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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.
CCHBCA	Coca-Cola Hellenic Bottling Company Armenia
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
EMMP	Environmental Mitigation and Monitoring Plan
ERGIS	Environmental Research and GIS
ESS	Environmental Scoping Statement
EU	European Union
ESA	European Space Agency
GHG	Greenhouse gas
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
MIS	Management Information System
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 third quarter of Year 2 of the project. It covers the period from 1st of April through 30th of June, 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:
 - Preparation of a draft digital hydrogeological map for the Ararat Valley, based on the historical data and the results of the groundwater wells, natural springs and fish farms in December 2016.
 - Completion of an unsupervised classification of the land cover for the Ararat Valley, using the SENTINEL-2 satellite imagery and the methodology developed during the past USAID-funded Clean Energy and Water (CEW) Program. Preparation of a georeferenced database with approximately 630 conflict sites to be surveyed in the field (groundtruthing) in June-August 2017.
- Technology component:
 - Launch of the irrigation system project in Hayanist.
- Legal component:

- On May 6, the Prime Minister approved the Program of Measures for efficient use of the groundwater resources in Ararat Valley, which references the ASPIRED Project in the implementation of a number of measures. The Government of Armenia (GOA) developed the program of measures (<https://www.e-gov.am/decrees/item/16974/>) through the ASPIRED Project's contributions to the activities of the Interagency Task Force, established by the GOA in January 2017.
- Communication and Donor Coordination component:
 - May 23, 2017: Community event dedicated to the completion of the water reuse project in Hayanist, with participation of the US Ambassador to Armenia Richard Mills, USAID Mission Director Deborah Grieser, the Governor of Ararat region Aramays Grigoryan, the representatives of partner organizations and the Ministries of Nature Protection (MNP) and Agriculture (MoA).



Photos from the community event to mark completion of the project on water reuse for irrigation system improvement in Hayanist community.

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 3	Life of project (as of end of Q3 of 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	20/0	-	-	By the end of the Project 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.
1.1.2	Percent (of total) wells mapped in the Ararat Valley.		-	100%	Target was met in the 1 st quarter of Year 2.
1.1.3	Number of stakeholders engaged in the data collection activities	8/10	-	10	The 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 ¹ . The target for Year 2 also included the fish farms with installed automated systems for the groundwater use monitoring ² .
Sub-IR 1.2: An online tool for hydrogeological modelling and decision-support for the Ararat Valley that incorporates hydrologic, economic, energy, social equity and environmental data generated					

¹ Four GOA agencies and Partnership for Enhanced Engagement and Research (PEER) grantee, the United States Geological Survey (USGS), the Institute of Water Problems which are engaged in data collection activities.

² 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 which in addition to its other programmatic tasks in the water sector will also collaborate with the ASPIRED on the technical upgrade of the SWCIS.

Indicators					
1.2.1	GIS-based DSS for the Ararat Valley developed	-	-	-	Since the DSS will be available starting in Year 3, there is 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 is contingent upon the GOA's action to pursue installation of the automated systems for the groundwater use monitoring in large fisheries. ³
Sub-IR 1.4: Plan for decentralized, sustainable data collection methods to monitor groundwater resources and strengthened implementation capacities of partners developed in partnership with the Government of Armenia (GOA) and local stakeholders					
Indicators					
1.4.1	Percent (of total) coverage of the groundwater extraction points monitored	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 (in partnership with Coca-Cola Hellenic Bottling Company Armenia (CCHBCA)) versus the total number of the operational groundwater wells available in the fisheries ⁴ . 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 of the implementation of the activity for Indicator

³ Implementation of the Project activities on announcing a public tender for procurement & installation of the automated online groundwater use monitoring system in the selected large fisheries was planned initially for February 2017. The delay was due to the GOA intention to shift the USAID's 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. Therefore, the USAID and ASPIRED Project will observe the progress and results of installation and operation of the monitoring system by the large and medium-size fisheries and GOA by September 2017, before initiating the process for procuring and installing the online monitoring system on 20 groundwater abstraction points in the selected small-size fisheries (with groundwater use below 100 liters per second).

⁴ During the latest inventory of the groundwater wells, natural springs and fish farms of the Ararat Valley, ASPIRED inventoried a total of 2807 wells, 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.

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 evaluated	2/1	-	1	The ASPIRED team completed the irrigation rehabilitation project in Hayanist in November 2016 ⁵ .
2.1.2	Thousands of cubic meters of water saved annually in Ararat Valley	300/1,100	1,100	1,100	The data comes from the operation of the irrigation system in Hayanist.

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	1/0	-	-	The indicator refers to water-use related EE/RE technologies to be piloted during the project implementation ⁶ .
2.2.2	Megawatt hour of energy saved annually	87/24	24	24	The data refers to the energy savings generated by the Hayanist project.
2.2.3	Clean energy generated annually, MWh	7/0	-	-	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 for this indicator depends on the implementation of Indicator 2.2.1.
2.2.4	Gains in the reduction of GHG emissions as a result of USG assistance	25/11.3	11.3	11.3	Greenhouse gas (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. The data is calculated based on the energy savings generated by the Hayanist project.

