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ADVANCED SCIENCE & PARTNERSHIPS FOR INTEGRATED RESOURCE DEVELOPMENT PROJECT

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List of Acronyms

AHGW	Arc Hydro Groundwater
ASPIRED	Advanced Science and Partnerships for Integrated Resource Development
ATTC	Aquaculture Technology Transfer Center
AAB	Ararat Artesian Basin
BMO	Basin Management Organization
BMP	Basin Management Plan
CADI	Computer Assisted Development, Inc.
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
EU	European Union
FAO	Food and Agriculture Organization
FAR	Fund for Armenian Relief
FTF	Farmer to Farmer Project
GIS	Geographic Information System
GOA	Government of Armenia
HMC	Hydrogeological Monitoring Center
ICARE	International Center for Agribusiness Research and Education
IR	Intermediate Result
ITF	Interagency Task Force
The Lab	U.S. Global Development Lab
LOP	Life of project
ME&A	ME&A, Inc.
MoA	Ministry of Agriculture
MNP	Ministry of Nature Protection
MoU	Memorandum of Understanding
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
USGS	United States Geological Survey
WRMA	Water Resources Management Agency
WUA	Water user association
WUP	Water use permit

1. Executive Summary

This report describes the programmatic activities implemented by the Advanced Science and Partnerships for Integrated Resource Development (ASPIRED) Project during the first quarter of Year 4 of the project. It covers the period from October 1 through December 31, 2018. The report reviews progress and achievements in each of the project areas during the reporting period, as well as describes planned activities for the next quarter. The report also highlights challenges and actions taken to address these challenges.

1.2 ASPIRED Project Summary

On September 29, 2015, the United States Agency for International Development (USAID) awarded ME&A, 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 October 1, 2018, the project received USAID approval of the ASPIRED Project Year 4 Work Plan.

- Data component:
 - In November, ASPIRED completed operationalization of the new server of the Ministry of Nature Protection (MNP);
 - ASPIRED team addressed the comments of the MNP on the Digital Hydrogeologic Map of the Ararat Valley and Three-Dimensional (3D) Model of the Ararat Valley Groundwater Basin and the Report on the Methodology and Calculated Values of the Natural Flow and Water Balance of the Ararat Valley
 - Provided on-the-job training/coaching to the Deputy Head of the Water Cadastre and

Monitoring Division of the Water Resources Management Agency (WRMA) on calculating ecological flow in the rivers of Armenia

- Technology component:
 - Received USAID approval for the well optimization project in Hovtashat community;
 - Signed the contract for the construction of the pumping station and drinking water network in Yeghegnut and Aratashen communities.
 - Completed and tested the construction of the main structures of the Aquaculture Technology Transfer Center (ATTC) Project.
- Legal component:
 - Submission of the draft of the government decision on establishment of requirements for protection of water resources in recreation zones as part of the ASPIRED Project's legal assistance to MNP and approval with reservations by the Ministerial Committee for Territorial Development and Environment.
- Communication and Donor Coordination component:
 - Held the project completion event and demonstration of the irrigation system built in Sayat-Nova community to the stakeholders on October 22.

2. Summary of Performance Indicators

Summary of performance indicators for the first quarter of FY 2019 (Year 4 of the project) is presented in the table below. The indicators of IR 2 providing the annual data will be reported by the end of each fiscal year.

	Indicator	Target/ Actual Year 4	Actual Quarter 1 Year 4	Target/Actual LOP	Notes: Descriptions/Comments/Assumptions
IR 1: Establish a comprehensive, user-friendly, open data system that is accessible to all stakeholders.					
Sub-IR 1.1: Ararat Valley Geocoded, real-time, publicly accessible data system that incorporates water resource, groundwater, and hydrological datasets from multiple stakeholders built and shared with the GOA					
Indicators					
1.1.1	Percent (of total) of datasets for the Ararat Valley publicly accessible	20/0	0	80/43	This indicator refers to the datasets related to the water resources in the Ararat Valley which will be accessible for the general public. By the end of the project life cycle, ASPIRED will make 80% of all datasets available on Ararat Valley public, which accounts for 100% of all the data that can be available to the public according to the Armenian legislation
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, collecting data for this indicator has been completed for the project.
1.1.3	Number of stakeholders engaged in the data collection activities	1/0	0	16/12 ¹	This indicator refers to the number of stakeholders engaged in the groundwater-related data collection activities in the Ararat Valley from different sectors – government, private, and public. ASPIRED and MNP discussed MNP the possibility of installation of online groundwater monitoring systems at a fourth fishery.
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. MNP with its subdivisions, PEER grantee, Institute of Water Problems, USGS, EU Water Initiatives Project, MOA, Metsamor power plant which are/were involved in the data collection process, fisheries: Alex Grig, Interaqua, and Golden Fish.

