

2012

# Water and Livelihoods Initiative (WLI)

## Second Quarter Report (April – June)



## Acronyms

AERI: Agricultural Economic Research Institute

AEZ: Agro-Ecological Zone

ARC: Agricultural Research Institute

AREA: Agricultural Research and Extension Authority

ARIJ: Applied Research Institute - Jerusalem

AUB: American University of Beirut, Lebanon

CBO: Community Based Organization

CLP: Community Livelihood Project

DAS –ELISA: Double Antibody Sandwich ELISA

EDRDP: East Delta Rural Development Project

FAO: Food and Agricultural Organization

FIG: Farmers' Interest Group

FTF: Feed the Future

FY: Fiscal Year

GCSAR: General Commission for Scientific Agricultural Research

GIS: Geographic Information System

HU: Hebron University

ICARDA: International Center for Agricultural Research in the Dry Areas

IFAD: International Fund for Agricultural Development

IWLMP: Integrated Water and Land Management Program

IWMI: International Water Management Institute

JICA: Japan International Cooperation Agency

LARI: Lebanese Agricultural Research Institute

LRC: Land Research Center

MAAR: Ministry of Agriculture and Agrarian Reform

MALR: Ministry of Agricultural Land Reclamation

MENA: Middle East and North Africa

MEPI: Middle East Partnership Initiative

MoA: Ministry of Agriculture

MWRI: Ministry of Water Resource and Irrigation

NARC: National Agricultural Research Center

NARES: National Agricultural Research and Extension Systems

NCARE: National Center for Agricultural Research and Extension

NPK: Nitrogen, Phosphorus, Potassium

NRM: Natural Resource Management

NWRA: National Water Resource Authority

NWRC: National Water Resource Center

PEER: Partnership for Enhanced Engagement for Research

SAG: Site Advisory Group

SBAR: State Board for Agricultural Research

SEPRP: Social, Economic and Policy Research Program

SWAT: Soil and Water Assessment Tool

TAMU: Texas A&M University

TOT: Training of Trainers

TSS: Total Suspended Sediment

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

USG: United States Government

USU: Utah State University, USA

WANA: West Asia and North Africa

WB: World Bank

WLI: Water and Livelihoods Initiative

WMRI: Water Management Research Institute

WNRDP: West Nubaria Rural Development Project

WUA: Water User Association

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## Executive Summary

The goal of the Water and Livelihoods Initiative (WLI) is to improve the livelihoods of rural households and communities in areas where water scarcity, land degradation, water quality deterioration, food security and health problems are prevalent in the seven participating countries, focusing initially on selected benchmark sites in Egypt, Iraq, Jordan, Lebanon, Palestine, Syria and Yemen. This report contains an update on activities during the second quarter of 2012 (April-June).

During the second quarter of 2012, the WLI Communications and Project Management Specialist, Mrs. Bezalet Dessalegn, served as Acting WLI Manager, enabling the continuation of activities in all countries as well as continual improvements to the WLI website and communication strategy, and a socio-economic focal point for the Initiative was designated at ICARDA. A new Manager joined the Initiative at the end of the quarter. Management decisions were taken to accelerate the schedule for WLI workplanning and approval, improve coordination of socioeconomic activities, create a scientific publication series for WLI, and respond proactively to all issues raised through the management review. Regional training activities focused on improving skills in scientific writing, collection of gender disaggregated socioeconomic information and SWAT modeling.

Field research was carried out by teams in all WLI participating seven countries, despite security-related challenges encountered across the region during this quarter. The development of watershed-level decision-support tools progressed, and results were generated through field scale experimentation with water management technologies. Analyses of baseline characterizations of sustainable land and water management practices and livelihood strategies continued to enable the identification of options for livelihood improvement. These and other recommendations from ongoing work fed into an external management review process to guide the WLI towards the achievement of its overall objective for sustainable livelihood improvement in water scarce areas.

## Introduction

This report presents an update on activities by the Water and Livelihoods Initiative (WLI) during the second quarter (April-June) of 2012. The goal of the WLI is to improve the livelihoods of rural households and communities in areas where water scarcity, land degradation, water quality deterioration, food security and health problems are prevalent in the seven participating countries, focusing initially on selected benchmark sites in Egypt, Iraq, Jordan, Lebanon, Palestine, Syria and Yemen. During this quarter, a management review of the WLI was completed by a team of experts from USDA-ARS. The reviewers visited the benchmark sites and met with the country teams in Egypt, Jordan and Palestine to gather insights concerning the management of the initiative and its work towards the achievement of the following immediate objectives:

1. Integrated water and land-use strategies for policy-making, tools for sustainable benchmark management and organizational mechanisms for community inclusion at the benchmark site.
2. Enhanced knowledge, skills and qualifications for key stakeholders in the benchmark sites.
3. Improved rural livelihoods of farmers in the benchmark sites through the adoption of sustainable land and water management practices and livelihood strategies.

At ICARDA, in anticipation of the arrival of the new Project Manager, the WLI Communications and Project Management Specialist, Mrs. Bezaiet Dessalegn, served as Acting Manager, enabling the continuation of activities in all countries, as well as continual improvements to the WLI website. The new WLI Manager, Dr. Caroline King, joined WLI at the end of the quarter, beginning work from the ICARDA Nile Basin Office, Cairo. This quarter also saw increased engagement of the Social, Economic, and Policy Research Program (SEPRP) at ICARDA in WLI activities, including the assignment of Dr. Boubaker Dhehibi as the focal person for socioeconomic research issues. The ICARDA IWLMP Program took a decision to create a scientific publication series for WLI, accelerate the schedule for WLI workplanning and approval, and respond proactively to other issues raised through the WLI management review.

Activities carried out by research teams in spite of security-related challenges in the seven participating countries included both biophysical and socio-economic research components addressing integrated water and land-use strategies and the improvement of rural livelihoods. These are reported on a country-by country basis in the following section of this document. Knowledge, skills and qualifications of key stakeholders in the benchmark sites were enhanced through regional thematic training activities offered by ICARDA, targeted national trainings offered by NARES, and a student exchange program with selected US University partners, as reported in subsequent sections. During the Third Quarter (July-September, 2012), the research teams will conclude their research activities for 2012, report on six selected FTF Indicators (see Annex 1), and prepare their workplans for 2013 in consultation with the Site Advisory Groups (see Annex 2).

