automated systems for the groundwater use monitoring in fisheries. The attainment of this action depends on the progress with the implementation of the indicator 1.3.1.
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	2/2	1	2	This indicator refers to technologies introduced at fish farms or other water use points that lead to the reduction of the groundwater extraction by users. This indicator also

²ASPIRED initially planned to start implementing Project activities on announcing a public tender for procurement & installation of the automated online groundwater use monitoring system in the selected large fisheries for February 2017. The delay was due to the GOA's intention to shift USAID assistance towards small fisheries. USAID and the ASPIRED team opt for the installation of the monitoring systems in the large fisheries, which are using the major share of the groundwater. By the request of the GOA, ASPIRED Project will initiate procurement and installation of the online monitoring system on 20 groundwater abstraction points in the selected fisheries in FY 2018.

³ During the latest inventory of the groundwater wells, natural springs and fish farms of the Ararat valley, ASPIRED inventoried a total of 2807 wells in the Ararat Valley, of which 1795 were found to be operational. Out of 1795 functioning wells, 336 are reportedly located in the fisheries of Ararat and Armavir marzes.

	evaluated				provides information on annual water saved in cubic meters. The Year 2 data refers to the water reuse project in Hayanist village ⁴ and the well sealing project in Sipanik village.
2.1.2	Thousands of cubic meters of water saved annually in Ararat Valley	300/1,575	475	1,575	The data for Quarter 4 refers to the permanent sealing of the well in Sipanik village. The measurements showed that after clearance of the well pipe, the actual water output of the well was 60 liters per second, compared to the previously estimated 35-40 liters. Therefore, 1.9 million cubic meters/year of groundwater is saved due to the project.

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	1/-	-	-	This indicator refers to water-use related EE/RE technologies to be piloted during project implementation ⁵ . ASPIRED will initiate the ATTC Project in Year 3.
2.2.2	Megawatt hour of energy saved annually	87/24	-	24	The data refers to the energy savings generated by the Hayanist project.
2.2.3	Clean energy generated annually, MWh	7/-	-	-	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 Indicator 2.2.1 Number of EE/RE technologies piloted and evaluated.
2.2.4	Gains in the reduction of GHG emissions as a result of USG assistance	25/11.4	-	11.4	GHG emissions reduction-related data will be calculated based on the kilowatt-hour of savings resulting from application of energy saving technologies in metric tons/year. This data is calculated based on the energy savings generated by the Hayanist project.
2.2.5	Number of people receiving improved service quality from an existing basic or safely managed water service as a result of USG assistance.	0/340 ⁶	-	340	This indicator refers to the qualitative improvement of the water resources resulting from the pilot projects implemented by the ASPIRED Project. Whenever applicable, ASPIRED will conduct pre- and post-implementation water tests to detect the qualitative changes in water. The term “water users” refers to households, local farmers and others benefitting from this improvements. Initially, this indicator referred to the drinking water supply projects only (to be implemented in partnership with PURE). However, ASPIRED decided, in concurrence with USAID, to consider all water supply projects (both potable and irrigation water supply) which resulted in the improved service quality for the beneficiaries. The current data includes water users (85 households), the beneficiaries of the water reuse project in Hayanist.

⁴ The project helped to avoid the drilling of an additional groundwater well for irrigation purposes by channeling the outlet water from the fishery to support community irrigation needs.

⁵ If water tests prove the suitability of the water from Sevjur river for aquaculture purposes, ASPIRED intends to install two types of RE technologies in the ATTC Project: photovoltaic and biogas.

⁶ 200 women and 140 men.

2.2.6	Number of water users experiencing improved efficiency of water resource use	3/3	1	3	This indicator measures change in efficient use of water resulting from the pilot projects implemented under the ASPIRED Project. Examples of such projects may be reduced water abstraction by fish farms due to new technologies installed. Based on the results of Hayanist project, (a) the community avoided drilling of an additional well for irrigation needs; (b) the fishery became a more efficient water user by providing water to the community instead of dumping to the drainage water and gaining a possibility to use the existing pump for the recirculation of water, thus reducing its water abstraction from the groundwater well.
Sub-IR 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	1/1	-	1	Throughout the project, the ASPIRED team will pilot at least six technologies. Following these pilot implementations, the project team will conduct evaluations and provide recommendations during Year 5 of the project. The Year 2 data refers to the successful launch of Hayanist project.
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 technologies to permanently close illegal or abandoned wells <u>piloted</u>	0/1	1	1	Although ASPIRED planned to start implementing this task during Year 3, the ASPIRED team completed the well sealing project in Sipanik in August 2017.
IR 3: Introduce new policies and regulations to improve integrated water resource management.					
Sub-IR 3.1: Trainings to build groundwater monitoring capabilities, capacity strengthening, and knowledge of how to use equipment; and follow-up assessments to test knowledge on groundwater monitoring and analysis of the basin management organizations (BMOs) and relevant water management agency officials to improve enforcement.					
Indicators					
3.1.1	Number of trainings for building capacity of Ministry of Nature Protection (MNP) in groundwater monitoring	1/1	1	2	This indicator refers to the trainings on enhanced up-to-date State Water Cadaster Information System (SWCIS) and Management Information System (MIS) for the Ararat Valley and on enhanced transparent water use permitting, control and oversight systems and decision support tools. USGS conducted a webinar on groundwater framework for the MNP staff.
3.1.2	Number of people educated on tools, approaches, and/or methods for water security, integrated water resource	12/37 ⁸ (28 men; 9 women)	11 (8 men; 3 women)	48 (12 women and 36 men)	This indicator refers to the trainings on enhanced up-to-date SWCIS and MIS for the Ararat Valley; enhanced transparent water use permitting, control and oversight systems; and environmental compliance procedures and efficient water use trainings