1.2.1	GIS-based decision support tools for Ararat Valley developed	1/0	0	2/1	This indicator refers to the GIS-based water resource management tools to be developed by the ASPIRED Project on the Ararat Valley. ASPIRED completed the Hydrological Model of the DSS for the Ararat Valley during Quarter 4 of Year 3. The project anticipates completion of the Groundwater Flow Model for the Ararat Valley by the end of Year 4.
Sub-IR 1.3: A publicly accessible system that maximizes the use of open source technology and produces reports based on high-quality, real-time monitoring data created					
Indicators					
1.3.1	Number of fisheries with automatic data system installed	1/0	0	6/3 ²	MNP is currently exploring the possibility of installing the remaining set of flow meters and data loggers in an additional fishery.
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	1.7/0	0	10/5.3	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 . By July 2018, ASPIRED installed 15 groundwater monitoring systems and this indicator also includes 3 groundwater monitoring systems installed under the European Union's Water Initiative + Project. MNP is currently exploring the possibility of installation of the remaining set of flow meters and data loggers in a fourth fishery.
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	4/0	0	7/3 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. This indicator also provides information on annual water saved, measured in cubic meters. During Quarter 4 of Year 3, ASPIRED completed the well optimization/irrigation improvement project in Sipanik.

² In Year 3, the ASPIRED team installed online groundwater use monitoring systems in the Alex Grig, Interaqua, and Golden Fish.

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.

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	8,777/0	0	9200 ⁵ /8,385 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 Project). The annual data for Year 4 counts also recurrent savings provided by completed water projects (Hayanist 1.1 mln, Sipanik well sealing 1.9 mln, Sayat-Nova 1.92mln and Sipanik well optimization 465,000) which will be reported during the last quarter of Year 4. Projections include projects in Aratashen and Yeghegnut communities, as well as other anticipated projects.
Sub-IR 2.2: Technologies with the objective of increasing energy efficiency and/or renewable energy generation of water users developed, piloted, and evaluated					
Indicators					
2.2.1	Number of energy efficiency and/or renewable energy (EE/RE) technologies piloted and evaluated	3/0	0	4/0	This indicator refers to water-use related EE/RE technologies to be piloted during project implementation. ASPIRED will install renewable technologies (photovoltaic and biogas) at the Aquaculture Technology Transfer Center (ATTC). Data for this indication will be available after completion of the ATTC Project.
2.2.2	Megawatt hour of energy saved annually	453/0	0	500/48 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. Year 4 Quarter 1 data refers to the Hayanist Water Reuse Project. Year 4 projections include ATTC, Aratashen, and Yeghegnut.
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 GHG emissions as a result of USG assistance, in metric tons	1,414 ⁸ /0	0	1440/472.4 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.

⁵Refers 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.

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.	9814/0	0	12000/986 ¹⁰ (500 women; 486 men)	This indicator tracks qualitative improvements ¹¹ of the water resource resulting from the 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).
2.2.6	Number of water users experiencing improved efficiency of water resources	7/0	0	13/5 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. Year 4 data refers to the ATTC fish farm, and the community projects, including those implemented in Hovtashat, Yeghegnut, Aratashen, Vedi, and Khachpar.
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	6/0	0	11/5 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.
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	1/0	0	3/2	ASPIRED initially planned to pilot at least two well optimization/sealing projects during Year 3. During Year 3 Quarter 4, the ASPIRED completed the well optimization project in Sipanik village. As of now, the ASPIRED team has submitted a letter of inquiry to MNP regarding additional recommended wells for closure and is waiting for a response.
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					

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

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 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.