## Activities at the Benchmark Sites

### Egypt

**Overview:** The main goal of WLI in Egypt is to improve the livelihoods of households and communities in the Nile-Delta, focusing on targeted research interventions at three benchmark sites representing the old lands, salt-affected lands, and the new lands. The socio-economic and bio-physical characterization of the benchmark sites was completed in 2010 through a baseline study.

Research by ARC/AERI, NWRC/WMRI and Egyptian Universities/Zagazig University continues activities begun through the 2011 plan of work to:

1. Assess impact of utilizing sustainable water use technologies and land management practices on improving rural livelihoods of farmers in the benchmark sites.
2. Identify potential options/interventions (technologies, institutions, policies) for enhancing water use efficiency (economic, social, technical and environmental).
3. Assess income-generating options in the benchmark sites.
4. Identify potential rural income-generating activities.

Additional work incorporating socioeconomic, gender and policy research has been planned for 2012 to:

- Study the potential of developing and applying integrated environmental friendly Agri-systems - in order to improve business leadership of agriculture production.
- Assess traditional and potential options for improving rural livelihoods through the empowerment of women in undertaking rural livelihood improvement activities (i.e. small ruminant production, poultry, post-harvest, processing) and enhancing the traditional livelihood spheres.
- Improve knowledge and skills of stakeholders in the three benchmark sites.
- Track the six core indicators at the three benchmark sites (see Annex 2)

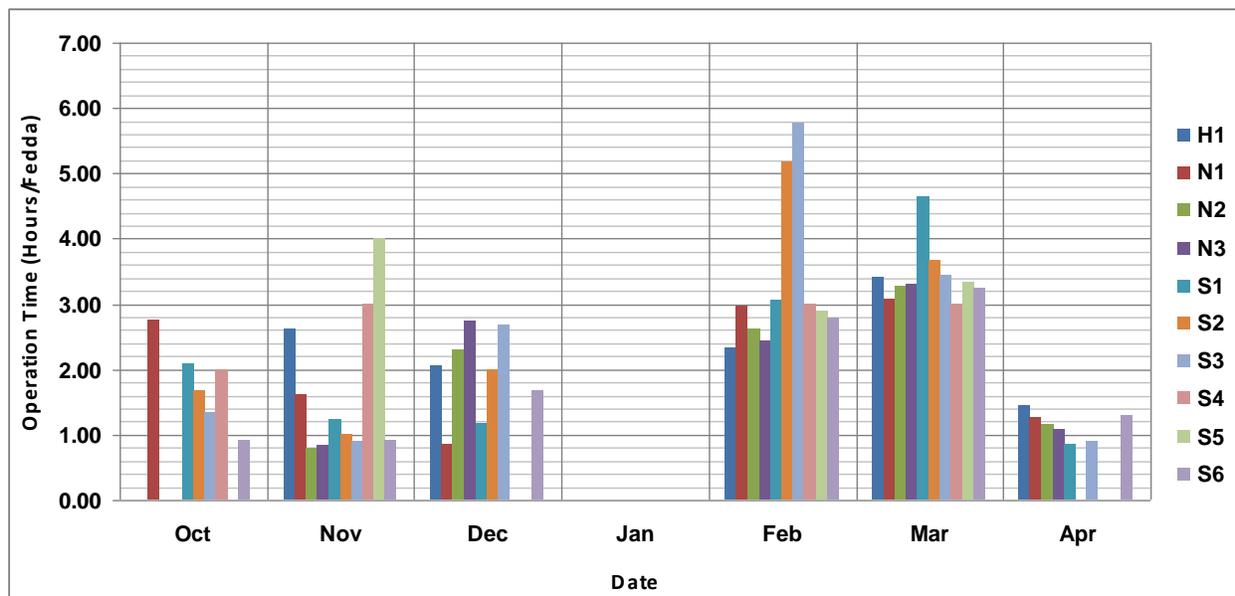
Ongoing biophysical field research activities feeding into these objectives focuses on short-term data collection objectives to:

- Determine the sustainable water and integrated water, land use, and livelihood in the Nile Delta sub-sites for scaling-up
- Assess the effect of water table fluctuations and salinity build-up on the sustainability of the irrigation system
- Determine the impact of water-saving practices (pressurized irrigation systems, irrigation scheduling...etc) on the sustainability of the irrigation system, and water productivity
- Present some salinity control practices, traditionally applied
- Present other salinity control practices that could be applied at the study conditions.
- Improve business leadership of agriculture production and improve agriculture-water productivity

In the first quarter, socio-economic surveys were implemented at three benchmark sites (East Hassanieh, Zankaloun & El Bustan), and biophysical data collection was undertaken at one benchmark site in the Old Lands at Damanhour, where a geodatabase was created.

**2<sup>nd</sup> Quarter Activities Undertaken by the Bio-physical Research Teams:** Data collection and monitoring continued in the Old Lands at Damanhour to focus on: (a) cropping patterns, (b) water levels and temperature in irrigation canals, (c) pump operation times, and (d) groundwater levels, conductivity and temperature. A hydrological model was calibrated and data were also used to conduct analysis of upstream/downstream water level fluctuation cycles, and seasonal evaluation of released water into branch canals. The team developed analysis of cumulative pump operating-times from measuring devices installed on diesel pumps as well as electric pumps, on specific locations on the gearbox, pump outlet, and pumping shelters for almost all lifting points and Mesqas within the benchmark area covering the 2011-2012 winter seasons and summer seasons (Figure 1).

**Figure 1: Total operation time for tertiary Mesqas during winter-Summer seasons 2011-2012**



A topological analysis was developed for use to support an integrated suitability index for water and soil management for irrigated agriculture (to be finalized by the end of July 2012). Analysis of the sources and effect of soil compaction and salinity build-up began using data collected from a survey of 50 samples in 10 villages where the groundwater table is 1.5-2m below the surface and surface irrigation systems are in use (basin, furrow and border, depending on the crop type). 72% of the sampled group reported drainage-related problems including plant yellowing, soil crust formation, prevalence of wide spread salt-tolerant weeds, and the existence of dark oily spots on soil. Targeted farmers had low to moderate education levels, low awareness of possible soil compaction problems due to inappropriate tractor use and minimal control over the specifications of tractors that they rent. An ongoing literature review on the “Sources and Effect of Soil Compaction and Salinity Build-up under Irrigated Agriculture” is under development as the basis for a report for publication.