⁵ The project helped to avoid drilling of an additional groundwater well for irrigation purposes by channeling the outlet water from the fishery to irrigate 40 hectares of land belonging to Hayanist community. The pumping station was built at the outlet section of the fishery to be shared between the community and the owner of the fish farm who in his turn plans to reduce abstraction of the groundwater by recirculating the water in his fishery with the help of the new pump.

⁶ If water tests prove the suitability of the water from Sevjur River for aquaculture purposes, then ASPIRED intends to install two types of RE technologies in the Aquaculture Technology Transfer Center (ATTC) project: photovoltaic and biogas.

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	-	-	Qualitative improvement of the water resource 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 these improvements. Initially, this indicator referred exclusively to the drinking water supply projects (to be implemented in partnership with PURE). However, it has been 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 from 85 households – beneficiaries of the water reuse project in Hayanist.
2.2.6	Number of water users experiencing improved efficiency of water resource use	3/2	2	2	More 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 from the 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	1	Throughout the ASPIRED Project, the project 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 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>	-	-	-	Although this task was planned to start during Year 3, the ASPIRED team started implementation of the well conservation project in Hayanist in May 2017. ASPIRED will report the data for this indicator upon the completion of the project during the fourth quarter of FY 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 MNP in groundwater monitoring	1	-	1 ⁷	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. ASPIRED plans to organize a training program for the MNP staff in September 2017.
3.1.2	Number of people educated on tools, approaches, and/or methods for water security, integrated water resource management, and/or water source protection as a result of USG assistance ⁸ .	12	-	11 (3 women and 8 men)	The indicators refer to the trainings on enhanced up-to-date SWCIS and MIS for the Ararat Valley and on enhanced transparent water use permitting, control and oversight systems. The indicator will be 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	Indicator completed in 2 nd quarter of 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

⁷ The ASPIRED team supported the USGS in organizing the well inventory training for its stakeholders (Hydrogeological Monitoring Center (HMC), WRMA) during Quarter 2 of Year 1 of the project.

⁸ This indicator is not cumulative and reported on an annual basis.

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	1	23 ⁹	The data refers to the PURE project in terms of the system mapping task.
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.	7 ¹⁰ /34	-	34	This indicator refers to the in-kind and financial contributions by implementing partners. The reported figure is taken from the actual cost-share of partners (CCHBCA, Environmental Research and GIS (ERGIS), and Hayanist community) in the implementation of the irrigation rehabilitation project in Hayanist.
5. Cross-cutting indicators					
5.1	Percent of population living in targeted areas with improved water management	30/3.5	3.5	3.5	The target area is Ararat Artesian Basin (AAB), which currently has 24 communities. The results for the interim period refer to the water reuse for irrigation project in Hayanist (2046 people). More data will be provided after completion of the well conservation project in Sipanik. A significant disparity between the actual and targeted results is caused by the late announcement of the PURE-Water Project which will cause delays in the design and implementation of water supply projects in the villages of Ararat Valley.
5.2	Number of key implementation steps taken to improve water management in the Ararat Valley	3/3	1	4 ¹¹	This indicator relates to policy, analysis and other activities targeted towards improvement of water data-related activities, including training and pilot projects. In the past quarter, the following could be reported in relation to this indicator: (1) the USAID presented to the GOA two reports - Achieving Sustainable Groundwater Use in the Ararat Valley: the Role of the Fisheries

⁹ Organizations to be involved in the mapping process are: Coca-Cola Hellenic Bottling Company Armenia (CCHBCA) 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).

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

¹¹ ASPIRED completed the inventory of groundwater wells and springs in September 2016.

					Sector and the Final Report on the Inventory of Groundwater Wells, Natural Springs and Fisheries of the Ararat Valley; (2) ASPIRED was involved in the Interagency Task-Force established by the Prime-Minister's assignment in January-February 2017. In May 2017, the Armenian Prime-Minister Karen Karapetyan approved the Program of Measures for Efficient Management of the Groundwater Resources of Ararat Valley. Developed with the expertise and data support of the ASPIRED Project, the Program of Measures 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; (3) ASPIRED launched implementation of pilot projects aimed at improving water management on the grassroots level by the communities and fish-farmers: the irrigation improvement project in Hayanist (launched in May 2017) and the well conservation project in Sipanik (started in May 2017).
5.3	Number of private sector firms that have improved management practices or technologies as a result of USG assistance	7/1	-	1 ¹²	The indicator refers to (a) the number of fisheries with automated groundwater use monitoring systems installed; (b) fisheries which have adopted innovative water or energy efficiency (including renewable) technologies.
5.4	Number of innovations supported through USG assistance ¹³	3/1	-	1	The LOP data refers to the practice of the secondary use of the outlet water from fisheries for irrigation purposes – which is an innovative approach and has never been practiced in Armenia at the community scale.

¹² The data refers to Samvel Lablajyan's fish farm where the pumping station is installed for channeling water to the community of Hayanist.