3.1.1	Number of trainings for building capacity of MNP in groundwater monitoring	1/0	0	6/4	This indicator refers to trainings on the enhanced up-to-date State Water Cadaster Information System (SWCIS) and Management Information System (MIS) for the Ararat Valley and on enhanced transparent water use permitting, control, oversight systems and decision support tools.
3.1.2	Number of people educated on tools, approaches, and/or methods for water security, integrated water resource management, water source protection and sustainable water use as a result of USG assistance.	25/1	1	126/92 (17 women and 75 men)	This indicator refers to trainings on enhanced up-to-date SWCIS and MIS for the Ararat Valley; enhanced transparent water use permitting, control, and oversight systems; 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. During the reported period, ASPIRED provided on-the-job training for the Deputy Head of the Water Cadastre and Monitoring Division of the WRMA on calculating ecological flow in the rivers of Armenia ASPIRED plans to conduct a GIS course for the stakeholders during Quarter 2 of Year 4.
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.	1/1	1	4/3	This indicator refers to the package of recommendations that the ASPIRED Project drafted and submitted to the GOA. In reporting period 1, the ASPIRED Project submitted the draft Government decree on establishment of the requirements for the protection of water resources in the recreational zones to the MNP.
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	1/0	0	26/24	This indicator refers to newly identified stakeholders and points of influence in water and water-energy nexus for the ASPIRED Project.
4.1.2	Number of partnerships made by ASPIRED with other organizations	3/3	3	16/15	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. The indicator refers to partnerships with the communities of Yeghegnut, Aratashen and Hovtashat.

Sub-IR 4.2: A transformative partnerships model to respond to needs for research, pilots, analysis and other coordinated efforts that is demand-driven, flexible, and has a plan for financial sustainability created

Indicators

4.2.1	Percent of total funding leveraged from stakeholders for water resources management activities.	35/0	0	35/30 ¹⁵	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. Although the ASPIRED team started the pilot projects in Yeghegnut, Aratashen and Hovtashat villages, the project team will report figures associated with these projects upon their completion.
1. Portfolio-level indicators					
5.1	Percent of population living in targeted areas with improved water management	41.8 (women: 4.2; men: 4)/0	0	52/8.2 ¹⁶ (women – 4.2%; men – 4%)	The geographical target area is the Ararat Artesian Basin (AAB), a territory of 13,075 hectares with a population of 58,373 people (28,392 men; 30,345 women).
5.2	Number of key implementation steps taken to improve water management in the Ararat Valley	2/0	0	10/6 ¹⁷	This indicator refers 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	2/0	0	9/6 ¹⁸	This indicator refers to (a) the number of fisheries with automated groundwater use monitoring systems installed; and (b) fisheries which have adopted innovative water or energy efficiency (including renewable) technologies.

¹⁵ This figure represents the actual cost-share of partners (Coca-Cola HBC, ERGIS and Hayanist community –for Hayanist project; VALML LLC for Sipanik, Sipanik community for well optimization; Partnerships for Rural Development Project (PRP), Fund for Armenian Relief (FAR) and Sayat-Nova community for water reuse project in Sayat-Nova) versus the total cost of the projects. Since the ASPIRED Project has different share in different projects, the total percentage of the leveraged funding may be lower than that for a particular year.

¹⁶ The results refer to the population size of Sipanik, Hayanist, and Sayat-Nova communities versus the total size of the population in the AAB.

¹⁷ This figure refers to (1) ASPIRED completed the inventory of groundwater wells, and springs in September 2016. (2) USAID presented two reports to the GOA - Achieving Sustainable Groundwater Use in the Ararat Valley: the Role of the Fisheries Sector and the Final Report on the Inventory of Groundwater Wells, Natural Springs, and Fisheries of the Ararat Valley; (3) ASPIRED was involved into the Interagency Task Force (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. 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: irrigation improvement project in Hayanist (launched in May 2017) and well conservation project in Sipanik. (5) Installation of the automated online groundwater use monitoring system in the fisheries of the Ararat Valley; and (6) hydrological model of the decision support system (DSS).

¹⁸ The LOE result includes six fisheries with improved water management practices: three have been equipped with online monitoring systems and three fish-farms participate in the infrastructure projects – ATTC and water reuse for irrigation (Lablajyan and Masis Dzuk).

5.4	Number of innovations supported through USG assistance.	1/0	0	5/4 ¹⁹	Innovative technologies, management/monitoring tools or practices introduced by the ASPIRED team in fish farms, at water use points and/or communities of Ararat Valley which contribute to the reduction of the groundwater use.
5.5	Number of innovations supported through USG assistance with demonstrated uptake by private and/or public sector firms	1/0	0	4/2	This indicator refers to the uptake/replication by the public and/or private sectors of projects, technologies, innovations and/or practices introduced by the ASPIRED Project at fish farms, water use points, and/or communities of the Ararat Valley. In Year 4, the ASPIRED team assisted the Hovtshat community with initiating the well optimization project. ASPIRED will report the pilot project results, upon the project's completion.

¹⁹ The LOP data refers to the practice of the secondary use of outlet water from fisheries for irrigation purposes, which has never been practiced at a community scale; well sealing/optimization activities; the ATTC; and installation of the online monitoring system in the fisheries.

