

Middle East Multilaterals
 MERIMIS Annual Report FY17
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Irrigation Management Information System (IMIS). IMIS is a multilateral coalition with the US, Israel, Jordan, and Palestinian territories, funded by the U.S. Department of State, and developed and managed by the ARS-OIRP, in support of peaceful interactions in the region. IMIS improves water management in the Middle East by developing a regional database system for dissemination of agro-meteorological information for scheduling irrigation and other crop management decisions to increase irrigation efficiency in the region. The program also installed automated weather stations, and lysimeters to develop and improve water management models and irrigation scheduling practices at both the field and watershed scale in the Middle East and the United States. The program also helped to apply the irrigation scheduling methodology in farmers' fields through interaction with farmers, farm advisors and extension personnel to promote the implementation of the IMIS system to ensure wide acceptance and sustainability.

In 2016 and planned for 2018, STATE supported ARS in the organization of two workshops to identify research gaps that existed in addressing emerging and priority animal diseases (foot and mouth disease, brucellosis, avian influenza, rabies and MERS).

POC:

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Background:

Competing demands for scarce water resources have become one of the key issues in sustaining agriculture and creating opportunities for peace in the Middle East. Population pressures and diminishing water supplies, combined with water quality problems are some of the challenges that Middle Eastern countries are encountering. Major emphasis is currently being placed on desalinization and water reuse or recycling to meet the immediate water resource needs of agricultural, industrial and urban users. However, these technologies require large investments in research, construction, and operation and maintenance costs. At the same time, minimal funding is being provided for the development and implementation of information-intensive water conservation and irrigation scheduling techniques that already have a proven potential for considerable water saving with a relatively small marginal investment. As such, this course of action is imperative. Success in implementing these technologies, however, is highly dependent on providing site-specific research, technology transfer and water conservation information directly to growers. Thus, and through an Interagency Acquisition Agreement (IAA) between ARS and the U.S. Department of State, Bureau of Near Eastern Affairs, ARS developed and managed the Middle East Irrigation Management Information System (IMIS) project for Efficient Water Use in the Middle East. The IMIS cooperators conduct research and study improved

water management techniques including determination of crop water requirements, irrigation scheduling, and micro-irrigation systems operation in order to attain irrigation efficiency in the Palestinian Authority, Israel, Jordan and the United States.

Project's Overall Objective:

Improve water management in the Middle East by developing a regional database system for dissemination of agro-meteorological information, providing data for scheduling irrigation and other crop management decisions to increase irrigation efficiency in the region.

Project's specific objectives:

- Improve water management in the Middle East by developing a regional database system for dissemination of agro-meteorological information, providing data for scheduling irrigation and other crop management decisions to increase irrigation efficiency in the region
- Install automated weather stations and lysimeters to develop and improve water management models and irrigation scheduling practices at both the field and watershed scale in the Middle East.
- Apply irrigation scheduling methodology on farmers' fields; and through interaction with farmers, farm advisors and extension personnel, promote the implementation of the IMIS system to ensure wide acceptance and sustainability.
- (Animal Health) identify high level research priorities that, if implemented, will provide scientific information that will benefit the health of animals and people

Reporting Period Activities:

Applied Research

1. **Meteorological Stations:** Project funds were appropriated to provide support for Field Visits, Maintenance, Continuing Data Accumulation, at the IMIS weather station sites in Tulkarem, Nablus, Bardala, and Al-Arub.
2. **Website Maintenance:** Updates and design changes to the IMIS website: *Irrigation Management Information System (IMIS)*.
3. **Research Project:** "correction of nutrient deficiencies in traditional rain fed olive orchards", ARO-Israel
Project in Phase III and being funded for 8 year in a row
Research Objectives:
 - a. To assess the nutritional status of traditional olive orchards in the Middle East region
 - b. To assess fertilization regimes designed to correct identified nutritional deficits
 - c. To develop and disseminate protocols for proper nutritional management in the region's orchards

Technical Trainings

1. **Workshop: Precision Agriculture**
Venue: Dead Sea Marriott, Jordan Valley
December 4-7, 2016

Impacts of climate change are well understood in the Middle East, which is reported by FAO to be a critical zone for available water supply even without declining precipitation totals predicted by global circulation models. All project efforts in the tri-lateral project are aimed at efficient and effective water use in agricultural production, which extends the land area that can be irrigated with a specific quantity and quality of water (or maintains the land area irrigated in the face of declining water supply), improves the quality and quantity of fruit, nut and vegetable production, and allows the use of brackish waters or treated waste waters, further extending the usefulness of available water supplies, and optimizing the utilization of plant nutrients contained in recycled waters. This year, project personnel organized and delivered a technical training on “Precision Agriculture” to participants of the Israeli and PA Ministries of Water and participants from NCARE, Jordan University of Science and Technology and Ministry of Water and Irrigation in Jordan providing scale-appropriate precision agriculture tools and a practical step towards training farmers and agricultural professionals in precision farming applications, tools and techniques. The workshop program included presentations by participants on their precision agriculture practices, problems and needs, expert lectures on several elements of precision agriculture (fertility, pest, disease, water quality, soil and plant water status sensing, remediation and control).