⁸ The data for Year 2 includes training participants of Hayanist farmer training (26 people; 20 men +6 women); 6 (3 men and 3 women) participants of the USGS webinar and 5 trainees (male) of the environmental compliance training in Sipanik

	management, and/or water source protection as a result of USG assistance ⁷ .				for the beneficiaries of the communities. Data for Quarter 4 is derived from the lists of participants for the USGS webinar and the EMMP training. This indicator is disaggregated by gender.
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	3/5	-	9	This indicator was completed during Year 2.
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	-	-	-	This indicator refers to the package of recommendations drafted by the ASPIRED project and submitted to the GOA. This activity will start in Year 3
IR: Ensure communications and coordination with stakeholders to avoid duplication of efforts					
Sub-IR: 4.1 Systems-mapping to gain and apply knowledge of points of influence, incentives, and resources of stakeholders in water and the water-energy nexus completed and shared					
Indicators					
4.1.1	Number of international and local organizations participating in the system mapping activities	1/6	-	23 ⁹	This refers to organizations involved in addressing groundwater resource issues of the Ararat Valley in various ways.
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					

⁷ This indicator is not cumulative and reported on an annual basis.

⁹ Organizations to be involved in the mapping process are: Coca-Cola HBC and the President's office (Both organizations demonstrate vivid participation in addressing water issues of the Ararat Valley); Metsamor Power Plant (provision of data for the Fee Report); and Sat-Agro. The latter provided data support to the ASPIRED Project (satellite imagery for the Valley), EU Water Initiative + Project., USAID PURE Project

4.2.1	Percent of total funding leveraged from stakeholders for water resources management activities.	7 ¹⁰ /33	7.7 ¹¹	33	This indicator refers to the in-kind and financial contribution by implementing partners. The reported figure is taken from the actual cost-share of partners (Coca-Cola HBC, ERGIS and Hayanist community) in the implementation of the irrigation rehabilitation project in Hayanist. As per the data of the Q4, the percentage of funds committed by partners decreased from 34% to 33%, based on the overall increase of ASPIRED contributions to the pilot projects. ASPIRED was the major donor of Sipanik project.
5. Cross-cutting indicators					
5.1	Percent of population living in targeted areas with improved water management	30/4.2	0.7	4.2	The target area is the Ararat Artesian Basin (AAB), which currently has 24 communities. A significant disparity between the actual and targeted results is caused by the PURE-Water Project's late announcement, which will cause delays in the design and implementation of water supply projects in the villages of Ararat Valley. The results for Year 2 refer to the completed projects in Sipanik and Hayanist villages.
5.2	Number of key implementation steps taken to improve water management in the Ararat Valley	3/3	-	4 ¹²	This indicator relates to policy, analysis and other activities targeted towards improvement of water data-related activities, including training and pilot projects.
5.3	Number of private sector firms that have improved management practices or technologies as a result of USG assistance	7/1	-	1 ¹³	The 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 ¹⁴	3/1	-	1	The LOP data refers to the practice of the secondary use of that outlet water from fisheries for irrigation purposes, an innovative approach that has never been practiced in Armenia at the community scale.

¹⁰ The ASPIRED team was cautious in setting cost-share margins. However, if ASPIRED is successful in raising additional funds for cost-shares in Year 2, the Project will consider revising the target indicator.

¹¹ Cost share of VALML LLC in the project.

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

¹³ This data refers to Samvel Lablajyan's fish farm, where the pumping station is installed for channeling water to the community of Hayanist.

¹⁴ Innovative technologies, management/monitoring tools or practices introduced by the ASPIRED Project in fish farms, at water use points and/or communities of Ararat Valley which contribute to the reduction of the groundwater use.