3. Program Implementation

3.1 Water Resource Data

SWCIS Enhancement

In November, ASPIRED completed operationalization of the new server of the Ministry of Nature Protection (MNP). The Project team installed the programmed databases of the State Water Cadaster Information System (SWCIS) Data Warehouse on the server and conducted series of technical discussions with personnel of the Water Resource Management Agency (WRMA) on populating the databases with the real data. WRMA and ASPIRED agreed on the format of recording the bugs identified in the process of data entry, which will allow the ASPIRED team to debug the programmed databases. In December, the ASPIRED and WRMA teams worked on testing and debugging of the selected databases and jointly initiated the process of designing the reporting templates for the SWCIS Data Warehouse.

In response to MNP's request to USAID for assistance on the implementation of e-governance mechanisms for transparent water resource management and the water use permitting process, USAID/Armenia's ASPIRED and Participatory Utilization and Resource Efficiency of Water (PURE-Water) Projects teams developed a proposal for creating a simplified platform for online submission of applications for water use permits. ASPIRED and PURE-Water teams presented the proposal and implementation details regarding hosting of the platform on the WRMA's web-site to the First Deputy Minister of Nature Protection on November 20 and received the Deputy Minister's concurrence. The ASPIRED team and the WRMA head agreed on the proposed approach, technicalities of developing the platform and providing linkages with the SWCIS Data Warehouse, including the implementation schedules and the roles of the WRMA, ASPIRED Project, and PURE Project teams.

Decision Support Tools

Before submitting the interim results to the MNP for review and feedback, the ASPIRED Project presented the interim results of the hydrologic analyses of the Ararat Valley to the USAID/Armenia Contracts Officer's Representative (COR) in October. The ASPIRED Team developed these two deliverables using the decision support tools which have been calibrated with the Ararat Valley datasets, including:

- Decision Support System (DSS) for calculating annual and multi-annual average values of water balance components for the Ararat Valley; and
- Arc Hydro Groundwater (AHGW) ArcGIS extension for creating the three-dimensional (3D) model of the Ararat Valley groundwater basin.

In December, the ASPIRED team met with the Head of the WRMA and specialists of the Environmental Monitoring Information Center (EMIC) to discuss their feedback, including questions for further clarification of the applied methodology, the data used in the calculation of the water balance components for 2016, the recommendations on the methodology, and findings narrative and

presentation of the break-down of water balance components for separate rivers basins of the Ararat Valley groundwater basin catchment area. The ASPIRED team updated the water balance calculations following the Ministry's feedback and re-submitted the revised version of the reports to the MNP on December 27, 2018. It was proposed to MNP to have a presentation and further discussion of the main outputs in January 2019, before the project deliverables are presented to a larger group of stakeholders.

DSS: During the reporting period, the ASPIRED team continued enhancing the DSS for the Ararat Valley. More specifically, the team made the following progress:

- Completed the programming of the surface water quality assessment modules of the DSS. This module allows qualitative classification of the surface waters of the Ararat Valley by using surface water monitoring data. The module also allows an assessment of the surface water resources based on their suitability for drinking and irrigation purposes, using the water quality norms defined by the Armenian legislation for drinking water and norms for irrigation recommended by the Food and Agriculture Organization (FAO) (Armenia does not have approved irrigation water norms).
- Started programming the groundwater quality assessment component of the DSS, which will be used to assess the quality of the groundwater resources, based on available data from the national reference monitoring network.
- Finalized processing of data sets of seven meteorological stations in the Ararat Valley (Ararat, Artashat, Armavir, Urtsadzor, Ashtarak, Yerevan Agro, and Yerevan Arabkir), as well as the Aragats high mountainous meteo-station required for calibrating the Climate Change model of the DSS for the Ararat Valley. Based on the ASPIRED team's request, the Armenian State Hydro-Meteorological Service provided information on gaps in the historical time-series which the ASPIRED team identified during analysis.
- Designed a conceptual scheme for reprogramming the ecological flow component of the supply-and-demand balance component of the DSS, based on the requirements of new ecological flow method adopted in February 2018.

Groundwater modeling tools: During the reporting period, the ASPIRED team initiated the process of constructing the numeric groundwater flow model for the Ararat Valley, which builds on the 3D model completed in September 2018. The team developed a schematic design of the groundwater numeric flow modeling in the MODFLOW environment that was discussed with the AQUAVEO team for its completeness and feasibility for achieving the project's modeling goals. The ASPIRED team identified and procured three new modules under the GMS software – Boreholes, TIN, and Solids – that are required to ensure the implementation of all technical steps for designing the groundwater flow model.

