



Water and Livelihoods Initiative (WLI)

First Quarter Report (January -March 2012)

Acronyms

AUB: American University of Beirut, Lebanon

CLP: Community Livelihood Project

CODIS: Communication, Documentation, Information Services

CU: Columbia University

DTM: Digital Terrain Model

FTF: Feed the Future

GCC: Global Climate Change

GCSAR: General Commission for Scientific Agricultural Research

GIS: Geographic Information System

ICARDA: International Center for Agricultural Research in the Dry Areas

IFAD: International Fund for Agricultural Development

IDW: Inverse Distance Weighted

JCB: Joseph Cyril Bamford

IWLMP: Integrated Water and Land Management Program

IWMI: International Water Management Institute

LARI: Lebanese Agricultural Research Institute

MENA: Middle East and North Africa

MEPI: Middle East Partnership Initiative

NARS: National Agricultural Research Systems

NPK: Nitrogen, Phosphorus, Potassium

SWAT: Soil and Water Assessment Tool

TS: Technical Support

TSS: Total Suspended Sediment

UC-D: University of California–Davis, USA

UC-R: University of California-Riverside

UF: University of Florida, USA

UI-UC: University of Illinois at Urbana-Champaign, USA

UJ: University of Jordan

USAID: United States Agency for International Development

USDA-ARS: United States Department of Agriculture –Agricultural Research Service

USDA-FAS: United States Department of Agriculture/Foreign Agricultural Services

USU: Utah State University, USA

WANA: West Asia and North Africa

WLI: Water and Livelihoods Initiative

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Executive Summary

The WLI partners implemented planned activities for the quarter as agreed during WLI's Third Regional Coordination Meeting in December 2011. The teams made substantial progress in executing planned activities both under the socio-economic and bio-physical components. Activities under the bio-physical component focused on data collection for modeling purposes in Egypt and Jordan; on-site experiments to improve water productivity in Lebanon, Egypt and Iraq; introduction of new varieties of wheat and barley in Palestine, and cactus and grapes in Lebanon; and development of water harvesting and land rehabilitation demonstration sites in Jordan and Palestine. The bio-physical teams in Egypt also conducted a survey to understand the causes of soil degradation.

Activities under the socio-economic component mainly related to completing household surveys and digitalizing collected data. The teams in Iraq also conducted a comparative study on yield, income and water productivity of vegetables grown under greenhouse and conventional agricultural practices.

The quarter also marked the beginning of research by an additional four graduate Syrian students who will be working under the Student Exchange Program on topics that are relevant to the WLI under the Student Exchange Program. In addition to working with their respective supervisors from Aleppo University, the students will also benefit from the expertise of ICARDA scientists who will serve as co-advisors for the duration of the research.

Major challenges in the reporting period relate to security conditions in the region, particularly in Syria and Yemen where planned activities were not executed as planned due to security concerns in and around the benchmark sites in these countries.

Activities at the Benchmark Sites

Egypt

Bio-physical component: During the reporting period, the team focused on two major activities including:

(a) Modeling water productivity and irrigation sustainability: Following the modeling site selection in 2011, the team collected considerable data on discharge of surface canals (four different locations), water quality samples, pump operating time for the winter season, and recorded groundwater levels and temperatures from four groundwater observation wells (Figures 1 and 2). Please refer to Figure 3 for measurement locations and the main irrigation/drainage streams. The team also surveyed and established a cropping pattern on the tertiary level for each canal and irrigation outlet (Figure 4).