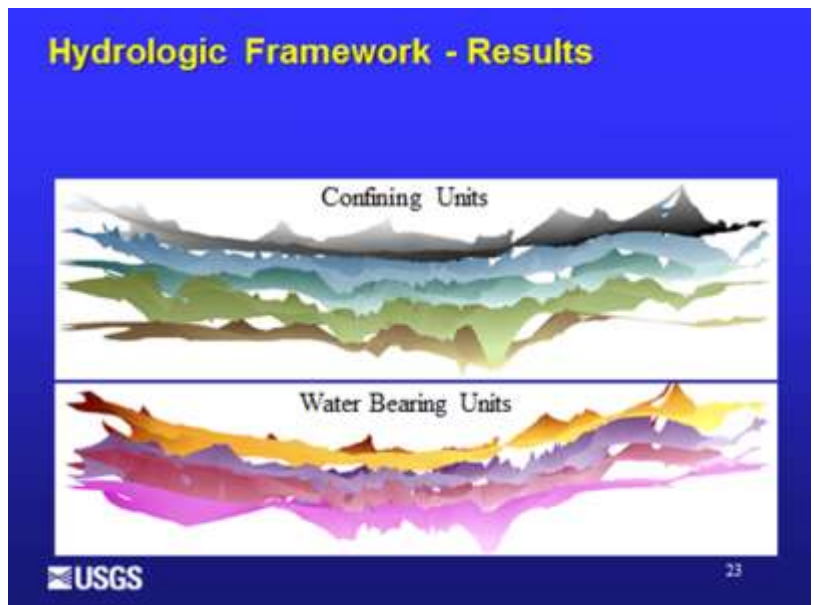
3. Program Implementation

Water Resource Data

Data Processing and Analysis:

During Quarter 4 of Year 2, USAID and USGS hit a milestone in their collaboration targeted at strengthening the groundwater management capacities for Armenia. The USGS Dakota team completed the draft Hydrogeologic Framework for the Ararat Valley. The Hydrogeologic Framework, which characterizes the hydrogeologic structure and conditions of groundwater resources in the Ararat Valley, was developed using vast amount of data collected by the ASPIRED national team.

USGS conducted a webinar presentation of the hydrological framework for the ASPIRED team and stakeholders on August 29 and 30, 2017. During the two-day webinar, the USGS experts provided an overview of the step-by-step process to build the complex hydrogeologic framework of the Ararat Valley by using available data and information and applying sophisticated tools and methods. USGS also presented groundwater management options and next steps toward development of the groundwater flow model for the Ararat Artesian Basin to the Armenian specialists, representing the ASPIRED Project, Water Resources Management Agency and Environmental Monitoring and Information Center of the MNP. Webinar participants also discussed comments and questions of the ASPIRED experts on the draft hydrogeological framework, as well as USGS findings on the state of groundwater resources.



Presented outcomes and opportunities for building the groundwater flow model generated a substantial level of interest from the MNP specialists to further enhance their skills in GIS and groundwater modeling tools, which will allow them to generate data that can support informed decisions by the GOA to more effectively manage groundwater resources.

The hydrogeologic framework provides the areal extent, thickness, depth, water levels, and groundwater flow directions of the artesian aquifers basin based on the existing geologic maps, remote sensing imagery and groundwater wells field inventory conducted by the ASPIRED team. When the hydrogeologic framework is finalized and report is published in November-December 2017, the ASPIRED team will use the framework of the Ararat Valley to develop a groundwater flow model.

Introduction of automated online system for groundwater use monitoring:

In September 2017, the MNP formally requested USAID's support to establish a new central management unit within the Ministry's structure, which will serve as a repository for compliance and enforcement data on water resources use, including Ararat Valley. This unit is expected to receive data from automated online systems for groundwater use in the Ararat Valley to be installed on groundwater abstraction points of the fisheries. In the event that non-compliance is detected through the data, the nominated personnel of the Unit will take immediate measures for bringing the groundwater use into compliance with the volumes and other conditions specified in the water use permit. Measures may include site-visits and discussions with the water user, exercising protocols on the non-compliance detected, and collaborating with the inspector on how to rectify the situation.

Following the MNP's request, the ASPIRED team and Coca-Cola Hellenic Bottling Company (Coca-Cola HBC) agreed to assist the MNP in establishing the Unit, within the framework of the Memorandum of Understanding (MOU) signed in July 2016 by the USAID, Coca-Cola HBC and MNP. This assistance will involve the procurement of a server with relevant software and the installation of an automated online groundwater use monitoring system on 20 groundwater abstraction points of selected large fisheries.

In September 2017, ASPIRED and MNP discussed the technical specifications of the server, as well as joint activities in tendering of the procurement and installation of the automated online groundwater use monitoring system.