Introduction of the automated online system for groundwater use monitoring

ASPIRED continues to monitor the operation of the flow meters installed on 15 groundwater wells in the three fisheries in collaboration with the sub-contractor Hybrid Telematica. Hybrid Telematica provided an option for accumulating the flow measurement data in a temporary virtual space until the MNP provides its feedback on the second component of the automated online groundwater monitoring

system – the Supervisory Control and Data Acquisition (SCADA) software. By the end of the reporting period, ASPIRED was waiting for MNP’s feedback on the SCADA software and its technical requirements.

In December, the WRMA finally reached an agreement with Max Fish company for installation of the remaining five flow meters and data loggers in one of the company’s fisheries. ASPIRED and its subcontractor specialists visited the fishery to observe site conditions and assess feasibility of installing water metering devices. This fishery operates four groundwater wells, which can be equipped with flow meters. ASPIRED Subcontractor will provide its technical and financial proposal to the ASPIRED Project in January 2019.

Extending the national reference groundwater monitoring network in the Ararat Valley

The ASPIRED team, jointly with the Project COR, monitored four refurbished groundwater monitoring wells in the feeding zone of the Ararat Valley and determined that all four wells can be handed over to EMIC for inclusion in the national reference groundwater monitoring network.

During the reporting period, ASPIRED also completed procurement of the spare parts of the mass spectrometer, which have been transferred to EMIC. In November, the ASPIRED team and the Project COR coordinated the procurement of the remaining items for EMIC from the agreed procurement list, based on EMIC’s priority needs for groundwater resources quality and quantity monitoring.

Additional assistance to the MNP

In November, the ASPIRED team collaborated with the working group established by the Environmental and Mineral Resources Inspectorate of the GOA for discussing issues to be considered by the Inspectorate during the supervision of the environmental performance of the small hydropower plants, including but not limited to: water use permits (WUPs), environmental impact assessments and expertise conclusion, ecological flow, embankments and fish passes, and water control/metering devices. The ASPIRED team presented the key data and findings of the inventory, ongoing activities on modeling, and expected results to the Inspectorate, with a purpose of supporting their understanding of the baseline situation in the Ararat Valley and improving the inspection of groundwater management and use, particularly by fisheries. In addition, the ASPIRED team and the Project COR clarified the areas of partnership and cooperation with the Head of Inspectorate, including the Inspectorate’s staff members’ capacity building in hydrologic and hydrogeologic analyses conducted for the Ararat Valley, introduction of the SCADA in selected fisheries in the valley, and support in improving the legal framework.

During the reporting period, the ASPIRED team worked on the design of a training program on calculation of the ecological flow values in the rivers of Armenia for the representatives of the WRMA and its six basin management organizations (BMOs), Environmental Impact Expertise Center of the MNP, Ministry of Agriculture, Environmental and Mineral Resources Inspectorate of the GOA. ASPIRED conducted a pre-training evaluation of the skills and capacities of the proposed trainees in

general hydrology, use of MS Excel and ArcGIS software, based on which the team put together a 10-day training program to take place in January 2019.

Following MNP's request, the ASPIRED Hydrologist conducted on-the-job training for the Deputy Head of the Water Cadastre and Monitoring Division of the WRMA on calculating ecological flow in the rivers of Armenia. ASPIRED provided about 25 hours of individual coaching during the reporting period and will continue providing individual coaching throughout the next quarter.

3.2 Low Cost and Water Efficiency Technologies

The table below summarizes the status of the pilot projects as of December 31, 2018.

Project Name/ Technology	Status	Total cost, USD	ASPIRED cost-share, USD	Partner cost- share, USD	Partner
Hayanist irrigation rehabilitation project	Completed in April 2017	131,705	89,524	27,212	Coca Cola HBC
				11,269	ERGIS
				3,700	Hayanist community
Sipanik well sealing	Completed in August 2017	51,546	47,823	3,723	VALML LLC
Well optimization Sipanik	Completed in September 2018	24,554	22,002	2,552	Sipanik community
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
Aquaculture Technology Transfer Center (ATTC)	Ongoing • The sub-contractor completed construction of the	178,028	114,542	63,486	Armavir Farmer LLC