¹³ 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

The ASPIRED Project prepared a draft digital hydrogeological map for the Ararat Valley, using historical data and results of inventory of groundwater wells, natural springs and fish farms completed in December 2016. The map includes GIS layers on boundaries of the Ararat Valley and Ararat Artesian Basin (AAB), tectonic structure, geological formations, aeration zone, drainage network of the Ararat Valley, directions and volumes of groundwater inflow into the valley, directions and volumes of groundwater outflow out of the valley, as well as the piezo-line of groundwater pressure.

The data team prepared a technical report describing the preparation of the hydrogeological map of the Ararat Valley, including sources and type of data and information used, methods used for creating separate layers of the map and calculations.

Introduction of automated online system for groundwater use monitoring

The GOA integrated the installation of the automated online system for groundwater use monitoring into the list of environmental measures planned under the GOA's Program of Priorities for 2017. It is also among the measures for reducing groundwater use by the fish farms approved by the Prime Minister on May 6, 2017 as part of a comprehensive program of measures towards efficient use of groundwater resources in the Ararat Valley. Installation of the monitoring system is mandatory for all fisheries, and must be installed at the expense of the farms by August 31 2017 in the farms using 150 liters per second and more (large farms), and by December 31, 2017 in the farms with 100–150 liters per second water use (medium size farms). Small fisheries, using up to 100 liter per second, must install the monitoring system during 2018.

In April-May 2017, the MNP developed technical specifications for the automated groundwater use monitoring system and presented them to the GOA for approval. The GOA sets the uniform requirements for all the fisheries for installation, operation and maintenance of the monitoring system.

On June 3, the MNP held a public discussion of the program of measures with the selected fish farmers. The meeting was chaired by the Minister of Nature Protection, with participation from the Advisor to the Prime Minister, Deputy Ministers and Heads of Departments of the MNP, fish farmers, international organizations, including the ASPIRED Project, etc.

The farmers were against the GOA imposing an additional requirement for them to install the automated groundwater use monitoring system. In the opinion of the farmers, the system installation is very expensive and not affordable for many fisheries. They also mentioned that their operational wells are equipped by mechanical water meters and they contract the Hydrogeological Monitoring Center (HMC) of the MNP on a quarterly basis for measurement.

There was no final agreement reached between the MNP and fish farmers on the final schedule and allocation of responsibility for installing the groundwater use monitoring system (farmers

versus the GOA). During the public discussion, the MNP encouraged the farmers to submit their proposed recommendations on implementing the monitoring and other measures for consideration by the GOA. In June, the ASPIRED team the minutes of the meeting, which outlines the discussions on the monitoring system and other measures, to USAID.

Enhancement of the SWCIS

The ASPIRED team continued the enhancement of the SWCIS following the structure and requirements of the GOA’s resolution on the Cadaster, and technical steps outlined in the Terms of Reference for upgrading the information system. During the reporting period, the ASPIRED team worked on the Water Use Permits (WUP) database of the Cadaster and designed new component – “Applications for the WUP”. The project team also re-programmed and enhanced the existing component on the “WUP’s”. The project team completed programming the interface of data input templates, while the reporting template is still undergoing the design process.

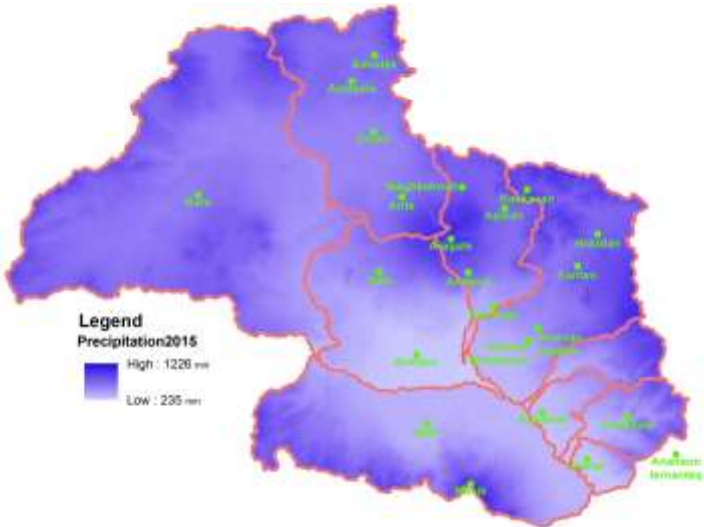
During the reporting period, the ASPIRED team conducted weekly meetings and work sessions with representatives of the WRMA’s Cadaster and WUP divisions. These meetings and work sessions were aimed at designing the sub-components of the WUP’s database, including the “Applications” and “WUPs” data input template and linkages among the various sub-components. These technical discussions served as on-the-job training for the WRMA personnel, enhancing their skills and capacities on database design, management, and data sharing. In June, the ASPIRED team presented the progress made on the enhanced WUP database to the Head of the WRMA, who recommended minor changes.

When the re-programmed WUP database is installed in the WRMA, ASPIRED will train technical representatives in preparing various reports within the database and linking the results with other components of the SWCIS. The ASPIRED team intends to continue these technical sessions with the WRMA representatives throughout the process of improving the SWCIS. The ASPIRED team plans to provide additional training programs to WRMA on the GIS to enhance the capacities on data analysis and linkages between the Cadaster’s various components. These trainings are anticipated for the next quarter of FY 2017 and throughout FY 2018.