Figure 1: Groundwater fluctuation during the period Nov 3, 2011 to Feb 21, 2012

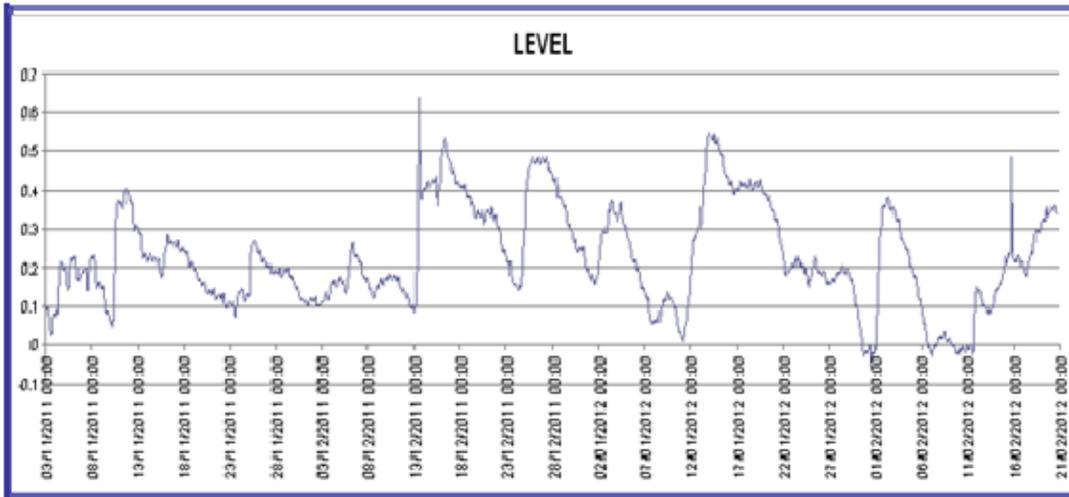


Figure 2: Groundwater temperature records for the period Nov 3, 2011 to Feb 21, 2012