Project Name/ Technology	Status	Total cost, USD	ASPIRED cost-share, USD	Partner cost- share, USD	Partner
	<p>ATTC, including finishing the external walls.</p> <ul style="list-style-type: none"> On November 30, ASPIRED tested the performance of the system in terms of leakages, having filled the fish and crawfish tanks with water. Since minor leakages were detected around pipes and fitting, ASPIRED requested that the sub-contractor improve the water circulation system in accordance with the design requirements. The sub-contractor eliminated the defects identified in the Construction Deficiency Act, signed by the ASPIRED and sub-contractor representatives. 				
Yeghegnut	<p>Ongoing ASPIRED finalized the tender results and signed the contract with Armplast LLC on December 21 for construction of the water system. The community will announce a tender for the trenchwork in January 2019.</p>	120,809	79,777	41,032	Yeghegnut community
Aratashen	Ongoing	125,365	87,455	37,910	Aratashen community

Project Name/ Technology	Status	Total cost, USD	ASPIRED cost-share, USD	Partner cost- share, USD	Partner
	ASPIRED finalized the tender results and signed the contract with Armplast LLC on December 21 for construction of the water system. The community will announce a tender for the trenchwork in January 2019				
Hovtashat	Ongoing: USAID approved the concept on optimization of the well in Hovtashat community in December 2018. In January 2019, ASPIRED will finalize and announce open competition for the project design.	4,3539	28,587	14,952	Hovtashat community
TOTAL		808,096	550,119	250,307	



Left to right: ATTC fish ponds and the training center.



Left to right: Sayat-Nova Project: before and after the operation of the irrigation system. On the right photo: Sayat-Nova mayor Razmik Alaverdyan, USAID Assistant Administrator Brock Bierman, and farmer Armen Gharibyan.

Design of New Projects

ASPIRED Project's technical team finalized the draft concept of the Vedi urban irrigation project. The PURE-Water Project will finalize and submit its portion of the environmental documentation to USAID. Once USAID reviews and approves the environmental documentation, the ASPIRED Project will submit the project concept to USAID.

The ASPIRED Project collaborates with the Pokr Vedi community and the local water user association (WUA) to prepare the concept paper for the irrigation project.

3.3 Water Regulation and Enforcement

On October 27, the ASPIRED Project received USAID approval to submit the draft Government decree on establishment of the requirements for the protection of water resources in the recreational zones to the MNP. The Ministerial Committee for Territorial Development and Environment discussed and approved the draft government decree; however, during the Government session on 20 December 2018, the Committee decided to postpone the submission of the draft decree to the Government till October 2019, given the need for amendments to the RA Water Code.

In October, the ASPIRED team began developing the method for assessment of self-purification capacity of rivers and its enforcement mechanisms. To this end, the ASPIRED team and the MNP discussed the planned tasks and finalized the composition of the working group, including involvement of other ministries and additional field experts. Thus, the relevant specialists from the Ministry of Emergency Situations and the Ministry of Territorial Administration and Development will participate in the working group activities. Since biotic and abiotic components of ecosystem (including phytoplankton, algae etc.) play a significant role in self-purification of water resources, the ASPIRED team considered recruiting relevant specialists on a short-term basis. During November and December, the ASPIRED team initiated recruitment of a hydro-biologist and hydro-morphologist for the final staffing of the working group, with all contractual arrangements to be finalized in January 2019.

During the reporting period, the ASPIRED team participated in the legal component activities of the PURE-Water Project, including the meeting of the informal public advocacy network. The purpose of the meeting was to discuss the contractual issues between the WUAs and water users where the ASPIRED Project was asked to consider assisting in the development of block pricing structure for irrigation water tariffs.

3.4 Donor Coordination and Communications

On October 22, the ASPIRED Project held an event dedicated to the completion of the irrigation improvement project in Sayat-Nova village. Participants included USAID/Armenia's Mission Director Deborah Grieser, Governor of Ararat Province Garik Sargsyan, and representatives of the MNP, Ministry of Agriculture, and local administration. During the organization of the event, ASPIRED collaborated with the community and the regional government's international relations and media departments. The event started with a demonstration of the pumping station and the irrigation system in operation, followed by welcoming remarks and children's dance performance at the village secondary school. The link to the event story is available on ME&A Armenia's Facebook page and the project web site: <http://www.aspired.wadi-mea.com/en/2018/10/23/new-irrigation-system-for-sayat-nova-community/20>

The ASPIRED and PURE-Water Projects collaborated extensively on the legal and pilot project components. Furthermore, in October and November, the ASPIRED team was involved in the selection committee of small grants announced by PURE-Water Project among NGOs and individuals interested in launching nation-wide advocacy campaigns on water issues of the Ararat Valley. On October 31, the ASPIRED team led a session during the training of trainers for the secondary school teachers from the communities of Ararat and Armavir regions, which was focused on the Ararat Valley Artesian Basin (AAB) and its issues.