**2<sup>nd</sup> Quarter Socioeconomic Gender and Policy Research Activities:** Collection, entry, and preliminary analysis of data was completed from questionnaires implemented at 450 households during the first quarter at the three sites (East Hassanieh, Zankaloun & El Bustan). A final report including the dataset

and preliminary analysis is expected by the end of July 2012. Dr. Boubaker Dhehibi, ICARDA Socio-economic focal point for WLI, provided suggestions to guide the analysis and ensure the quality of outputs to be generated.

## Iraq

**Overview:** The goal of WLI in Iraq is to improve the livelihoods of households and communities in the Abu Ghraib irrigated site, increasing economic, social and educational opportunities. The socio-economic and bio-physical characterization of the benchmark site was completed in 2011 through a comprehensive household survey.

The 2012 workplan focuses on biophysical research activities by the State Board for Agricultural Research (SBAR) – Ministry of Agriculture (MoA) to:

- Identify indicators of water productivity assessment and improvement
- Compare different on farm cropping systems, cultural practices and irrigation techniques
- Measure improvement to scale in livelihoods due to the use of greenhouses

First quarter activities included the creation of digital maps, studies of the effect of deficit irrigation on wheat and water productivity, field trials on the effects of altered of irrigation schedules on water productivity. A study on the effect of surface and sub-surface drip irrigation on enhancing crop production and improving water productivity began and field experiments were carried out to compare three methods of irrigation on eggplant and pepper yields, as well as studies on fertilizer application effects on water productivity. A comparative study on the yield, income and water productivity of vegetables cultivated using traditional farming practices and greenhouses was expanded through a survey of farmers using greenhouses.

**2<sup>nd</sup> Quarter Activities Undertaken by the Bio-physical Research Team:** Soil data collected from the research field site were integrated with other datasets including climate, landform, land cover and land use as well as 30 years of previous soil data. A land suitability index and maps were created following the Agro-Ecological Zoning (AEZ) methodology developed by the Food and Agriculture Organization (FAO). These focus on thirteen strategic crops grown in the study area, including wheat, barley, maize, cotton, broad bean, tomato, green gram, sunflower, sorghum, potato, onion, alfalfa/berseem and some vegetables. So far, two maps for potato and wheat suitability in the Abu-Ghraib project have been completed.

Field trials continued to assess the effect of deficit irrigation applied at three intervals on the productivity of wheat. Preliminary results of the data analysis for yield and yield components reveal no significant difference associated with alteration in the irrigation schedule beginning either mid-April or May. This information could be used to improve strategies for water conservation.

Field trials to test the effect of surface and subsurface drip irrigation on eggplant production and water productivity produced data and analysis indicating that sub-surface irrigation is less water-intensive and has higher water productivity (Table 1). A similar analysis focusing on irrigated pepper production will be reported in the third quarter.

**Table 1: Yield of egg plants (kg/plant) under different treatments of irrigation**

Irrigation Interval (Day)	Yield (Kg/plant)		
	Subsurface drip irrigation (SSDI)	Surface drip irrigation (SDI)	Surface Irrigation (SI)
T1 (1 day)	0.830	0.900	0.600
T2 (3 day)	0.710	0.560	0.940
T3 (5 day)	0.820	0.310	0.500

To improve the performance of greenhouse techniques, the effect of varying fertilizer applications on water productivity of selected vegetables was investigated at the Akarkoof district of Abu-Ghraib benchmark site. Three levels of amino acid were applied with two combinations of NPK fertilizers and the fields were irrigated up to 50% and 75% of field capacity.

Ten farmers were trained on best practices for improving water productivity in protected agriculture. The training was held at the Training and Rehabilitation Center at Abu-Ghraib province on June 28-29, 2012. Two 'field day' trainings were held to demonstrate the water and fertilizer use efficiency and yield benefits of using sub-surface irrigation (June 14, 2011, Akarkoof district: 8 farmers trained) and improving water productivity for vegetable gardening in greenhouses through the application of appropriate doses of fertilizers including NPK and Amino acid (June 19, 2012, Al-Shiha district: 4 farmers trained).

**2<sup>nd</sup> Quarter Socioeconomic and Policy Research Activities:** 120 randomly selected farmers who use greenhouse technology were surveyed, including both state and private farmers. Yields, revenues generated, and water productivity in the greenhouses will be compared with vegetable cultivation under traditional farming practices. A simple analysis of the data collected revealed some correlation between farmers' farming practices and their respective educational status, with those having secondary education and above using the greenhouse technology more than those who are either illiterate or have up to primary level education. The team plans to focus their extension work on promoting greenhouse technology among the latter group. Collected socio-economic data including the distribution of privately and state owned land, irrigation canals, drainages, locations of greenhouses, wells and orchards for all districts in Abu-Ghraib Project was digitized and linked with the existing GIS database.

The average cost of establishing a greenhouse for one season was estimated, based on information collected from 50 randomly selected farmers. According to the survey, labor represents the highest cost followed by fuel (Table 2). The team also estimated the average expected revenue based on the outputs from four greenhouses (Table 3). The information collected will be used to generate a comparative study of changes in livelihoods for farmers using the greenhouse technology versus open fields.

**Table 2: Average Cost of Establishing a Greenhouse for One Season**

Description of Inputs	Av. Cost /unit in USD	Percentage share
Nylon	100	12.4
Seedling	115	14.3
Fertilizer	100	12.5
Pesticide	50	6.2
Labor	210	26
Fuel	140	17.4
Mechanical operation	40	5
Picking and Handling	50	6.2
Total	805	100

**Table 3: Average Revenue from Greenhouse Farming**

Crops	Avg.	Price/Kg in USD	Total Revenue
Tomato	6000	0.50	3000
Cucumber	4500	0.50	2250
Eggplant	3000	0.75	2250
Pepper	1500	0.75	750

## Jordan

**Overview:** The main objective of the WLI in Jordan is to develop and pilot test an integrated water, land-use and livelihoods strategy in the Mharib and Majidyya benchmark site for scaling up, which will optimize new and existing income-generating crop and livestock activities. A socio-economic and bio-physical characterization of the benchmark site was prepared under a previous initiative (ICARDA Water Benchmark Project). During 2011, the project activities focused on capturing the results of water harvesting techniques through hydrological modeling, community awareness raising and the preparation of a socio-economic survey to collect sex disaggregated data on income sources, agricultural production systems, water supply for the household, women's daily routine, and role in agriculture, and community activities.