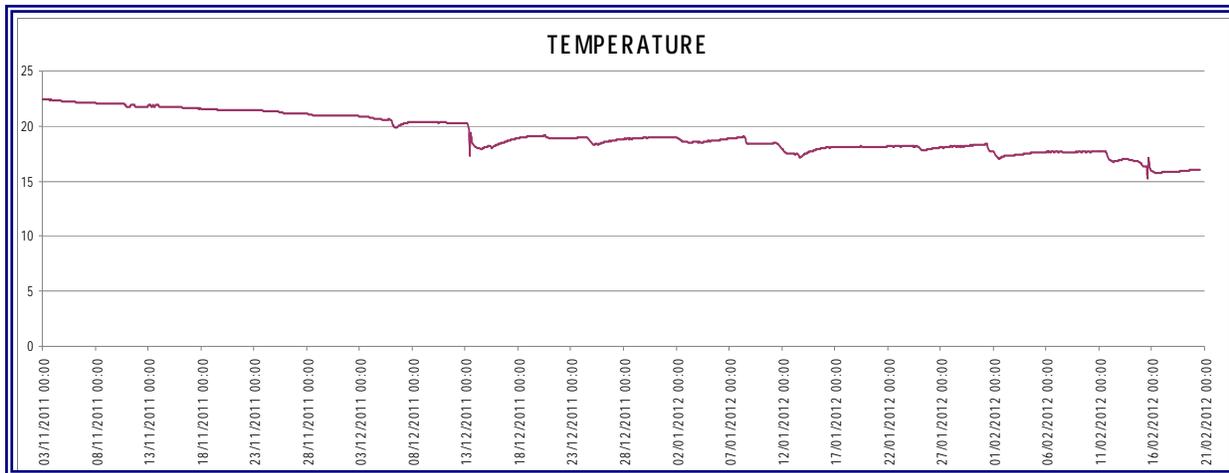


Figure 3: Measurement locations and the main irrigation/drainage streams

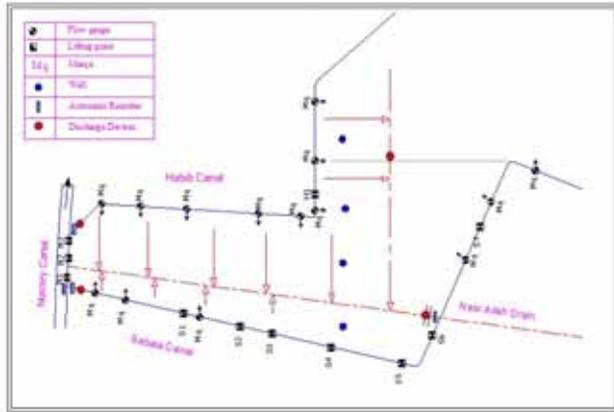
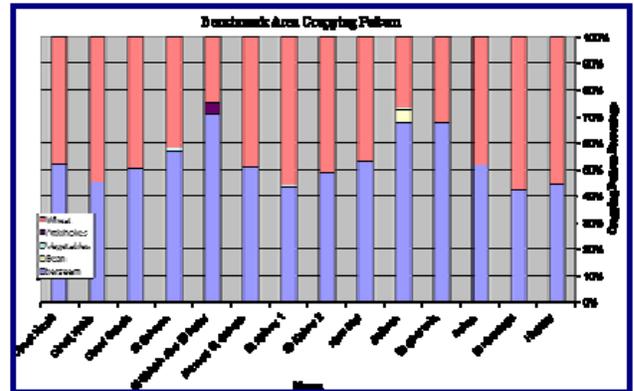
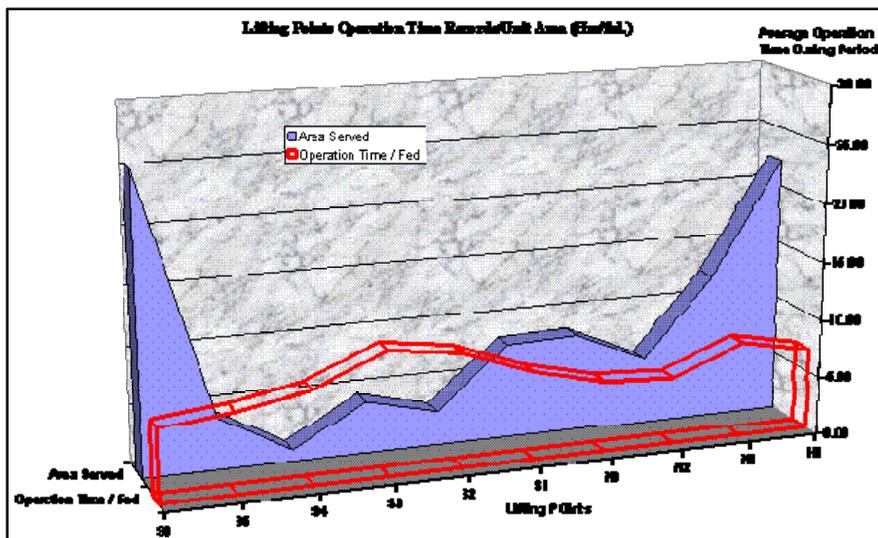


Figure 4: Winter Cropping pattern for the Benchmark area (dominant crops are wheat and berseem)



In addition, the team measured the discharge records to determine the effect of water-saving practices such as the raised-bed and leveling techniques on the sustainability of the irrigation system. The data collected was supplemented with information on water temperatures and pump operation times collected through thermo recording devices. Linking the pump operation time with the area served by each lifting point (Masqua), revealed that fragmentation of agricultural areas reduces water efficiency (Figure 5). The team found that smaller served areas tend to have longer irrigation time, reduced water productivity, and high financial cost.

Figure 5: Pump operation time versus area served for all irrigation lifting points (winter season 2011-2012)



b) Soil degradation assessment: The team designed a questionnaire to investigate the source of soil compaction due to agricultural practice, and to assess farmers' perception of the effect of soil compaction on water management and agricultural productivity. The questionnaire was based on the framework of analysis developed in the last quarter. The survey was pre-tested, modified and was launched at the end of January 2012. The data collected will be analyzed using GIS software and will be used to develop integrated sustainability index of water and soil management for irrigated agriculture. To date, the team has established the main geo-database, and nine paper maps which were scanned and corrected to develop various layers of irrigation network, field zones (collection of fields irrigated with the same marwa), and buildings. The team hopes to develop additional layers in the coming quarter.

Socio-economic component: In the first quarter of the year, the team completed the household survey and is now in the process of cleaning and digitalizing the data collected. The team also identified the data needed for calculating selected FTF development indicators, modified the FTF Framework, determined the most suitable method for collecting the data required, and designed a checklist to conduct participatory group discussions with policy makers and main stakeholders in the three benchmark sites.