Decision Support Tools:

Decision Support System (DSS):
ASPIRED prepared a detailed work plan with proposed activities and schedules for simplifying the DSS (developed under the Clean Energy and Water Program) and calibrating it for the Akhuryan, Metsamor, Hrazdan, Azat and Vedi River Basins.

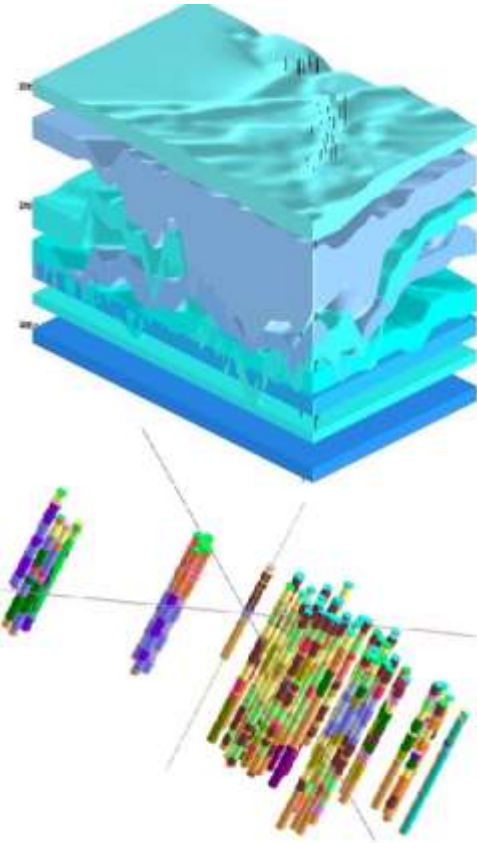
ASPIRED completed the re-programming of the interface of the hydrological component of the DSS during this reporting period. The re-programming resulted in a more user-



Precipitation data for the Ararat Valley used in the DSS design.

friendly interface featuring simplified functions for calculating the water balance and separate components thereof. After testing, ASPIRED will calibrate the DSS for the river basin catchment areas of the Ararat Valley in the next quarter, with participation from the WRMA and ArmStateHydromet Service representatives.

Groundwater Modeling: In April, the South Dakota US Geological Survey (USGS) team shared with the project the progress report on developing the hydrogeological framework for the Ararat Valley. The draft scheme and descriptions on use of datasets provided by the Project look comprehensive.



Preliminary lithology of well and aquifers of the Ararat Valley: testing phase of the groundwater modeling.

During the next reporting period, the USGS team will provide the online workshop on the hydrologic framework on August 29 and 30, 2017. The USGS will provide the draft GIS files to the ASPIRED team for preliminary review and formulation of the questions to be addressed during the workshop. The ASPIRED team will work with the USGS on arrangements for the training, including the agenda and the list of the stakeholder participants.

During the reporting period, the ASPIRED Hydrologist reviewed the available groundwater modeling tools developed by USGS – specifically MODFLOW and its front-end and back-end extensions (i.e. GMS, Modelmuse, etc.) – as well as other software which could be used for modeling the AAB (RockWorks with its RockWare).

In June, the ASPIRED Data component specialists completed the first round of testing the RockWorks groundwater modeling tool. The ASPIRED team constructed preliminary two- and three-dimensional images of the Ararat Valley aquifers, with cross sections, using data of about 60 deep groundwater wells. The project team will continue testing the groundwater modeling tool, using data of additional representative wells from the 2016 inventory.

Applying remote sensing technologies for data analysis

During the reporting period, the ASPIRED team completed the unsupervised classification of the land cover for the Ararat Valley, using the SENTINEL-2 satellite imagery and following the methodology developed during the past CEW Program. As a result, the team came up with a georeferenced database with approximately 630 conflict sites to be surveyed in the field (groundtruthing) in from June through August 2017.

Following the detailed Scope of Work for the groundtruthing activities, the ASPIRED Project's team of groundtruthing experts initiated the field surveys in June. By the end of the reporting period, the ASPIRED team successfully surveyed and took 250 GPS waypoints.

Support to the MNP in improving water management policies and regulations

During the reporting period, the ASPIRED team, following MNP's request, provided its technical expertise and assistance in improving existing approaches and methods for calculating the ecological flow as well as water (hydrological) balance, and water supply and demand balances in the rivers of Armenia.

Specifically, the ASPIRED Project hydrologist revised the draft Government resolution on the new methodology for calculating the ecological flow in the rivers of Armenia, as well as its User Manual. The revisions took into consideration the comments and recommendation of the stakeholders during the stakeholder review process.

Both regulations have passed stakeholders' review and are currently under the GOA's review, pending approval. Adoption and implementation of the regulation will significantly contribute to informed decisions on WUPs, and long-term water planning and management, following an ecosystems approach.