The workplan for 2012 includes data collection, modeling and dissemination activities by the Jordanian National Center for Agricultural Research and Extension (NCARE) with the involvement of University of Jordan, Texas A&M and ICARDA scientists. These activities focus on evaluation of the implications of water harvesting interventions for bio-physical processes and livelihood improvement. Socio-economic gender and policy research activities are also continuing to raise the awareness of local communities and to assess views on the rehabilitation approach from the community, government, range rehabilitation experts and public stockholders.

During the first quarter, devices were installed for measuring water flow and water level at the Mharib and Majidyya sites and data was collected on soil, sediments, runoff and climatic conditions and productivity of barley and atriplex for use in modeling and evaluation of the water harvesting technologies. A proposal to support to the Majidyya and Muharib Women Cooperatives located in the WLI benchmark site was developed and resubmitted to the Middle East Partnership Initiative (MEPI).

**2<sup>nd</sup> Quarter Activities Undertaken by the Bio-physical Research Team:** To evaluate the effects of selected water harvesting techniques on bio-physical conditions, data collection was completed on rainfall, runoff, water flow, water level, and sediments for the 2011/2012 season. Samples of sediments collected on a geotextile silt trap were analyzed for organic matter, Exch P, Total N, and texture in the soil lab at NCARE. Moisture measurements were also recorded after each rainfall event at selected modeling sites using a TDR device. New sensors were installed to improve the weather station and to collect data on temperature at different heights. The Soil and Water Assessment Tool (SWAT) model was calibrated and run in collaboration with Dr. Feras Ziadat of ICARDA and Dr. Raghavan Srinivasan from Texas A&M University.

Monitoring and data collection on height, number of shoots, soil moisture, survival rate, etc. continued for five varieties of barley and Atriplex planted in the Marrab water harvesting area. The bio-physical team also began the site selection process for new demonstration sites to introduce additional water harvesting technologies including sub-surface dams. Technical assistance during the site selection

process and regular follow up on the water harvesting and erosion control structures built at the benchmark sites was provided to the NCARE team by Dr. Mohammed Boufaroua of ICARDA.

**2<sup>nd</sup> Quarter Socioeconomic and Policy Research Activities:** A training on gathering gender disaggregated socio-economic data was offered by Dr. Samia Akroosh with Drs. Sandra Russo and Constance Shehan from University of Florida (UF), and Dr. Malika Martini from ICARDA (May 27 – 31, 2012). The socio-economic team also collaborated with five graduate students from UF to refine focus group discussion questions, conduct five focus group discussions with members of the community at the WLI benchmark sites, write up the reports, and make recommendations on how the process could be improved for use by the other WLI partners. A report on these activities is anticipated from the University of Florida by the end of July 2012.

The planned household survey including detailed gender disaggregated information is anticipated to be completed and reported by the end of the year. Datasets are anticipated to capture educational levels, income sources, agricultural production systems including women's roles and daily routines, housing, water supply, and agricultural community activities including women. Additional work to assess the views on rehabilitation approach from the community, government, range rehabilitation experts and public stockholders is also anticipated to be completed and reported by the end of the year.

The team received provisional approval for the proposal submitted to USAID under the MEPI grant program. The proposal seeks funding to support the Majidya and Muharib Women Cooperatives located in the WLI benchmark site through peer training by the relatively more developed Ngera Women's cooperative, located nearby. Final approval, which requires the team to prepare and submit additional information on the proposal is expected by the end of September 2012.

## Lebanon

**Overview:** The goal of WLI Lebanon is to improve the livelihoods of households and communities in the El Qa'a Benchmark Site by increasing economic, social and educational opportunities. The main objective is to develop and pilot test an integrated water, land-use and livelihoods strategy in the El Qa'a Benchmark Site, which will optimize new and existing income-generating crop and livestock activities. During 2011, the team adapted a household questionnaire developed by NCARE, Jordan, to develop a baseline characterization of the benchmark site, completed data collection and began the analysis. This is ongoing in 2012.

In addition to the completion of the socio-economic data analysis and report elaboration by LARI, the workplan for 2012 includes biophysical research components on GIS and modeling aiming to characterize and understand landcover change and the farmer practices at the benchmark area and across the Orontes River Watershed, in preparation for modeling of the watershed management, scaling up of the integrated water, land-use and livelihoods strategy, and improving water productivity by LARI, AUB, MoA, LU and US Universities.

Activities carried out in the first quarter of 2012 focused on promoting conservation agriculture through zero-tillage, introducing new drought-resistant cactus and seedless grapes, promoting yield and water use efficiency, as well as pest management for drip irrigated crops. A crop parcel map was prepared and an evaluation of the effects of urban expansion pursued through the GIS database.

**2<sup>nd</sup> Quarter Activities Undertaken by the Bio-physical Research Team:** Classification of different satellite images to develop a land cover/land use map for the benchmark area and the watershed proceeded. This will be followed by ground-truthing surveys. Current urban spatial distribution was digitalized to support an evaluation of the effects of continued urban expansion over agricultural lands. A field survey on crop rotation practices was also prepared.

Experiments underway on farmers' fields to study the effects of zero-tillage for growing corn were monitored. The results will be used to support the promotion of conservation agriculture. Surveys of trial sites for introduction of new varieties of drought-resistant seedless grapes and cactus in the arid and semi-arid areas of the northern Bekaa plain were conducted to supervise the irrigation schedule, application of fertilizers and adherence to general pest management practices,

More than 4,000 peach trees were inspected in 20 commercial orchards for easily detectable viruses. Around 200 samples were collected and supplemented with qualitative information gathered from the owners of the fields. Additional samples of leaves were randomly collected from each field, taking into consideration the location and number of varieties present. The presence of specific viruses and fungal, bacterial pathogens, or physiological disorders was detected using DAS-ELISA. Pathogens were identified through further laboratory analysis.