Enhancement of the SWCIS:

During the reporting period, the ASPIRED team worked with the Water Resources Management Agency (WRMA) on enhancement of the SWCIS, following the structure and requirements of the GOA resolution on the Cadaster, and technical steps outlined in the Terms of Reference for upgrading the information system. Specifically, ASPIRED's work with the WRMA focused on the following:

- Completion of the integration of the WRMA's WUP database into a new Data Warehouse: The Data Warehouse contains 3 sub-components on (a) water users; (b) WUP application; and (c) follow-up tool on the process of WUP issuance.
- Migration of the water quality monitoring tables from the existing Data Warehouse to the new warehouse: Additionally, two separate tables were designed to maintain the data on annual and monthly pollution from the 131 water quality sample points throughout the country.
- Design & programming of a skeleton of the SWCIS' new components on the Lake Sevan water level values, Armenia's reservoirs and hydropower plants (HPPs): Designed based on the requirements of new legislation, these components will be populated with data, and query and report forms will be programmed during the next reporting period.

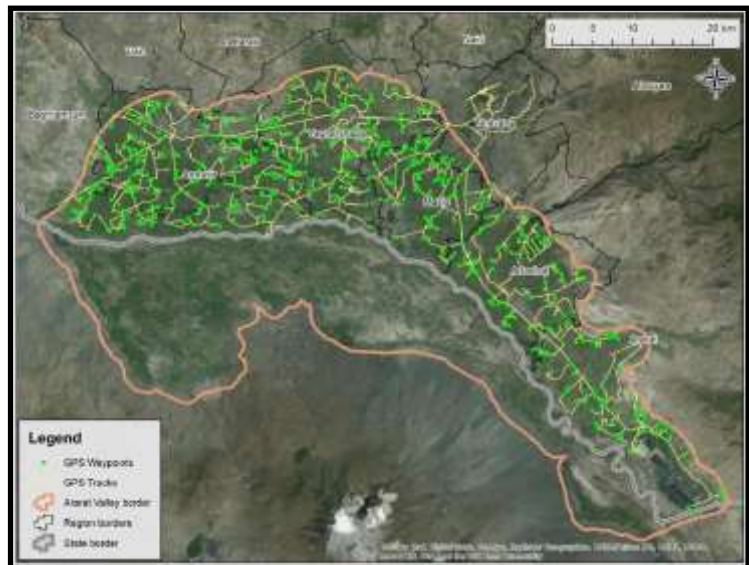
In September 2017, the ASPIRED team requested that the WRMA provide a format for the reprogramming and redesign of the Groundwater Resources component of the Data

Warehouse, including integration of additional tables for the quantitative and qualitative monitoring implemented in 128 observation wells of the national reference network. WRMA's response is still pending. To this end, ASPIRED conducted a number of technical discussions during the reporting period.

In September 2017, the ASPIRED team met with the Deputy Chairman of the State Committee of the Real Estate Cadastre to discuss cooperation opportunities between the ASPIRED Project and the State Committee regarding the framework of an Integrated Cadastre and analysis of satellite imagery implemented by the Real Estate Cadastre, which would prevent any repetition in analytic works conducted. Meeting participants agreed that there is no overlap between the work implemented by the State Committee and by ASPIRED. When the Integrated Cadastre or National Spatial Data Infrastructure (NSDI) is established in future, results of the ASPIRED Project's water resources assessment and enhanced SWCIS may be linked with the NSDI.

Decision Support Tools:




Decision Support System (DSS): During the reporting period, the ASPIRED team worked on calibration of the Hydrologic Model of the DSS for the Akhuryan, Metsamor, Hrazdan, Vedi and Azat river basins of the Ararat Valley catchment. Specifically, the project team calibrated the precipitation and evaporation components of water balance, using historic datasets received from the Armstatehydromet service of Armenia. The Project Hydrologist worked on the MS Excel database for restoring the natural flows in the rivers of the Ararat Valley catchment basin.



The ASPIRED Project submitted a request to the MNP for the nomination of specialists from the WRMA and Environmental Monitoring and Information Center (EMIC) SNCO, who will be working with databases and decision support tools – including the groundwater modeling tools – and collaborating with the ASPIRED team on the development and calibration of the tools. When ASPIRED receives the names of the nominated specialists, ASPIRED will assess the GIS and other technical tools before designing and delivering the training course on the GIS.

Applying remote sensing technologies for data analysis

From June 2017 through August 2017, ASPIRED conducted the field survey (ground-truthing) in the Armenian section of the Ararat Valley to clarify the land cover classes for the unclear sites. The ground-truthing team visited and generated global positioning system (GPS) coordinates for 674 sites, as well as took representative photos for each site. As a main output of the ground-truthing process, the ground-truthing team created a geo-referenced database with the clarified status of the sites and prepared a report with the clarified CORINE class, geographic coordinates, and representative picture for each site.