2. Workshop: Treated Waste Water Community Outreach #1

Venue: ARO Gilat Research Center, Israel

Workshop on hold due to regional volatility

A professional training program, for both skilled extension agronomists and skilled researchers, will be conducted. The goal is to build their capacity and to improve their technical experience in several aspects, i.e. field management, fresh produce processing and quality, and to develop specific competencies in every step of the targeted commodities of Fresh Fruits production, in order to enhance the productivity and increase the quality of production by using the advance technology for irrigation and best agricultural practices. The training will be provided for 25 - 30 skilled agronomists and skilled researchers to strengthen their capacities and practical experience. These agronomists and researchers will have a good practical background in farming applications, but additional knowledge is required and should include a series of advanced theoretical and practical training courses. Participants attendance will carry an obligatory requirement of conducting their own similar training at a grass roots level for applicable end users in their region/tribe/community The overall objectives of the training are:

- a. Strengthening their capacities and practical experience, and
- b. Exposing them to innovative techniques and knowledge and awareness regarding SMART Irrigation practices and NEW technology and water management inside Israel.
- c. Explaining new trends and methods for water management methods

3. Workshop: Treated Waste Water Community Outreach #2

Venue: TBD NCARE Facility in Amman, Jordan

Workshop on hold due to regional volatility and successful completion of first training in Israel

4. Workshop: Animal Health

Venue: Dead Sea Marriott, Jordan Valley

Workshop on hold due to regional volatility

The purpose of this workshop is to identify strategic research initiatives that will enable the development of scientific information and veterinary medical countermeasures to protect animals and

people. The intent is to identify gaps in knowledge associated with priority emerging and re-emerging diseases that pose a threat to animal agriculture, food security, and public health.

Emphasis was given to zoonotic diseases but diseases that impact food security and therefore the livelihood, nutrition, and health of people of the Middle East Region was included. The goal of the workshop is to identify high level research priorities that, if implemented, will provide scientific information that will benefit the health of animals and people. This information captured in the report will be used to identify strategic areas of research for maintaining a healthy and safe food supply for the agricultural communities and consumers of agricultural products in the Middle East Region.

Disease topics of focus this year are as follows: Avian Influenza, Foot&Mouth Disease, NewCastle, Peste de Petite Ruminants (PPR), Blue Tongue, Rift Valley Fever.

Participant Data Table Summary:

| Program | Activity | Men | Women | Israeli | Pals. | Jordan | Other | Total |
|-----------------------|---|-----------|-----------|-----------|-----------|-----------|----------|-----------|
| 1. Applied Research | Weather Station Maintenance and Data Accumulation: Israel | 2 | | 2 | | | | 2 |
| 2. Applied Research | Weather Station Maintenance and Data Accumulation: Palestinian Authority | 1 | | | 1 | | | 1 |
| 3. Applied Research | Weather Station Maintenance and Data Accumulation: Jordan | 2 | | | | 2 | | 2 |
| 4. Applied Research | Study: "correction of nutrient deficiencies in traditional rain fed olive orchards": ARO-Israel | 1 | 1 | 2 | | | | 2 |
| 5. Technical Training | Precision Agriculture | 20 | 12 | 12 | 12 | 8 | 3 | 32 |
| Actual Totals | | 26 | 13 | 16 | 13 | 10 | 3 | 32 |
| 6. Technical Training | Treated Waste Water Community Outreach #1, Israel | 25 | 20 | 8 | 30 | 5 | 2 | 45 |
| 7. Technical Training | Treated Waste Water Community Outreach #2, Jordan | 25 | 20 | 8 | 30 | 5 | 2 | 45 |

| | | | | | | | | |
|-----------------------------|--------------------------|----|----|---|---|---|----|----|
| 8. Animal Health Conference | Animal Health Conference | 25 | 27 | 8 | 8 | 8 | 28 | 52 |
|-----------------------------|--------------------------|----|----|---|---|---|----|----|

Due to the closure of the Israeli Embassy in Jordan and US announcement to move its Israeli Embassy to Jerusalem, the following activities were postponed due to regional conflict and their rescheduling remains TBD until travel authorization can be obtained for USG personnel and regional participants are able to travel within the Levant. Participant numbers are estimates based off pre-cancelling event registration and are subject to change

| IMIS FY17 Participant Data Total | | | | | | | |
|---|------------|--------------|----------------|--------------|---------------|--------------|--------------|
| | Men | Women | Israeli | Pals. | Jordan | Other | Total |
| Actual | 26 | 13 | 16 | 13 | 10 | 3 | 39 |
| Estimate including rescheduled events | 75 | 67 | 24 | 68 | 18 | 32 | 142 |
| Projected Totals | 101 | 80 | 40 | 81 | 28 | 35 | 181 |

Future Activities:

We propose 3 training courses (3-4 days each) for Palestinian and Jordanian participants (agronomists from NGO's, universities and the private sector). In the courses, the leading researchers from ARO and ARS will share knowledge with the participants on their area of expertise. The training courses will include frontal lectures as well as practical work in ARO labs.

The suggested topics are:

1. Postharvest A large proportion of agricultural products is lost in the way to the consumer. Furthermore, exported crops demand maintenance of high quality under storage conditions during the time taken between harvest and arrival to target markets. In this course, researchers from the Institute of Postharvest and Food Sciences will cover a wide range of topics in order to introduce and explain state of the art technology for the preservation of fruits vegetables and herbs.
2. Plant protection Modern, intensive agriculture faces a wide range of plant protection issues and sources including viruses, other diseases, pests and weeds. The researchers from the Institute of Plant Protection will present up-to-date information on the issues relevant to plant protection in our region. The course will cover both biology and methods for control.
3. Using low quality water (recycled and brackish) for irrigation Irrigation is the main tool to increase production while shifting from traditional rain fed to modern agriculture in the Middle East. However, water scarcity makes utilization of low quality water (recycled and brackish water) necessary. Israel in general, and the ARO specifically, is among the world's leaders regarding use of marginal quality water for irrigation and consideration of minimizing the damage to crops, the environment or consumers. In this course, researchers from the Institute of Soil Water and Environmental Sciences will share their knowledge regarding the nature of low quality water, its effects on crops, soils and the environment, and strategies for profitable, safe and sustainable use.