Iraq

Bio-physical component: During the reporting period the team continued the process of transferring bio-physical data they collected into digital maps, and studying the effect of deficit irrigation on wheat and water productivity. Field trials were conducted to assess the total amount of irrigation water used, total yield, and water productivity by altering the last days of irrigation. The team also began a study on the effect of surface and sub-surface drip irrigation on enhancing crop production and improving water productivity. Moreover, field experiments were carried out in Abu-Gharib area to compare three methods of irrigation to cultivate eggplants and peppers - namely flooding, surface drip irrigation and sub-surface drip irrigation. The team will continue to explore ways of improving the productivity of eggplants, cucumbers, and melons using the greenhouse technique. In addition, the team is seeking to find the best combination of fertilizer and amino acid to increase water productivity and yield, by applying two different combinations of nitrogen, phosphorus and potassium (NPK) and combining them with various levels of Arginine, Proline, and Tyrosine amino acids (0, 100, 200 ppm).

Socio-economic component: In this reporting period the team expanded the comparative study they began in the last quarter and surveyed an additional 200 randomly selected farmers who use greenhouse technology to cultivate their vegetables. The result was compared with the yield, income generated and water productivity for vegetables cultivated under traditional farming practices. Efforts to digitalize collected socio-economic data and link it with existing GIS database for the area is also underway.

Jordan

Bio-physical component: Activities in the quarter mainly focused on collecting and analyzing data from intervention and non-intervention sites to be used for SWAT modeling. The team analyzed soil samples for organic matter, EC, Exchange P, total N, pH, soil bulk density, texture, stone content, etc. Other parameters needed for the SWAT model including field capacity, wilting point and hydraulic conductivity were derived using the peddo transfer function (soil estimate parameters software). Still others such as erodibility factor, albedo and hydro soil group were estimated from existing tables. The team also installed devices for measuring water flow and water level at the beginning of the winter season at both sites. Data on runoff and sediments on geo-textile were collected after each significant rainfall and were analyzed at the soil and water laboratory of NCARE for Total Suspended Sediment (TSS) and Nitrogen, Phosphorus, and Potassium (NPK). The team also collected data on rainfall and moisture measurements for both sites.



The Marrab in Majidiah benchmark site planted with five varieties of Barley.

As a follow up to the dissemination efforts that began in the last quarter, the team continued to monitor the height, number of shoots, soil moisture, survival rate, etc. of the five varieties of barley and Attriplex planted in the Marrab.

Socio-economic component: In this quarter the team further developed and re-submitted a proposal to the Middle East Partnership Initiative (MEPI) based on feedback received from USAID. The proposal seeks funding to support the Majidya and Muharib Women Cooperatives located in the WLI benchmark site through peer training by the Ngera Women's cooperative which is relatively more developed.

Lebanon

Bio-physical component: during the reporting period, the team focused on four activities namely:

- (a) Promoting conservation agriculture through zero-tillage: the team identified two volunteer farmers to demonstrate zero-tillage conservation agricultural practice by dividing the land into two and planting corn the conventional way on one part of the field and using zero tillage on the other.
- (b) Introducing new drought-resistant cactus and seedless grapes: the team identified a new drought-tolerant variety of cactus (*Opuntia-ficus-indica*) and grapes (PGRS –seedless from Italian origin) that can be promoted in the arid and semi-arid areas of the northern Bekaa plain. The cactus will serve multiple purposes including fruits for human consumption, fodder for animals, and material to construct fences around small garden plots. As regards to the grapes, the team completed the site selection process and conducted the necessary soil analysis in the first two months of the year.
- (c) Promoting yield and water use efficiency, as well as integrated pest management for drip irrigated eggplants in the El Qaa region: towards this end, the LARI plant protection team made successive visits to the region to observe and meet with farmers, and to identify the main strategic crops to examine for emerging diseases and pests. They identified peach, nectarine and table grape orchards as the main strategic crops followed by stone fruit species and newly introduced pome fruits.
The team also had extensive discussions with farmers on phytosanitary problems in their orchards and advised them to adopt an Integrated Pest Management (IPM) system that is appropriate for each crop. The general impression of the team is that the peach orchards in Qaa are relatively less infected than other commercial peach and nectarine orchards in central and/or west Bekka. The team hopes to make periodic visits to the area and develop GIS maps for particular diseases and pests.
- (d) GIS and modeling: during the reporting period, the GIS team prepared a crop parcel map, began to develop land cover/land use map for the benchmark area and the watershed, and started the ground work to evaluate the effects of continued urban expansion over agricultural lands.