In the olive orchards, the team identified a harsh fungal disease that causes the olives to wilt. The symptoms observed appear like necrosis and cause mummification of flowers and inflorescences, leaf chlorosis and necrosis, as well as necrosis of twigs similar to “slow decline” disease accompanied in some cases by severe defoliation. The presence of the disease was confirmed by farmers in the area. Olive bark midge (*Resseliella oleisuga*) was also found. However, the prevalence of these insects in the El Qa’a region is not as pronounced as it is in other regions in the country. Based on the findings of these investigations, surveys, and analyses, the team was able to advise farmers working on the peach and olive orchards on how to adopt appropriate integrated pest management practices.

**2<sup>nd</sup> Quarter Socioeconomic and Policy Research Activities:** Data entry and cleaning are in progress for the dataset from 50 respondents surveyed last year in El Qa’a (additional data on the cost of production are still to be included). Analysis of the data collected was delayed in anticipation of a training on SPSS that was to be provided by a WLI team member from NCARE Jordan. Security problems prevented travel to Lebanon by Dr. Samia Akroush of WLI and NCARE Jordan, who was anticipated to provide this training. However, a visit was made by Dr. Boubaker Dhehibi, WLI socio-economic focal point at ICARDA, and the data analysis is expected to be done within the next quarter.

A new survey based on focus group discussions is also planned for the next quarter. The questionnaire for the new survey was developed through a collaborative effort involving the University of Florida, NCARE, and ICARDA. The new survey is intended to establish a database on household income composition, roles of women in the household and in the community, alternative income generating possibilities, and other socio-economic information that will complement and update the socio-economic survey data on the El Qa’a area.

An additional activity concerning the establishment of a womens cooperative, which was planned to involve the water user association of El Qa’a and Dr. Malika Martini of ICARDA, has not yet been implemented. A student research project with the University of Illinois at Urbana-Champaign (UI-UC), which was planned for this quarter, was relocated to Jordan, due to security constraints.

## Palestine

**Overview:** The goal of WLI Palestine is to improve the livelihoods of households and communities in the Tammun and Hebron benchmark sites by increasing economic, social and educational opportunities. Research activities focus on developing and pilot testing an integrated water, land-use and livelihoods strategy in the benchmark sites. This strategy is intended to optimize new and existing income-generating crop and livestock activities for future upscaling. In 2011, the research team obtained preliminary results for the characterization of the benchmark site from a socio-economic survey and assessment of land suitability for crops and rangeland. The team also began work on assessment of suitability for water harvesting activities.

In 2012, NARC, LRC, Applied Research Institute – Jerusalem (ARIJ) and HU plan to pursue the assessment of rangeland management and utilization, including suitability mapping for different land uses and introduction of pilot agro-production demonstrations using both local and external expertise with support from ICARDA and training on activities related to water-harvesting. The 2012 workplan also includes a socio-economic component focusing on enhancing the awareness and knowhow of project stakeholders based on needs identified through the socio-economic survey.

During the first quarter, four sites were selected in Annab (Hebron) and Atuf (Tammun), rocks were cleared and retaining walls constructed for ponds. Fences were built and olive, almond, and other tree seedlings planted. Sites were also identified and planted with both local and improved wheat and barley varieties in order to assess their yield potential and survival rate under severe drought conditions.

**2<sup>nd</sup> Quarter Activities Undertaken by the Bio-physical Research Team:** For the development of the suitability maps, in addition to the 92 soil samples previously collected to develop mockup suitability maps for rangelands, trees and crops, the team collected 1,054 more soil samples to represent most of the area within the benchmark sites. The LRC GIS team, in close collaboration with the GIS team at ARIJ, is using these data on soil texture, depth, stoniness, rockiness, etc. to develop new suitability maps. The map for Hebron was completed, and the one for Tammun is under anticipated soon.

The team completed the construction of contour ridges and semi-circular bunds to demonstrate simple water harvesting techniques that can easily be replicated by the farmers at the Tammun and Hebron benchmark sites. Additional fencing was also constructed around pilot water harvesting areas (2,830 meters) to protect shrub seedlings from animal grazing. The shrubs were irrigated to ensure their survival (current rate: 75%).

Field trials of new drought tolerant varieties of wheat and barley planted under normal conditions on a total of 53 dunuums (23 in Hebron and 30 in Atfu site) were monitored. Results of the trial, anticipated soon, will be compared with the performance of local varieties of wheat and barley that are also grown under similar conditions.

The opportunity to introduce SWAT modeling activities to the team was discussed during a coordination meeting held at ARIJ. The team agreed to explore the benefits of applying the SWAT model in the benchmark site if possible and to write concept notes for the same purpose.

Two team members specialized in GIS received training on SWAT modeling (see Regional Trainings), which focused on data preparation and calibration of the model with data from Jordan, and discussion with participants from Syria and Ethiopia. The opportunity to apply SWAT in the Palestinian benchmark sites was confirmed to be of interest to the team, leading to the following recommendations under consideration in preparation for the 2013 workplan:

1. Installation of weather stations in the benchmarks, in order to collect relevant and constant daily weather data needed for SWAT.
2. Opportunities for the post-graduate student and researchers to apply SWAT in their researches and studies.
3. Maintain cooperation and experience exchange among partners.

To maximize the benefit from the SWAT tool the Palestinian team recommended that ICARDA should organize advanced training and TOT courses on SWAT.

A preliminary plant inventory study was conducted in the benchmark areas in order to establish baseline data on existing varieties and their uses. This will be useful to inform future rangeland management activities. The team is continuing work on the identification of the most economically valuable plant species, to be reported soon.

The WLI team from LRC conducted more than 18 extension field visits during this quarter to provide farmers with practical onsite training to improve their farm management practices and increase the health, yield and quality of their crops.

**2<sup>nd</sup> Quarter Socioeconomic and Policy Research Activities:** A workshop on household food security was conducted in Atuf for 10 women. The workshop focused on the definition of food security, the role of women in achieving food security, and the role of food security in achieving development. Training on home gardening was also offered to 15 households. The training focused on optimal methods and timings of irrigation, simple rain water harvesting techniques, and the role of home gardening in achieving food security.

Further information will be required for inclusion in the annual report in order to connect the participating households and the topics discussed during these workshops to the findings of the socio-economic survey.