Waypoints / Tracks	Latitude	Longitude	CORINE class	Photo IDs	Representative photo
050	39° 43' 25.125" N	44° 46' 15.426" E	2.3 Pasture/Grasslands	040-041	
051	39° 47' 34.971" N	44° 47' 39.322" E	2.2 Permanent crops (2.2.2 Fruit trees and berries plantations - apricot)	042-043	
052	39° 47' 14.053" N	44° 47' 2.594" E	2.2 Permanent crops (2.2.2 Fruit trees and berries plantations - apricot)	044-045	

Sites with captured GPS coordinates and photos during the ground-truthing activity.

Low Cost and Water Efficiency Technologies

Aquaculture Technology Transfer Center (ATTC): In August 2017, the ATTC partner Armavir Farmer LLC completed construction of the new water intake structure on Metsamor/Sevjur River, following the recommendation of ASPIRED. Results from the water testing in July 2017 indicated that the water quality from the existing source was not suitable for the ATTC purposes. Therefore, the ASPIRED team provided technical solutions to the fish farm owner for construction of the new water intake, with the aim of improving the safety of water. In September 2017, ASPIRED contracted the Environmental Impact Monitoring Center (EIMC) to test the water samples from the new catchment, followed by a review of the test results by the ASPIRED Project’s aquaculture specialist. Based on the review, the water was suitable for the fish-farming facility designed under the ATTC Project, since it already included biofiltration and phytofiltration units.

In September 2017, ASPIRED amended the project concept, EMMP documents, and Cooperation Agreement with the owner of the fish-farm to incorporate information on the water source change. ASPIRED resubmitted the project package to USAID for review and approval.

Surface water from the upper reaches of the Metsamor/Sevjur River is the source for arranging a poly-culture aquaculture system as designed (breeding trout, Siberian sturgeon and Australian red claw crayfish). The Armavir Farmer Company holds a water use permit (WUP), which was

issued by the Ministry of Nature Protection (MNP) on July 27, 2016 and is valid till July 27, 2019. The WUP allows a maximum water abstraction rate of 278.0 liter per second (or 24,019.0 cubic meters per year) from the Sevjur River for fish farming purposes. ASPIRED will begin the actual procurement process, pending USAID review and approval of the submitted project package.

During the reporting period, the ASPIRED Project's volunteer from Birthright Armenia prepared a review of farming Australian crayfish in an aquaponics system. In July 2017, the project team presented to USAID the report titled "Literature Review: How to Farm Australian Red Claw Crayfish in an Aquaponics System". The ASPIRED team decided to translate and provide the report to other fish farmers once the peer review is completed.

Permanent Sealing of a Well in Sipanik: In August 2017, ASPIRED completed the project on



Before and after photo of Sipanik well.

permanent sealing of a self-emitting groundwater well near Sipanik village. Although the initial assessment indicated that the well had the capacity of 35-40 liters, the real output of the well grew to 60 liters per second after the cleaning of the well pipe. Thus, the annual saving of artesian groundwater resources due to the implementation of this project increased from 1.9 million cubic meters of water.

This pilot project initially faced technical complications due to the level of clogging in the well pipe. After the local sub-contractor began the well pipe cleaning process, the workers found out that the well pipe was clogged with external objects and almost all water was escaping from the space between the well pipe and well casing. The ASPIRED team collaborated with the representatives of EMIC SNCO of the MNP, as well as conducted a joint site visit, to discuss the technical complications associated with the decommissioning of the well. Based on the ongoing monitoring process, the ASPIRED team prepared a memo on hidden and unforeseen costs incurred during the well decommissioning activity. Following the well decommissioning process, the local subcontractor conducted a final inspection of the well, which indicated that there had been no water released from the well. Following the well inspection, the ASPIRED team and Sipanik community representatives signed an act of acceptance to indicate acceptance of the inspection results, Due to additional efforts and excessive use of machinery and workforce the total cost of the pilot project increased from USD 30,144 USD to USD 51,546. The sub-contractor refused from its project overhead (revenue) to incur a portion of the cost difference, while the ASPIRED Project reimbursed the remaining portion of the cost difference after receiving USAID approval to reimburse the local sub-contractor for the additional level of effort. The project completion event is scheduled for early-November 2017.

Hayanist Project Follow-up: By the end of August 2017, the ASPIRED team completed the reinforcement of the drainage canal walls at the Hayanist



Reinforced drainage canal wall in the fish farm.

project pumping station. This activity was intended to protect the pumping station located at the water outlet point at Samvel Lablyajyan's fish farm, as water gradually washed off the earth bank of the drainage canal and would ultimately put the safety of the pumping station at risk. ASPIRED carried out the local procurement for these works in July and early August 2017, with all activities having been completed by the end of August 2017.

Additionally, the ASPIRED team followed up with farmers who have cultivated their land plots during the past irrigation season for monitoring the quality of crops. The samples of watermelon and melon were taken to the Food Safety Laboratory of the Ministry of Agriculture and ERGIS conducted the organoleptic analysis of tomatoes. More information on the analysis provided under the [Environmental Compliance](#) section of this progress report.