Low Cost and Water Efficiency Technologies

During the reporting period, the ASPIRED Project achieved the following accomplishments under the project's technology component:

- Launch of the irrigation system in Hayanist
- Approval and implementation of the well decommissioning project in Sipanik
- Approval of the Aquaculture Technology Transfer Center (ATTC) project concept

In early-April, the Hayanist community launched its new irrigation system from the pumping station located at the nearby fishery. For the first time, community members cultivated their farmlands after many years of abandonment. The ASPIRED Project's Engineer and the contractor instructed the pumping station operator and the mayor of Hayanist community on the use of pumps.

The ASPIRED team helped the community to plan an irrigation schedule that will allow using the pumping station more effectively and providing reliable irrigation services to the farmers. ASPIRED assisted the village in preparing the spreadsheet for the village administration to keep track of the irrigation water supply and collection of payments. To ensure the sustainability of the Hayanist project, ASPIRED and the Environmental Research and GIS (ERGIS) met with the farmers to explain the operation of the new irrigation system, the billing mechanisms and setting of the irrigation queue and schedule. Additionally, ERGIS NGO provided seeds and samplings to farmers and established a demonstration farmland to show high-value agriculture practices to the farmers.

In May 2017, the ASPIRED began implementation of the well decommissioning project in Sipanik. Based on the competitive bid results, the project selected VALML LLC as the qualified sub-contractor to carry out activities towards sealing the well. The plan to sealing the well

involves four major phases: 1) assessment of the condition of the well casing; 2) preparation of the site to ensure access to the well for heavy machinery; 3) cleaning the well casing from rubble and any debris that would create 'pockets' and reduce the effectiveness of sealing; and 4) sealing of the well with a mix of bentonite and neat cement. After the flow is stopped and the monitoring shows that there is no flow on the outside of the well casing, the upper part of the well (3-4m) can be filled with monolith concrete.

In April 2017, USAID approved the concept paper for the implementation of the Aquaculture Technology Transfer Center Project. Following USAID approval, the ASPIRED team signed a cooperation agreement with the private fish farm Armavir Farmer LLC – the local partner of ASPIRED in this project – on May 6, 2017. The premises of a partner will be used for the construction of a demonstration fish-farm where all modern aquaculture technologies and practices will be piloted at a small scale. The Armavir Farmer LLC submitted a groundwater abstraction water permit application to the MNP, which was rejected by the GOA due to a halt imposed on the issuance of WUPs. After reviewing other options, the ASPIRED team considered using the surface water for the ATTC, since the Armavir Farmer LLC has a valid water use permit for taking water from the source of Sevjur River. The ASPIRED team is waiting for the water quality analysis results that will be used for aquaculture purposes.

The Birthright volunteer, in collaboration with the ASPIRED Project, prepared a study on the production of crayfish with best practices which will provide useful guidance for fish farmers.

Water Regulation and Enforcement

In May 2017, the adoption of the Program of Measures for the effective management of the groundwater resources in the Ararat Valley was an important step towards the conservation and more rational use of the country's groundwater reserves. ASPIRED provided input on the preparation of the Program of Measures through technical expert assistance and data support. Specifically, the project team engaged in the activities of the Interagency Task Force mandated to elaborate the document and present it to the GOA for review and approval.

The Program of Measures refers to USAID's ASPIRED Project in relation to planned institutional reform, namely the enhancement of the SWCIS, update and digitization of the hydrogeological data, 3D modeling of the groundwater basin of Ararat Valley, and assessment of the groundwater reserves of the Ararat Valley and their recharge potential.

The team also followed up with the Report "Achieving Sustainable Groundwater Use in the Ararat Valley – Role of Fisheries." Particularly, the ASPIRED team presented the fee calculation scenarios and recommendations of the Report to the former Deputy Minister of Nature Protection Simon Papyan and ministry staff. Although the ministry team was expected to analyze the information and present their feedback, the ASPIRED team did not receive any comments from the MNP. After the elections, the MNP was undergoing major restructuring of its subdivisions, affecting activities under the ASPIRED Project as well. ASPIRED will resume discussions with the MNP as soon as the organizational changes are completed.

The legal component was also involved in the meetings with the Urban Foundations as part of the newly-awarded PURE project. The discussions of the legal component focused on the complimentary efforts towards improving the legal and regulatory framework of the water sector. The ASPIRED team provided comments and suggestions for aligning the legal task of the PURE project work plan with the objectives of the ASPIRED Project. In June, the ASPIRED team reviewed and provided comments on the Draft Government Decision to amend the Ararat Basin Management Plan with the Ararat Valley groundwater resources management plan developed by the WRMA. The ASPIRED team submitted comments via the www.e-draft.am site, where the draft legal acts are placed for public comments. MNP accepted the comments made by the Project team. Underlines in the screenshot below show that ASPIRED Project's made comments (Column 1) and they are accepted (Column 3.) ASPIRED team made the comments based on the inventory data on the state of groundwater use in Ararat Valley(2016) and recommendations provided in the project reports on improving groundwater management in the Ararat Valley.