On December 3, the ASPIRED team met with the head of the PR and Programs Department of the All-Armenian Fund to discuss the collaboration opportunities and the possibility of joint projects. The ASPIRED team presented the project objectives and the focus of the pilot projects implemented by ASPIRED, as well as their overlap with the goals of the All-Armenian Fund. The parties agreed that the ASPIRED team would share the concept paper of the Pokr Vedi irrigation project with the Fund's management for review, while the Fund would research the availability of funding through their sources.

²⁰ The media coverage links <https://www.ecolor.org/hy/news/water/-60-/10521/>
<https://news.am/arm/news/477475.html>
<https://armenpress.am/arm/news/952775.html>
<https://www.lragir.am/2018/10/30/391292/>
<https://www.anau.am/ru/about-us/2544-2018-11-03-09-05-05>

Performance Monitoring: On October 20, the ASPIRED Project submitted FY 2018 inputs on the indicators contained in the Performance Plan and Report to USAID, including the explanation on any deviations found in the indicators. Furthermore, on November 29, the USAID and ASPIRED teams met for the data quality assurance (DQA) review by USAID on the following indicators: the GHG emission reduction, the number of innovations supported by the ASPIRED Project, and the number of innovations replicated by private and public entities.

Communications and Outreach. During the reporting period, the ASPIRED team conducted the media monitoring of the coverage of the project event in Sayat-Nova community. The success story on the project, which also highlights the visit of USAID’s Assistant Administrator Brock Bierman to Sayat-Nova was prepared and shared with ME&A headquarters. Updates of the web site and Facebook pages of the project included news stories, photo and library uploads, posting of announcements.

Furthermore, the ASPIRED Project participated in the communications training organized by USAID for the implementing partners on October 31-November 1. Throughout the communications training, USAID briefed its implementing partner representatives on the most recent outreach-related requirements and PR projects of USAID, and discussed the focus of the communications activities implemented by the partners.



Left to right: USAID/Armenia Mission Director Deborah Grieser and Ararat Governor Garik Sargsyan launching the pumps; The demonstration of the irrigation system to the stakeholders.

4. General Administrative Issues

During the reporting period, the project administration focused on the budget review and realignment for the remaining funding period. Two representatives from ME&A’s headquarters visited the Yerevan office from October 24, 2018 through October 27, 2018 to conduct a mid-term review of the ASPIRED Project progress, discuss the Project activities for the upcoming year, meet with USAID/Armenia representatives and project counterparts, and conduct pilot project site visits.

During the reporting period, the ASPIRED Project administered the tender for Yeghegnut and Aratashen villages for the installation of the pump and water pipes and fully-executed the contract with

Armplast LLC. The bids received were on average higher than the budgeted figures by 16% due to the complexities of construction work and pipework in winter period and the necessity to install a new transformer substation in Aratashen. ASPIRED requested USAID approval to increase the total cost of the tender. After the project received USAID approval for this request, ASPIRED signed a contract with Armplast on December 21.

On November 14, the ASPIRED Project started recruitment of short-term services of a hydro-biologist and hydro-morphologist for technical assistance under the legal component.

On November 15, ME&A Headquarters conducted its annual online training for the ASPIRED Project team regarding ethics, non-discrimination, and prevention of harassment at the workplace.

5. Environmental Compliance

During the reporting period, the ASPIRED Project conducted regular environmental compliance monitoring of the ongoing projects in Metsamor (ATTC) and Sayat-Nova project sites, as well as at three fisheries where the flow meters were installed. In Metsamor and Sayat-Nova, the sub-contractors were instructed to abide by the EMMP requirements, particularly on the proper and safe disposal of the construction debris and safety norms to be maintained at the project sites. The specialist recommended reinforcing the bank of the biological pond of the ATTC and water intake canal at the pumping station area of the Sayat-Nova project. The ASPIRED team has documented the observations made during the monitoring visits and instructions to the ASPIRED Subcontractors and other implementing parties in the Field observations checklists kept at the ASPIRED office.

During the reporting period, the ASPIRED and PURE-Water Projects' environmental specialists worked together on the preparation of the environmental review checklist and EMMP for improving irrigation of green zones of Vedi town. The ASPIRED and PURE-Water teams also conducted a site visit to Vedi to assess the baseline environmental conditions.