Socio-economic component: the team completed entering the household socio-economic data collected in previous quarters and is awaiting Dr. Samia Akroush's guidance to analyze the data. Dr. Samia is expected to visit LARI at the end of April.

Palestine

Bio-physical component: During the reporting period, the team selected four sites in Annab (Hebron) and Atuf (Tammun) to introduce water use efficiency techniques and drought resistant barley and wheat cultivars provided by ICARDA. In the first phase of the intervention, the team along with experts from the Ministry of Agriculture identified and visited the sites that are suitable to demonstrate rehabilitation of agricultural lands in the area. JCB machineries were used to clear the rocks from the surface and facilitate the construction of protected ponds which will, at a later stage, be populated with drought resistant trees. The team also constructed retaining walls to build up the ponds and protect the soil at both sites. In addition, the team built fences and cultivated olive, almond, and other seedlings in the upper, middle, and around the Annab pilot site. Additional demonstration sites were also identified in Annab and Atuf to introduce drought tolerant barley and wheat cultivars. The sites were planted with both local and improved wheat and barley varieties in order to assess their yield potential and survival rate under severe drought conditions.



Socio-economic component: The quarter was mainly devoted to completing the ground work for major activities planned under the bio-physical component. The team will use the rest of the year to build the capacity of the community based on needs identified through the socio-economic survey conducted in 2011.

Syria

Bio-physical component: during the reporting period the team continued their efforts to digitalize pertinent maps for the benchmark area. Field activities were postponed due to security concerns in and around the benchmark site.

Socio-economic component: The team was not able to conduct the socio-economic survey as planned due to security concerns in the area, and hence resorted to collecting and analyzing secondary data obtained from public offices in the Al Gharb area.

Yemen

Poor security conditions in and around the benchmark area continue to hamper the effective implementation of planned activities in Yemen. Nonetheless, the WLI team has managed to undertake some activities in the reporting period.

Bio-physical component: the team mainly focused on reviewing previous study on main crops grown in the area and collecting data on their growing requirements. The data collected will be used to develop land suitability maps for the main crops in the Abyan Delta.

Socio-economic component: In this reporting period, the team made preliminary assessment of water productivity on livelihoods based on data collected from 15 households. The data collected include irrigation water sources, water conveyance and application, yield, marketing, water pumping costs, etc. The team also surveyed 30 households in the benchmark area and made a brief assessment of indigenous knowledge and social norms that are commonly used to manage natural resources in the area.

Training

Lebanon: A team of experts from the Lebanese Agricultural Research Institute (LARI) gave a one-day training on conservation agriculture to 38 farmers from the El Qaa benchmark site. The training also included a detailed presentation of the WLI. The training and ensuing discussions resulted in the selection of two different sites to use as demonstration plots for successful conservation agricultural practices. The training was held at the El Qaa Public Library.



Student Exchange Program

As part of the efforts to build the capacity of young researchers within the region, a number of students were involved in conducting research at WLI benchmark sites.

Syria

Waseem Adleh (PhD student) has now completed his research on “The effect of mineral and organic N (green manure) on some physical and chemical properties of soil, on yield, and quality of cotton (SN 124) under Al-Ghab valley conditions”. Waseem was supervised by Dr. Abdulkhali Khorshied from Aleppo University and Dr. Awadis Arslan from the General Commission for Scientific Agricultural Research (GCSAR). Waseem is expected to defend his dissertation during the second quarter of the year.