Անկիտայնություններում ներառվում են նախագծի վերաբերյալ ներկայացված բոլոր քվեարկության արձագանքությունները, արցանց զրկաները՝ 2 սպիտակաթղթային օրվա, էլ փոստով ուղարկվածները՝ 10 սպիտակաթղթային օրվա ընթացքում

№/№	Առաջարկության նկարագրի, առաջին անհատիկը	Առաջարկության բովանդակության բնույթը	Ընդունված է	Կատարված փոփոխության բնույթը
	1	2	3	4
1	<u>ԱՍՆ ԱԶԳ ԳԱԾՕ ծրագիր</u> 29.05.2017 11:43:55	1. Որոշման նախագծի հավելված 1-ի «Արարատյան դաշտի ստորերկրյա ջրային ռեսուրսները, օգտագործելի, ուսզմակարգման և ազգային ջրային պաշարները» բաժնի 4-րդ և 5-րդ կետերում նշված է, որ 2016թ. դրությամբ ստորերկրյա ջրերի փաստացի օգտագործումը՝ ըստ գրայագրման և հաշվարկման տվյալների, գնահատվել է շուրջ 1670.0 մլն մՅ/տարի: Նույն ծախսը տրված է նաև, իրականացնելու հիմնավորումում: Գնահելված 1-ի արդյունքում 113-ի 5-րդ ստորում (Շնչառիկը ջրապահանջարկը, այն է՝ 2016թ. Արարատյան դաշտի ստորերկրյա ջրային ռեսուրսները փաստացի ջրօգտագործումը ըստ ռզրոնների տրված է 1608.0 մլն մՅ/տարի ծախս: Այդ թիվը վերահսկման կարգի ունի, որի արդյունքում կփոխվի նաև արդյունաճի 7-րդ ստորը՝ Դեֆիցիտը/պահպանումը:	Ընդունված է	Կատարվել է համապատասխան փոփոխություն:
2	<u>ԱՍՆ ԱԶԳ ԳԱԾՕ ծրագիր</u> 29.05.2017 11:43:55	2. Որոշման նախագծի հավելված 1-ի Արդյունք 4-ի 1-ին ստորում և հաջորդող ստորում 2017թ. դրությամբ խմելու-կենցաղային նպատակով ջրային ծախսը ևս վերահսկման կարգի ունի՝ հիմնվելով նախորդ կետով կատարված առաջարկության վրա: Առաջարկվում է հիմնավորել խմելու-կենցաղային նպատակով ջրային կանխատեսված ծախսերը 2017-2021թթ. համար:	Ընդունված է	Կատարվել է համապատասխան փոփոխություն:
3	<u>ԱՍՆ ԱԶԳ ԳԱԾՕ ծրագիր</u> 29.05.2017 11:43:55	3. Առաջարկվում է հավելված 12-ում ներառել նաև «Արարատյան դաշտի ջրային ռեսուրսների արդյունավետ կառավարման միջոցառումների ծրագիրը հաստատելու մասին» հայաստանի հանրապետության վարչապետի 2017թ. մայիսի 6-ի 413-Ն որոշմամբ հաստատված միջոցառումները:	Ընդունված է	Որոշման նախագիծը լրացվել է նոր 17-րդ կետով:

The comments (adopted provided by the ASPIRED to the GOA's decision on amendments to the Ararat Basin management plan underlined red.

Donor Coordination and Communications

During the reporting period, ASPIRED held several coordination meetings with the project partners and stakeholders on different task areas, including the Coca-Cola Hellenic Bottling Company Armenia (CCHBCA), ERGIS NGO, PURE Project, EU Water Initiatives Plus, and government stakeholders.

The ASPIRED team worked closely with the CCHBCA and UNDP GEF Small Grants Program on the completion of the Hayanist project and organization of the project's opening ceremony on May 22, 2017. The ASPIRED team acted as the lead in coordinating the event with the project partners, USAID and the community.

The May 23 celebration event involved a fishery visit to observe the newly constructed pumping station. Event participants also observed the new irrigation system in practice and met with farmers who gained a chance to return their farmlands to cultivation after many years of abandonment. US Ambassador to Armenia Richard Mills, the CCHBCA General Manager Christoph Speck, UNDP Deputy Resident Representative Dmitry Mariyasin and Ararat Governor Aramays Grigoryan provided welcoming remarks during the official ceremony at the village school. Event participants included UNDP Mission Director Deborah Grieser, Deputy Minister of Nature Protection Simon Papyan, other representatives of the MNP and MoA, Hayanist



Farmer Hakob Konjaryan shows his apricot orchard to the main donors of the Hayanist water reuse project. Right to left: Richard Mills, US Ambassador to Armenia, Christoph Speck, CCHBA General Manager, Hakob Konjaryan, a farmer from Hayanist and Magda Avetisyan, ASPIRED Chief of Party.

community members, mayors of neighboring communities and approximately 50 mass media representatives. Broadcast and electronic media outlets covered the event – the media coverage of the event is publically available via the links provided below¹⁴.