## Syria

**Overview:** The goal of WLI Syria is to improve the livelihoods of households and communities in the Orontes Basin benchmark site by increasing economic, social and educational opportunities through addressing the key priority issues identified by Syria. Research activities focus on developing and pilot testing an integrated water, land-use and livelihoods strategy which will optimize new and existing income-generating crop and livestock activities. In 2011, although a socio-economic survey questionnaire was developed, this could not be implemented due to security concerns. However, the team made progress in the biophysical characterization of the Orontes Basin, including digital mapping of the geographic boundaries, soils, city repartition, relief and presence of surface water bodies. Suitability criteria for sprinkle, spate and drip irrigation were developed. A study of the negative effects of nitrogen-based fertilization on groundwater and benefits of nitrogen-legume fertilization and was developed and published and field experiments on irrigation management began at Al Gab, Amukhtaria, and Surabaya stations.

For 2012, planned activities included conducting the baseline survey and collecting secondary socio-economic information, as well as biophysical modeling research on water accounting, studying the effects of deficit irrigation on the productivity of corn and soybean, and effects of fertilizer application rates on cotton productivity. In the first quarter, maps of the benchmark area were digitized but field activities were postponed due to security concerns in and around the benchmark site. The team was still not able to conduct the socio-economic survey as planned due to security concerns. The research team therefore focused on collecting and analyzing secondary data obtained from public offices in the Al Gab area.

During the second quarter, the security situation deteriorated further, but the research team has still been able to conduct field data collection in some areas. Planned activities at Al Gab research station by GCSAR involving ICARDA, IWMI, MAAR, the General Commission for Al Gab Development and Management, National Universities (Damascus, Aleppo), Commission of Planning and International Cooperation and Ministry of Irrigation were not executed due to security concerns in and around the benchmark site. Participating scientists from ICARDA and IWMI have been relocated to other WLI countries. However, local student research took place at Mukhtaria and Serbaya Stations (see also Student Exchange Program).

**2<sup>nd</sup> Quarter Activities Undertaken by the Bio-physical Research Team:** Digitized maps of the benchmark area were further developed and used to define the watershed boundaries and groundwater sub-basins, and to identify appropriate units for ongoing research. In addition to contributing to benchmark characterization, these maps will also be used by the PhD students who are working on water accounting in the Orontes River Basin. The students continued their secondary data collection, literature reviews and work on the refinement of their methodologies (see Student Exchange Program). An outline of Doctoral research ongoing by Tammam Yahghi was prepared in English with support from the ICARDA Capacity Development Unit. Dr. Vinay Nangia of ICARDA has continued to guide the preparation of the methodological outline for the study remotely, and anticipates to receive an updated methodological research overview during the next quarter.

Field experiments to determine the effects on soybean and sorghum production and quality due to use of deficit drip irrigation were established by Dr. Bushra Khuzam, Eng. Dareen Asad, Eng. Nidal Ghanem and Dr. Awadis Arslan in Mukhtaria station. These include a control using traditional irrigation methods. The data from these experiments will be used by the project for the calculation of yield, water use, water use efficiency (water productivity), and to inform the research of the PhD students. A field plot for additional experiments was prepared, designed and installed one of the students (see Student Exchange Program), but subsequently destroyed by an anti government group at the end of June. A PhD dissertation addressing the effects of fertilizer application rates on cotton production and quality was completed and defended, resulting in four publications in Arabic (see Student Exchange Program). Insights informing the planned work for forthcoming quarters have been gained through the discussion of these research contributions by the research team.

**2<sup>nd</sup> Quarter Socioeconomic and Policy Research Activities:** 250 socioeconomic questionnaires were administered in the Al Gab region for an “Analytical Study of Living Style of Local Inhabitants in Al Gab Region”. The data is now being compiled for analysis. The analysis of questionnaire data, in combination with compiled secondary datasets (statistics and published studies), is anticipated to determine the current status of livelihoods in the benchmark including properties, income sources and plant and animal activities, analyze positive and negative points and provide suggestions for future improvement. According to the 2012 workplan, survey data and secondary data is also anticipated to be used for the study of economical & social effects of farmers’ adoption of irrigation technologies, focusing on introduction of new irrigation methods, efficiency of new irrigation methods and adoption rates. Use of primary and secondary socio-economic datasets is further intended to determine current marketing channels, identify gender roles in marketing and make suggestions for future improvement.

Pending a more comprehensive report and analysis, the research team has so far identified the following weaknesses in rural livelihoods, which could also be addressed through future research and extension activities on production and marketing as well as water management:

- Lack of intensified-cropped areas due to water resources scarcity and drought
- High prevalence of gramineae due absence of mechanically harvestable legume species and alternative high value crops
- Large variation in crop production economics among households
- Price variation of agro-products
- Limited utilization of surface runoff and water harvesting and spreading
- Low water use efficiency and contribution to ground water pollution
- Soil salinization in low lands.

Opportunities for improving rural livelihoods at the benchmark sites identified so far include integrated water management and conservation techniques, introduction of improved high-yielding varieties, and new cropping patterns that don't depend on large areas, i.e. cultivation of medicinal and aromatic plants. The research team has also expressed interest in tracking additional indicators on access to basic services including clean drinking water, electricity, proper sanitation, etc. under the “Improve Community Health and Nutrition” section of the WLI Feed the Future Framework (FTF).

## Yemen

**Overview:** The goal of WLI Yemen is to improve the livelihoods of households and communities in the Abyan Delta benchmark site by increasing economic, social and educational opportunities through addressing the key priority issues identified by Yemen. The Elkod Research Station was looted and destroyed in 2011 and the WLI team was therefore unable to implement planned activities, including a socioeconomic survey, but was able to establish a digital database for Delta Abyan, and work on monitoring and assessing water resources, analyzing soil samples and updating existing soil and land suitability maps to identify suitability for irrigation. The 2012 workplan focuses on establishing a functional GIS database for the Abyan Delta, assessing and increasing water productivity in spate irrigation and ground water use, assessing the role and effectiveness of associations in Natural Resource Management (NRM) and community support, assessing the impact of water productivity on livelihoods and appreciating indigenous knowledge and social norms in the management of agro-ecosystems.