Water Regulation and Enforcement

During the reporting period, the ASPIRED team collaborated with the PURE Project on mutually complementary tasks. Specifically, the ASPIRED team was involved in the stakeholder meetings and discussions organized by PURE Project in the public advocacy and legal areas.

The ASPIRED team participated in the revision of the two major documents: a) the legal analysis report, with special focus on the section referring to the water rights and water use permits; and b) the public advocacy strategy in water sector, to be conducted by PURE throughout implementation of the project. ASPIRED contributed to the desk review of the documents, as well as participated in the round-tables and stakeholder meetings aimed at discussing these documents and actions towards ensuring better accountability and citizen participation in the water section. To this end, the ASPIRED team participated in the establishment of the Public Advocacy Network in the Water Sector, along with the representatives of communities and active civic groups from Yerevan, Ararat and Armavir marzes. Aiming to support and advocating on behalf of citizens' rights, the network will address three directions of impact – legal, financial, and monitoring. The ASPIRED team was included in the legal and monitoring groups.

Donor Coordination and Communications

During the 4th Quarter of Year 2, the ASPIRED team continued collaboration with its key partners – the MNP, the USGS, PURE – and made efforts towards identifying new partners.

September 2017 marked ASPIRED's successful collaboration with the USGS on the organization of the webinar on hydrogeological framework. ASPIRED prepared and sent to USAID the write-up on the event, as well as posted the write-up on the project web page.

During the development of the ASPIRED Year 3 Work Plan, the ASPIRED team – via facilitation by USAID – held several consultations with the MNP regarding the major directions of Year 3 ASPIRED activities, particularly activities under ASPIRED's water resource data component. ASPIRED and the MNP also discussed the GOA's policy and plans on improved monitoring of groundwater use in the fish-farms, new system on integrated permitting and data warehouse, priority issues. Following these discussions, the ASPIRED team shared the Draft Work Plan –

including narrative and operations plan – with the MNP for their review and comments, which were taken into account in the final version of the Year 3 Work Plan. In September 2017, the ASPIRED team submitted the final work plan to USAID for review and approval.

During the reporting period, ASPIRED met with the PURE team for several coordination meetings regarding planning and implementation of pilot projects. Both teams had a joint meeting to discuss the pilot project ideas proposed for the Aygavan community and provided recommendations on the feasibility of projects. The ASPIRED and PURE teams also discussed the characteristics and definitions of the projects/activities presented and prioritized by 12 selected communities. ASPIRED suggested its assistance at all levels – starting from the identification of the solutions to the issues identified by the community active groups to helping these groups in the proposal development process. Following this strategy meeting with PURE, the ASPIRED team hosted a meeting, with facilitation from a USAID representative, to streamline actions in the implementation of water supply projects in the communities and, more importantly, identify alignments between the participatory objectives of both the PURE and ASPIRED projects. ASPIRED and PURE agreed that ASPIRED would be responsible for the implementation of 5-7 projects, with the final number of projects determined at a later date based on the availability of funding. It has been agreed that PURE and ASPIRED will meeting for monthly coordination meetings starting during the next reporting period.

During the reporting period, ASPIRED also worked on identifying new partnerships, especially from the private sector, to support in the implementation of pilot projects:

- During the 4th Quarter of Year 2, ASPIRED met with the representatives of the Electric Networks of Armenia (ENA), including the ENA Technical Director David Grigoryan and Head of Communications and Corporate Relations Department Natalya Sarjanyan, to present the irrigation project in Sayat-Nova village based on the fish farm outlet water and to discuss the possibility of collaborating with the ENA under their CSR component. ASPIRED provided the concept paper of the irrigation project for Sayat-Nova village with the technical description and the budget and sent an official letter to the General Director of the ENA soliciting the company’s interest in collaborating with the ASPIRED Project. ASPIRED is waiting for ENA’s feedback on the concept paper.
- ASPIRED met with the implementing team of the Farmer to Farmer (FTF) Project in Armenia, VISTAA Expert Center. The FTF supports Armenia’s rural sector by bringing consultants who work with Armenian farmers on a volunteer basis. The VISTAA Expert Center may be able to identify relevant experts for the ASPIRED pilot projects, specifically a crayfish expert for the ATTC. ASPIRED plans to host a more detailed discussion of this topic, following approval of the ATTC project.
- ASPIRED also met with the representative of the Sustainable Energy Development Fund, which implements energy efficiency and renewable energy projects in Armenia. ASPIRED and the Fund’s representative discussed opportunities to collaborate on the installation of renewable energy technologies and



Farmer Hakob Konjoyan showing his produce to a film operator and ASPIRED team.

identification of external financing sources for the pilot projects.