Following USAID approval of the Pure Project, ASPIRED team arranged a number of coordination meetings with representatives from the Urban Institute. Both teams discussed their joint plans for the coming year and agreed

to coordinate efforts in the legal/regulatory field, selection and design of pilot projects for ASPIRED implementation, and the implementation of public awareness activities. During the reporting period, the collaboration between the ASPIRED and Urban Institute teams included the following activities:

¹⁴ www.goo.gl/wXcJTd; <http://yerkirmidia.am/social/hayanist-vorogum/>; <https://armeniatv.am/hy/62065-62065>; www.goo.gl/D6SbvU; www.goo.gl/fflR2H; <http://www.panarmenian.net/arm/photoset/all/10910>; <http://www.globnews.am/?p=5043&l=am> ; <https://news.am/arm/news/391519.html>; <http://www.tert.am/am/news/2017/05/23/Hayanist/2380619> ;

- ASPIRED shared its data and documents, particularly the legal gap analysis report prepared during the CEW Program, with the PURE team as a source of information during their legal studies and work planning.
- The project team participated in the discussions with the representatives of the Environmental Law Research Center – the partner of the Urban Institute in the implementation of PURE project – on legal sector issues related to the PURE project.
- ASPIRED participated in the PURE project’s partners meeting and work plan presentation to USAID.
- The ASPIRED team reviewed and provided comments on the household survey conducted by PURE in the communities of Ararat and Armavir marzes and was interviewed in the key informant interview process.

During the reporting period, the team also performed other communication tasks, namely:

- Designing and featuring a new pilot projects page on the ASPIRED Project [website](#)
- Posting project updates to the ASPIRED Project web site and Facebook page
- Preparing press releases, media invitations, and a story board for the event in Hayanist
- Participating in the community meetings and site visits
- Preparing outreach materials to highlight project-related activities

4. General Administrative Issues

The Administrative department deals with tasks related to routine program management, administration, and procurement.

Following USAID approval of the project in Sipanik village, the ASPIRED team announced the request for submission of quotations for implementation of the well decommissioning project in Sipanik. Based on the tender results, the ASPIRED selected and signed a contract with the local company, VALML LLC.

ASPIRED signed a service agreement with the Environmental Impact Monitoring Center of the MNP for sampling and analysis of the water quality at the outlet of Samvel Lablajyan’s fish farm.

5. Environmental Compliance

During the reporting period, the ASPIRED team prepared the environmental review documentation, including the checklist and Environmental Mitigation and Management Plan (EMMP) for a demonstration project on the decommissioning of a groundwater well in Sipanik community. After the project launch, the ASPIRED team conducted an environmental compliance and safety training for representatives of the VALML Company, ASPIRED’s local subcontractor for the well decommissioning project in Sipanik. The ASPIRED Environmental Specialist presented the environmental and social mitigation and prevention measures, as stated in the Environmental Mitigation and Monitoring Plan (EMMP), as well as requirements of the RA legislation on environmental compliance and safety (Order of the Minister of Urban Development on Construction Norms, adopted in January 2008) to the five members who will be working on the well decommissioning project under VALM Company.

As a follow-up, the Environmental Specialist visited Sipanik village to check safety and environmental compliance of the groundwater well decommissioning works. The Environmental Specialist observed that the construction site was properly delineated, compacted, and graded. The subcontractor arranged a platform for the machinery to prevent soil erosion and contamination, as well as laid a temporary pipe to channel water to the drainage system. The subcontractor made sure to observe existing construction and safety norms. ASPIRED will continue conducting regular monitoring visits to the Sipanik well decommissioning site during the next project quarter.

At the beginning of the irrigation season in April, ASPIRED checked the quality of discharge waters from the fish farm provided for the irrigation needs of Hayanist village to ensure that the project complies with the requirements of the EMMP. A specialist from the MNP's Environmental Impact Monitoring Center collected water samples at the outlet of the Lablajyan fish farm.

These water samples were analyzed against 38 parameters, including main physical and chemical parameters and heavy metals. Water test results showed that concentrations of macro and microelements, trace elements and heavy metals, dissolved oxygen and pH levels are within the range defined by the FAO to be suitable for irrigation. Only concentrations of total nitrogen and potassium are slightly high. However, these high concentrations can be adjusted by reducing the application of fertilizers, as discussed during the March training program conducted by ERGIS NGO for approximately 28 farmers from the Hayanist community.

In May, the ASPIRED Engineer and Environmental Specialist explored all water sources for establishing the ATTC, since the Armavir Farmer Company's request to have its permit renewed for abstracting water from its groundwater well was rejected by the WRMA. One of the alternative sources of water that ASPIRED looked into was an intake of a pumping station on the Sevjur River fed by the natural springs. The pump station belongs to the Armavir farmer, who holds a permit for using about 230 liters/second from the Sevjur River. The ASPIRED will check suitability of the water for the ATTC during the next month, after the Armavir farmer cleans the site. The Project will contract the MNP's Environmental Monitoring and Information Center SNCO for sampling and analysis. Prior to the start of activities related to establishing the ATTC, ASPIRED Project's Environmental Specialist will provide a training program to the ATTC Project implementing partners and subcontractors on environmental and social safety, focusing on implementation of mitigation measures as defined in the EMMP.

6. Existing Problems or Issues

- ASPIRED delayed the announcement of a public tender for procurement and installation of the automated online groundwater use monitoring system in the selected large fisheries. Although the announcement was initially planned for February 2017, the delays are due to the GOA's plans to shift the USAID's assistance towards small fisheries. USAID and the ASPIRED team strongly support the installation of the monitoring systems in the large fisheries, which are using the major share of the groundwater.