First quarter activities included a review of previous studies on the main crops and collection of data on their growth requirements for use in land suitability mapping. A preliminary assessment of water productivity on livelihoods was based on data collected from 15 households. 30 households were surveyed in the benchmark area and a rapid assessment of indigenous knowledge and social norms in the management of natural resources in the area was developed. Armed conflict occurred in and around the benchmark area, but ceased at the end of the second quarter.

**2<sup>nd</sup> Quarter Activities Undertaken by the Bio-physical Research Team:** progress on the preparation of land suitability maps included follow-up on data collection begun in the previous quarter and analysis of soil suitability for the main crops grown in the Abyan Delta. A land suitability index was calculated, which will enable the production of land suitability maps for the main crops in the Abyan Delta.

**2<sup>nd</sup> Quarter Socioeconomic and Policy Research Activities:** Field measurements were undertaken on 10 farms for assessment of the impacts of water productivity on livelihoods. Measurements included irrigation water sources, water conveyance and water application. Additional data were collected on yields, marketing and water pumping costs. Analysis of the datasets was carried out, including calculation of irrigation efficiency and water use efficiency.

Data collected during the previous quarter from a random sample of 30 farmers located in 5 different villages were analyzed, enabling identification of land tenure and prevalent cropping pattern in the study area (vegetables, field crops and fruits), sources of irrigation water (groundwater and spate water), investment costs related to wells used for irrigation (drilling and equipments) and farm budgets for all cultivated crop in the season 2011/2012, including input costs, yields and sale prices. The following preliminary observations were drawn from this analysis:

1. *Water availability is the main constraint to the expansion of agricultural production in Abyan Delta, especially where agriculture depends on spate irrigation.*

2. *Approximately 80% of the cultivated area is privately owned (primarily where fruit are cultivated) and 20% is rented either for cash rent or share cropping.*
3. *Abyan Delta is a diverse agroecosystem, including cultivation of fruit (e.g.: banana and papaya) and field crops (e.g. cotton, sesame and sorghum) concentrated in upstream areas, and vegetables (particularly tomato, onion and eggplant) in the mid- and downstream areas.*
4. *The flow of the spate water varies from year to year according to the climatic conditions. Distribution of spate water on the fields depends strongly on their location. While in upstream areas some fields get water 2-3 times per season, others in downstream areas have not received water for a period of 3-5 years.*
5. *Installation of a well for irrigation use requires on average 4-5 million Yemeni Riyal (18000-22500 US\$), and is only available to relatively well-off farmers.*
6. *Farmers sell their produce (vegetables and field crops) either on local markets in Ga'ar or Zingibar, or on the central wholesale market in Aden, which is located approximately 60 km away from Abyan.*

During the next quarter, data the economic analysis of the collected data will be completed, including calculation of the extraction cost of water per cubic meter, the economic returns of different crops, and productivity of production factors, particularly those associated with water and soil.

Analysis of indigenous knowledge and social norms in the management of the Abyan Delta agroecosystem based on the collected data from 2-part open questionnaire interviews with 30 farmers on traditions ("A'araf") and reality/norms in spate irrigation and groundwater has so far revealed the following preliminary results:

1. *Irrigation with spate water is very important for those farmers, who don't have an access to Groundwater (poor farmers).*
2. *There are lot kinds of traditions and norms, practiced until now as "unwritten laws".*
3. *Spate irrigation is organized according to the following existing norms: Upstream farmers have the advantage to get more water than downstream's farmers.*
4. *Cooperation between the spate irrigation unit and farmers to determine the responsibilities for planning, implementation and monitoring of spate irrigation is weak.*
5. *Water user's associations should have an important role in contributing to the planning, implementation and monitoring of spate irrigation, but are presently either absent or weak.*
6. *Optimal water utilization in the Abyan Delta is difficult because the distribution spate irrigation canals in the Abyan Delta are in bad condition.*
7. *Increased awareness increase about the advantages of working together is required to help the farmers to organize themselves in water user's groups and farmer's associations to address the problem.*

Observation of the farmer associations in the Abyan Delta will continue during the next quarter in order to determine their role in the optimal use and conservation of irrigation water.

## Regional Activities

### Regional Trainings and Workshops

#### **Training on scientific writing (June 10-21, 2012):**

A two-week training course was organized to build the capacity of NARES partnering with the IWLMP by upgrading their skills in writing (i) high quality project progress reports, (ii) scientific journal papers, and in developing (iii) effective research results presentations and powerful communication materials. The training was given by Mr. Richard Sanders and Mr. Michael Devlin, experts from ICARDA's Communication, Documentation and Information Services' (CODIS)



team. The training was attended by WLI partners from Egypt, Iraq, Jordan, Lebanon, Palestinian, and Yemen. Two trainees from Syria were returned from the airport in Amman due to immigration policies.

#### **“WLI Gender Training/Planning Meeting”. (May 27-31, 2012. Amman, Jordan).**

A five-day gender training and planning meeting was conducted at the National Center for Agricultural Research and Extension (NCARE) in Amman. The meeting served the dual purpose of training WLI team members to conduct community based surveys, and developing strategic plans on how the training and questionnaire could be standardized for use by all WLI partnering countries.



The training/meeting was attended by members of the socio-economic team from NCARE, a representative from the Lebanese Agricultural Research Institute (LARI), five graduate students from the University of Florida (UF), and a Fulbright Fellow who is currently doing research at the WLI benchmark site in Jordan. The training was jointly given by Drs. Sandra Russo and Constance Shehan from UF, Dr. Malika Martini from ICARDA, and Dr. Samia Akroush from NCARE.

The training mainly focused on practical tools required to conduct focus group discussions, establish seasonal and daily calendars, draw problem/solution trees, and conduct preference analysis. The trainees were also given the opportunity to test the tools they learned in the field, where they held various focus group discussions with men and women groups at the WLI benchmark sites in Jordan.

**Training on SWAT modeling – (June 24-26, 2012), Amman, Jordan** – the training was offered by Prof. Raghavan Srinivasan, Director of the Spatial Sciences Laboratory at Texas A&M University (TAMU), and facilitated by Dr. Feras Ziadat from ICARDA. The training was attended by members of the bio-physical team from NCARE who are actively engaged in SWAT modeling, two members of the bio-physical team from Palestine, and two participants from Ethiopia and ICARDA.