Tammam Yaghi and Ammar Abas completed their registration for a PhD degree at the Faculty of Agriculture in Aleppo. Tammam’s research will focus on “Water accounting of the area between the Lebanese border and Al Rastan dam” and he will work under the supervision of Prof. Abdul Naser Darer from Aleppo University and Dr. Vinay Nangia from ICARDA. Ammar will study “Water accounting of the area between Al Rastan dam and the Turkish border” under the supervision of Prof. Jamil Abas from Aleppo University and Dr. Theib Oweis from ICARDA.

Mohamed Shibli and Dareen Assad also began their research during this time, by preparing their respective fields for experiments. Mohamed will be working towards a PhD and will study “The effect of regular and irregular deficit irrigation on growth, and yield of soya bean using drip irrigation” at the Serbaya station under the supervision of Dr. Marwan Al Haj Hasan from Aleppo University and Dr. Vinay Nangia from ICARDA. Dareen will be working towards a Master’s degree and her research will focus on improving water and fertilizer productivity under deficit

irrigation for corn at the Mukhtaria station. Daren will be supervised by Dr. Bushra Khuzam of GCSAR.

Exchanges and Visits

Visit to the University of Florida (Feb. 29 – March 7, 2012): Dr. Malika Abdelali-Martini visited the University of Florida (UF) to discuss and develop the gender research questionnaire for WLI with Drs. Sandra Russo and Kathleen Colverson. The questionnaire will be further developed by the UF team and Dr. Samia Akroush who will be visiting UF on April 1-15, 2012, and tested on the field upon the return of Dr. Akroush. Dr. Martini also gave a seminar on “Gender and occupational health in North Africa” to graduate students of Gender and Development at UF. The seminar was also attended by Drs. David Sammons, Sandra Russo and Kathleen Colverson, and presented a good opportunity to emphasize some of the major gender issues in the MENA region.

Moreover, Dr. Martini joined the Gender and Development graduate class on a trip to Washington, D.C. where she visited organizations and agencies that work in the area of gender and development including USAID, the World Bank, IFAD, ACIDI-VOCA and Winrock International. At USAID, Dr. Martini met with a number of individuals including Drs. Christiansen and Tully, Dr. Caren Grown – a Senior Gender Advisor at USAID, Chris Burns who runs the Women project at USAID, Dr. Sharon Phillips in the Africa Bureau, and Dr. Jeannie Harvey in the Bureau for Food Security.

Visit to the Samuel Roberts Noble Foundation (March 27-29, 2012): Dr. Scott Christiansen, USAID Office of Technical Support (TS), Asia and Middle East (A&ME) Bureaus, and Floyd P. Horn, ex-Administrator, retired, USDA Agricultural Research Service (ARS) traveled to Ardmore, Oklahoma during March 27-29, 2012 to assess the possibility for cooperation with the Samuel Roberts Noble Foundation (SRNF) as a part of U.S. institutional collaboration in various USAID efforts in the Middle East and North Africa.

The Noble Foundation:

- Is the largest private foundation in Oklahoma and is in the top 44 in the United States (based on asset size).
- Employs more than 370 individuals, including more than 90 Ph.D. scientists, agricultural consultants and research associates.
- Hosts a large international population, including employees from more than 25 countries and six continents.
- Houses 21 primary research laboratories focused on plant research.
- Operates a 500,000-square-foot central campus having research, program, infrastructure and administrative space.

- Operates more than 12,000 acres of farms in southern Oklahoma for research and demonstration projects.
- Assists more than 1,700 farmers and ranchers in a 47-county service area (southern Oklahoma and north Texas) in achieving their individual financial, production, stewardship and quality-of-life goals.
- Receives extramural, research support from numerous donor agencies.
- Conducts its operations through the activities of three operating divisions:
 - (a) Agricultural Division: serves a 47-county area within a 100-mile radius of the Noble Foundation's headquarters in Ardmore, OK, assisting more than 1,700 regional farmers and ranchers in achieving their individual financial, production, stewardship and quality-of life goals.
 - (b) Plant Biology Division: conducts basic biochemical, genetic and genomic plant research for the purpose of improving crop productivity and value, and enhancing animal and human health.
 - (c) Forage Improvement Division: translates basic plant science research into tangible plant varieties and within SRNF serves as a link between the discoveries in the laboratory and the field, intending to enhance agricultural outcomes in Oklahoma and around the world.