Prior to initiating the process for procuring and installing the online monitoring system on 20 groundwater abstraction points in the selected small-size fisheries (with groundwater use

below 100 liters per second), USAID and the ASPIRED Project will observe the progress and results of the installation and operation of the monitoring system by large- and medium-size fisheries and/or the GOA by September 2017,.

This agreement was reached between the MNP and USAID in April 2017.

- During the reporting period, the ASPIRED Project sent a written notice to the MNP to nominate the representatives of various divisions of the WRMA into the technical working group. Inclusion of these representatives into the working group would ensure a more consistent and formalized collaboration between the ASPIRED Project and WRMA staff. The Project intended to assess the capacities of the nominees for designing and delivering training programs on data organization and management, data analyses, using an on-the-job training approach. As of the end of the reporting period, the MNP has not responded to ASPIRED's written notice, possibly due to the political and structural changes taking place within the MNP. As a result, ASPIRED is experiencing slight delays in delivering the training programs as outlined in the Year 2 Work Plan.

7. Planned Activities for the Next Quarter

7.1 Data

- After having reached an agreement between USAID and the GOA on USAID's support towards the installation of automated groundwater use monitoring systems in the selected fish farms, the ASPIRED team will follow up with the WRMA on finalizing the selection of the fish farms where the monitoring system will be installed.
- The ASPIRED Project will continue assisting WRMA in improving the SWCIS based on the action plan prepared by the ASPIRED Short-Term Database Programmer. The project team will continue its collaboration with the WRMA on finalizing the WUP's database by creating an interface for reports templates. The project team will continue holding weekly meetings to this end. When the enhanced WUP database is complete, the Project will present the database to the MNP.
- The Project will finalize the field survey (groundtruthing) of the conflict points identified as the result of the unsupervised classification of satellite imagery for land use/cover classification in the Ararat Valley.
- The DSS programmer, in cooperation with ASPIRED team, will calibrate the Hydrological Model of the DSS for the Akhuryan, Metsamor, Hrazdan, Vedi and Azat river basins, focusing on the water balance component.
- The training program, using the "learning-by-doing" approach, will be designed and implemented, based on the needs of technical representatives of the WRMA and ArmStateHydromet Service.
- The ASPIRED Project will work with the USGS on the design of the on-line workshop on the hydrologic framework. The USGS South Dakota team will facilitate the workshop on August 29 and 30, 2017. ASPIRED will review the draft Hydrogeological Framework

report and GIS files, as well as finalize the workshop agenda based on the ASPIRED team's questions to be addressed during the workshop. The ASPIRED team will also work with the USGS on the list of the stakeholder participants, venue, and other workshop-related logistics.

- The Project Hydrologist will continue the second round of testing for RockWorks open source model for groundwater modeling, using data from the 2016 inventory. ASPIRED will compare the results obtained from creating the 2- and 3- dimensional models of the Ararat Valley with the hydrogeological framework prepared by USGS.
- The Project's Short-Term Hydrogeologist will finalize the digital hydrogeological map of the Ararat Valley, based on the project team's comments on draft map. The Project will add these digital datasets to the generic Geodatabase of the Ararat Valley, as well as use them for groundwater modeling and the development of the Ararat Valley Atlas.

6.2 Pilot technologies

- Completion of the pilot project in Sipanik.
- Inception of the ATTC Project (based on the results of the water analysis).
- Preparation of the tender documents for ATTC Project implementation (subject to USAID approval).
- Drafting of the concept paper for the water reuse project in Sayat-Nova community.
- Drafting of the well optimization project in Hovtashat village.
- Reinforcement of the drainage channel bank for protection and environmental sustainability of the irrigation system.

6.3. Legal and Policy Issues

- To review and provide recommendations on the Report on Quantitative and Qualitative Studies on Water Utilization in Ararat Valley developed by the PURE project.
- To meet with MNP to discuss priority legal issues that can be covered with PURE project assistance.
- To follow up on the Report "Achieving Sustainable Groundwater Water Use in the Ararat Valley: Role of the Fisheries Sector."

6.4 Performance Management, Communication and Donor Coordination

- To prepare the component work plan for Year 3.
- To follow up on the development of collaboration with PURE and other partners of the Project.
- Collaborate with CCHBCA on the human interest stories covering the impact of the

irrigation system improvement in Hayanist.

- Prepare outreach materials, including USAID highlights, and manage the ASPIRED web site and Facebook pages.
- Follow-up on the PMP updates and prepare weekly highlights, monthly reports and quarterly reports.

6.5 Environmental Compliance

- Testing of water samples from the ATTC to check the quality of the surface water from Sevjur river in terms of its suitability for aquaculture.
- Testing of the produce from Hayanist village.

6.6 Project Management

- Preparation of the ASPIRED Project Work Plan for Year 3.
- Budget management and administration of tenders for approved projects.
- Handling of contractual procedures with the short-term technical assistance (STTA) consultants.
- Recruitment for the replacement of the Deputy Finance and Administration Director during her maternity leave.