The ASPIRED Project also prepared the environmental review documentation for the well optimization project in the Hovtashat community to complete the package for submission to USAID. The examination of the well water quality, specifically its physical and chemical monitoring demonstrated that it is suitable for irrigation, following the FAO recommended quality norms.

6. Existing Problems or Issues

The ASPIRED Project anticipates a delay in the installation of the water pipes by the ASPIRED sub-contractor due to the delay in the announcement of the tender for trenchwork by Aratashen and Yeghegnut communities. During the joint meeting of the ASPIRED and PURE-Water Projects with the communities' mayors on December 20 and 21, PURE-Water Project's specialists cautioned that the

communities won't be able to finalize their tenders earlier than late- January 2019 due to the timing requirements of the Armenian Public Procurement Law.

7. Activities for the Next Quarter

7.1 Data

- Continue the testing and debugging of the programmed databases of the SWCIS data warehouse in parallel with population of the programmed databases with actual data by the WRMA;
- Program, test and debug the reporting templates of the SWCIS Data Warehouse;
- Re-program the ecological flow calculation component of the advanced version of the DSS based on the new methodology adopted in 2017;
- Customize the Historic Trends tool of the Climate Change model of the DSS with data of the Ararat Valley;
- Complete the testing and debugging of the enhanced surface water quality assessment component of the DSS;
- Initiate construction of the numeric groundwater flow in the hydrogeologic layers of the Ararat Valley in the GMS and MODFLOW, using the 3D structure of the Ararat groundwater basin;
- As requested by the MNP, present and discuss the main outputs of the water balance and 3D hydrogeologic structure of the Ararat Valley, incorporating WRMA's and EMIC's comments and recommendations. Present the final interim findings of the ASPIRED Project to the stakeholders; including Ministry of Agriculture , Hydromet Service under the Ministry of Emergency Situations, Regional Administration, Civil Society NGOs etc.
- Complete installation of the four flow meters in the second fishery owned by Max Fish company;
- Complete procurement of equipment for enhancing EMIC's capacities in qualitative and quantitative monitoring of groundwater resources;
- Conduct a training program for the technical staff of key stakeholder agencies on calculation of ecological flow values in the rivers of Armenia;
- Following WRMA's request, conduct a training program on GIS for selected technical personnel from WRMA.

7.2 Pilot Technologies

- Provide technical input to the preparation of the tender documentation for Hovtashat project
- Monitor the construction work under Yeghegnut and Aratashen projects;
- Finalize the project concepts and expenditure estimates for Pokr Vedi project and submit them to USAID for approval;
- Receive the finalized EMMP from PURE-Water Project and send the Urban Irrigation Project of Vedi town to USAID for approval;

- Develop the fish farmer plans to populate the fish and crayfish ponds in Spring 2019, based on the recommendation of the aquaculture expert provided by the USAID-funded Farmer to Farmer (FTF) Project.

7.3. Legal and Policy Issues

- Contract hydro-biologist and hydro-morphologist for the working group;
- Meet with the two selected experts to discuss the details of their assignment and share their work plans;
- Conduct working group sessions with the nominated representatives from the MNP, Ministry of Territorial Administration and Development, and the Ministry of Emergency Situations;
- Identify the method for estimation of self-purification capacity of rivers, select pilot site(s) (river, river section, etc.) to carry out seasonal field studies.

7.4 Performance Management, Communication and Donor Coordination

- Follow up with the All-Armenian Fund on collaboration opportunities;
- Negotiate with the FTF Project the possibility of bringing the aquaculture expert for the ATTC in February-March 2019.
- Follow up with the project activities to prepare news posts and stories;
- Conduct site visits to the project sites;
- Continue updating the program web site and Facebook pages;
- Prepare the fact sheet for Hovtashat project;
- Conduct project monitoring to collect the data and the background documentation for the PMP indicators.

7.5 Environmental Compliance

- Conduct health and environmental safety training programs for the project implementing partners for the drinking water supply improvement Projects in the Yeghegnut and Aratashen communities;
- Conduct regular monitoring of the ongoing pilot project activities in Aratashen and Yeghegnut communities, and ATTC;
- Collaborate with the ASPIRED Engineers and PURE-Water Project specialist in providing environmentally and socially safe implementation of the pilot projects.

7.6 Project Management

- Administer the tender for the selection of the design sub-contractor for the pilot project in Hovtashat and other projects to be approved by USAID;
- Follow-up on the implementation of the contractual commitments by the sub-contractors;
- Procurement of portable flow meter, camera for monitoring of the ground water wells, one computer and printer for EMIC.