CONCLUSIONS:

1. SRNF's philosophy and approach for extension is particularly well adapted for potential cooperation.
2. SRNF is becoming gradually more international in its perspective, with scores of individuals from other countries working as employees. In a meeting with key managers it was evident that they understand the global learning opportunities available from sharing science and technology with partners in other regions of the world who are striving to increase water and agricultural productivity, tackle issues of land degradation, and desire to sustain a viable farming lifestyle.
3. By means of the seminar presented by Scott Christiansen, the SRNF staff were able to identify the potential to leverage their own resources with those of USAID and other donors involved with several projects in the Middle East and North Africa (MENA): Water and Livelihoods Initiative (WLI); Management of Water in Agriculture (MWA); and the Network for Water Centers of Excellence (NWC).
4. The MWA concept note was submitted on 22 Mar 2012 to USAID in response to a Request for Proposals on University Engagement, prepared by ICARDA. If ICARDA is invited to submit a full proposal it would be possible to include SRNF as a partner to Texas A&M University.

Upcoming Events

Evaluation of the WLI activities in Egypt, Jordan and Palestine (April 20-May 4, 2012): Dr. Chuck Onstad, together with Dr. Kristofer Dodge (USDA/ARS) and Dr. Max Rothschild will evaluate the WLI programs in Egypt, Jordan and Palestine.

Training on scientific writing (June 10-21, 2012): The proposed two-week training course is expected to equip trainees to develop - high quality project progress, and final research reports; clear, concise and effective scientific journal papers; effective research results presentations; and powerful communication materials – posters, pamphlets etc. The training will be given by experts from ICARDA’s Communication, Documentation and Information Services’ (CODIS) team.

International Workshop “Land and water policies to sustainably improve food security” (May 24-25, 2012): The workshop aims to appraise policy options that have significant potential in maintaining or enhancing land management, food security and livelihoods in a sustainable and economically viable way in Jordan, Morocco, Pakistan and Yemen. The workshop is also expected to promote partnerships among disciplines and organizations working on land and water policies, food security and rural livelihoods in the WANA region. WLI partners operating in the focus countries are expected to benefit from the lessons learned and policy recommendations to be made.

Student Researcher Joseph Monical (June 2012 – August 2012): a PhD student from the University of Illinois at Urbana Champaign (UIUC) is expected to begin his research on “Conjunctive use of surface water and ground water with efficient irrigation practices to enhance agricultural production and farmer livelihood” in the El Qaa region off the upper Beqaa Valley of Lebanon. Joseph will be supervised by Dr. Prasanta Kalita, a Professor of Soil & Water Resources Engineering at UIUC.

Introduction to basic methodologies to conduct economics, policy and gender analysis (June 17-18, 2012): The socio-economic department of ICARDA plans to hold a two-day workshop in Cairo, to equip representatives from NARS with basic skills required to conduct socio-economic analysis in WLI benchmark sites.

Summer Internship (May – July 2012): Four graduate students from the University of Florida (UF) and the chair of the Sociology Department will travel to Amman sometime in late May to test and conduct a gender survey at WLI benchmark sites in Jordan, Egypt and Lebanon; and to analyze the data collected. The questionnaire for the survey will be drafted by Drs. Sandra Russo and Kathy Colverson from UF, Dr. Malika Martini (ICARDA), and Dr. Samia Akroush (NCARE).

Training on how to conduct gender surveys (May 26-30, 2012): Two-day training on how to conduct a gender survey will be held at the National Center for Agricultural Research and Extension (NCARE) of Jordan. The training will be offered by Dr. Sandra Russo and Dr. Constance Shehan from the University of Florida. The training will be followed by two-day practical learning opportunity where the trainees will have the opportunity to test the survey. The survey will then be administered at the benchmark sites in Egypt, Jordan and Lebanon.