Additional tasks during the reporting period included preparation of the outreach materials and information, contributing information to USAID on the interim portfolio review in August, conducting pilot project site visits, and updating to the project web site and Facebook page. Additionally, ASPIRED helped USAID's outreach team to organize video shootings and interviews with the beneficiaries of Hayanist irrigation project. By the request of USAID, the ASPIRED team also responded to UNDP's inquiry regarding projects containing climate change adaptation. The ASPIRED team summarized the information on water projects and policy activities which were implemented with USAID funding from 2012 to date and which contributed to climate change adaptation. This also included the summary of information on the pilot projects implemented under the Clean Energy and Water Program

4. General Administrative Issues

During the July 12-14, 2017 staff retreat, the ASPIRED team developed the Year 3 Work Plan, which received COR approval by the end of the reporting period.

During the reporting period, ASPIRED established a service contract agreement with the EMIC to conduct water tests at the intake structure of the Armavir Farmer LLC. In August 2017, the ASPIRED team signed a contract with the bid winner for the reinforcement of the drainage canal wall in Hayanist village. The work on this contract ended in August 2017.

The project also signed a service contract with a short-term aquaculture specialist to analyze the results of the water tests and provide conclusion on the suitability of water for the ATTC Project. Additionally, through an open competition process, ASPIRED selected and hired Narine Ghahramanyan to serve as Interim Project Deputy Director of Administration and Finance to replace Kristine Manvelyan during her maternity leave period.

ASPIRED signed the act of acceptance of the well sealing project in Sipanik. Based on the memo prepared by the engineer, ASPIRED partially compensated additional costs incurred by the sub-contractor for overcoming the technical difficulties of the project and ensuring completion of the work.

5. Environmental Compliance

Following the requirements of the Environmental Mitigation and Monitoring Plan (EMMP) for the Hayanist project on reuse of return flows from fisheries for irrigation, the quality of various crops grown were tested as a part of the project post-implementation monitoring process. The watermelon and melon samples were tested by the Food Safety Laboratory of the State Service for Food Safety of the Ministry of Agriculture for the main safety parameters for fruits and vegetables, defined by the Government Decision N: 412-N, dated April 5, 2012. These parameters are selected heavy metals (lead, arsenic, cadmium, mercury), pesticides (DDT and its metabolites, Hexachlorocyclohexane (alpha, beta, gamma isomers) and nitrates. Samples were also tested for organoleptic parameters such as appearance, taste and odor. Based on the test results, the Food Safety Laboratory concluded that the melon and watermelon samples met the safety norms of Armenia. Both samples showed no signs of unnatural odor and taste.



Produce from Hayanist underwent testing of the Food Safety Laboratory

The Hayanist Project implementation partner, ERGIS NGO, sampled 3 different varieties of tomatoes, egg-plant, okra, and watermelon for testing of their taste and odor characteristics. According to the Statement on Tasting Evaluation Results issued by the Scientific Center on September 15, 2017, taste characteristics of the samples do not differ from the taste characteristics of a checker and have taste characteristics typical for the same variety of the crops tested. Tasting Evaluation Sheets from the specialists also indicate that the tested crop varieties demonstrated no other additional odor. ASPIRED shared these results with USAID, MNP, and relevant Project partners. The ASPIRED team will check the water quality in early October, before the winter crops planting.

During the reporting period, ASPIRED also checked compliance of the works with the EMMP on reinforcement of the drainage canal walls at Hayanist project pumping station. The works were completed in full compliance with the EMMP requirements.

Sipanik Well Closure: During the reporting period, ASPIRED conducted regular visits to the groundwater well closure site to monitor implementation of the EMMP requirements. Following instructions of the ASPIRED team, the project site was cleaned of waste and construction debris, graded and compacted after completion of the construction works.

ATTC: During the 4th Quarter of Year 2, the ASPIRED team checked the water quality for the main parameters twice. The Environmental Monitoring and Information Center state non-commercial organization of the MNP collected and analyzed the water samples. After the first test, the catchment structured was re-modeled, as some of the water parameters were not suitable for aquaculture. Results of the second test showed that most of the parameters analyzed are reliable, while a few selected parameters, such as nitrites, manganese, and oxygen, can be rectified by pretreatment via oxidation and biofiltration. ASPIRED amended the environmental review checklist and EMMP for the ATTC concept level design for the modified water supply source. ASPIRED submitted both amended items to USAID for review and approval.

6. Existing Problems or Issues

The Project experienced delays with the launch of the ATTC Project due to the change of the water supply source from the groundwater to the surface water of Sevjur-Aknalij river, as well as the need to build the new water catchment and conduct additional water tests. Completion of

the well closure project in Sipanik also experienced minor delays due to unforeseen technical complications which emerged during the well sealing process. However, the sub-contractor VALML LLC continued to complete all planned activities by the end of August 2017.

7. Planned Activities for the Next Quarter

7.1 Data

- The ASPIRED team will continue its collaboration with the WRMA on the enhancement of the SWCIS Data Warehouse. ASPIRED will develop new component on groundwater resources monitoring along with the built-in queries and reports as needed for the WRMA annual reporting. Additionally, the Water Quality component of the SWCIS Data Warehouse will be improved to accommodate the requirements of EMIC to maintain the data on annual surface water quality status of the water bodies. The ASPIRED team also plans to implement the population of the newly programmed components of the SCWIS on the Lake Sevan, reservoirs, and HPPs.
- The Project's short-term satellite imagery analyst will complete the supervised classification of the Ararat Valley land cover/use under GIS environments based on the results of the field survey (groundtruthing). The finalized patterns of the land cover will lead to generation of the precipitation/runoff curve for the Ararat Valley, which then be used in DSS as an alternative method for calculation of surface run-off in the area. Additionally, the project will consolidate all GIS datasets on land cover/use in a single geodatabase, as well as initiate the design of a large-scale A0 format map on land cover/use of the Ararat Valley for further publication and presentation to relevant stakeholders.
- In November 2017, the ASPIRED National team will work with CADI International Expert, Dr. Tom Sheng, on the following activities:
 - Finalization of the results on land cover/use classification for the Ararat Valley, including GIS layers and CN raster imaging;
 - Generation of precipitation/runoff curves for catchment area of the Ararat Valley for calculation of surface and groundwater flows in the area;
 - Utilization of the datasets of the hydrogeological framework – developed by the USGS – for Decision Support Tools development;
 - Review of progress made by the ASPIRED national team on customizing the hydrogeological model of the DSS for the river basins of the Ararat Valley.
- The ASPIRED team will finalize the reprogramming of the Hydrological Model of the DSS, including generation of the precipitation/runoff curves for the Ararat Valley. The water quality assessment component of the model will be enhanced.
- The ASPIRED team will provide a basic GIS training to the nominated technical staff members of the WRMA and EMIC. It is envisaged to continue this activity in the second quarter of Y3 by conducting advanced GIS training aimed at using the enhanced SCWIS and DSS.

- The Project will work with a selected trainer on design and content of a customized training program for the Project team and selected stakeholders on ArcGW tools, including MODFLOW, using Hydrogeologic framework developed by the USGS. The training is planned for the second quarter of Y3.
- The Project, in collaboration with the MNP, will finalize the bidding document package for a tender for procurement and installation of the automated online system for groundwater management at the 20 water intake points of the selected fish farms in the Ararat Valley. The WRMA will provide a list of the selected fish farms to the ASPIRED team.
- The ASPIRED Project will finalize the Hydrogeologic map of the Ararat Valley, based on the input of the short-term hydrogeologist and the Hydrogeological Framework developed by the USGS.
- The Project will work on preparing a cooperation framework and joint action plan with the EMIC to extend the national reference groundwater monitoring network. ASPIRED also plans to organize a series meetings with the MNP and EMIC to plan project assistance in this area.

6.2 Pilot technologies

- Following the approval of the ATTC Project, prepare the RFP package for the selection of a contractor and inception of the planned activities
- Complete the concept for Sayat Nova water reuse/irrigation project and submission to the USAID for approval, based on the information on available cost-share to be provided by the project partner(s).
- Prepare a draft project concept for optimization of a community-owned irrigation well.
- Prepare a draft project concept for introduction of water- and energy-efficient technology in an operational fish-farm.
- Review and provide an initial assessment of the draft pilot project proposals presented by PURE (if any).

6.3. Legal and Policy Issues

- Assist PURE Project in the establishment of the Strategy Task Force for the development of the Policy Regulatory Improvement Strategy and a roadmap of implementation.
- Participate in individual meetings with the stakeholders and interested parties during the development of the Strategy Task Force participant list.

6.4 Performance Management, Communication and Donor Coordination

- Plan, conduct, and follow-up on the well sealing project completion event in Sipanik. Schedule the event, discuss the participation level with USAID, and coordinate the event

logistics accordingly.

- Follow up on the development of collaboration with PURE and other partners of the Project, work towards establishment of partnerships.
- Prepare outreach materials, including USAID highlights, and manage the ASPIRED web site and Facebook pages.
- Follow-up on the PMP updates, as well as prepare weekly highlights and monthly reports for USAID. Provide input to the Performance Plan and Reports and portfolio reviews, as requested by USAID.

6.5 Environmental Compliance

- Conduct environmental compliance training for selected sub-contractors under the ATTC project.
- Arrange water tests for the Hayanist project before the planting of winter crops.
- Prepare EMMP packages for the new projects.

6.6 Project Management

- Administration of tenders for approved projects and activities.
- Handling of contractual procedures with the STTAs.