The training used real data collected during the previous season from three research sites in Syria, Jordan and Ethiopia and included data validation, calibration of the model to fit geo-climatic conditions of the modeling site with emphasis on dry environments, running the model, and reviewing the results. The team from Palestine was included in the training to keep them abreast of the on-going modeling exercise in Jordan and to equip them with the necessary skills required to replicate the model in Palestine. The Palestinian team has shown great interest in replicating the water harvesting work done in the Jordan Badia and in using the SWAT model to collect and analyze data.

**International Workshop “Land and water policies to sustainably improve food security” (April 24-25, 2012):** The workshop was organized by ICARDA’s USAID funded OASIS project, and was held at NCARE, Jordan. The workshop served as a platform to present the findings and recommendations of successful in-depth research activities conducted in Jordan, Morocco, Pakistan, and Yemen on improved land and water management practices that sustainably enhance food security (see: <http://www.icarda.org/WLI/research.html>). The OASIS team is in now in the process of developing a synthesis paper with specific policy recommendations and policy briefs that can readily be available for policy makers.

## 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.

### Iraq

A post-graduate student from University of Baghdad, College of Agriculture is now finalizing his research on the “Effect of Saline Water and Deficit Irrigation on the Growth and Yield of Sunflower”. The student also benefited from the JICA sponsored ICARDA training program on “Improving Water Productivity in Agricultural Systems” which was held in Amman, Jordan during the weeks of May 6-26, 2012.

### Jordan

**Summer Internship (May 27– July 29, 2012):** Five graduate students from the University of Florida spent close to five weeks in Jordan to help test and refine the questionnaire designed to collect gender disaggregated data from the community. The students in close collaboration with the WLI socio-economic team from NCARE conducted five focus group discussions among members of the community in the WLI benchmark site. The students are now in the process of analyzing and compiling their findings into a final report.

### Syria

Waseem Adleh a PhD student who worked at the WLI benchmark site defended his dissertation on “The Effect of Green Manure, and Nitrogen Fertilization in the Productivity of the Al-Gab Soil for Cotton Crop” on May 22, 2012. As reported at the end of 2011, part of his dissertation was published in *American-Eurasian Journal of Agricultural and Environmental Science*<sup>1</sup>.

Waseem also published three other articles in Arabic including:

- Khorshid, A., A. Arslan and W. Adleh. 2011. The effect of green manuring and N fertilizer on cotton yield components (Strain 124) under Al Gab valley conditions (1). In Arabic. Aleppo University for Agricultural Research.
- Adleh W., A. Khorshid, and A. Arslan. 2012. The effect of mineral and organic N fertilization on yield, dry matter and fertilizer use efficiency of cotton In Al Gab region (2). In Arabic. Aleppo University for Agricultural Research.
- Adleh W., A. Khorshid, and A. Arslan. 2012. The effect of mineral and organic N fertilization on soil available N and its effect on cotton yield under Al Gab conditions. In Arabic. Al Furat University for Agricultural Research.

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<sup>1</sup> Adlah, Wassim, Awadis Arslan and Abdul Khorshid. 2011. “Effect of Organic and Mineral Nitrogen Fertilization on the Production Components of Cotton (strain 124) under Al-Ghab Plain Conditions” *American-Eurasian Journal of Agricultural and Environmental Science*. 11(4):534-541.

Mohamad Shibli, a PhD student from Aleppo University, continued his research on “The effect of regular and irregular deficit irrigation on growth, and yield of soya bean using drip irrigation” during the quarter. During the reporting period, Mohamad prepared the soil and laid out his drip irrigation system to plant soybeans and conduct his field experiments at the Serbaya station. His plot was, however, destroyed when the station came under attack during the last weeks of June. Mohamad hopes to start his experiments again in 2013.

Dareen Assad continued her work towards MS degree focusing on ways to improve water and fertilizer productivity in Al Mukhataria station, focusing on sorghum and soybeans. During the reporting period, Dareen in close collaboration with Dr. Bushra Khuzam, Eng. Nidal Ghanmen, and Dr. Awadis Arslan prepared her field experiment sites which will be compared with the control sites that use traditional irrigation methods. Soil samples were collected and the soil was prepared for sorghum and soybean planation on May 21 and 28 respectively. Dareen planted sorghum on June 13 and will plant the soybeans on July 2<sup>nd</sup>. Dareen plans to expand her experiments to include corn in the next season (2013). Data collected from the fields will be used to calculate yield, water use, and water use efficiency.

PhD students Tamman Yaghi and Ammar Abas continued their research on water accounting of the Orontes River. During the reporting period, both refined their methodologies and have begun collecting data by taking advantage of the digital maps of the Orontes Basin developed through the WLI. Tamman also attended the JICA Training on “Improving water Productivity and farming systems” that was held in Amman, Jordan during the weeks of May 6-31, 2012.

Eng. Shadia Awad registered at Aleppo University for a PhD in Agricultural Economics. Shadia’s research will focus on water use efficiency in and around the WLI benchmark site. Her research topic is “Economic and Technical Study of Water Resource Use Efficiency of Syrian Agriculture in Al Gab Region”. Shadia will be supervised by Dr. Darweesh Shek Juma from Aleppo University, Dr. Ahmad Mazid from ICARDA, and Dr. Muammar Dayoub from GCSAR.

## Regional Communication Activities

Several US students reviewed the WLI website and provided feedback to the initiative on its presentation of WLI activities to external visitors.

Mrs Beza Dessalegn, Communication and Project Management Specialist at ICARDA, worked on a communication strategy, and made continual improvements to the WLI website.

During the next quarter, the WLI Communication Strategy will include the following elements:

- a. Revised WLI country information including factsheets
- b. Quarterly newsletter and newsflashes
- c. WLI quarterly, annual and other reports eg on training content and activities
- d. Development of WLI dedicated publication series
- e. Compilation of other research publications produced by research team members
- f. Regularly updated website including pages on research opportunities for graduate students
- g. Sharing of datasets generated by research teams through the secured WLI File Manager

## Regional Coordination Meetings

**External evaluation of the WLI activities in Egypt, Jordan and Palestine (April 20-May 4, 2012):** Dr. Chuck Onstad from USDA/ARS (team leader), together with Kristofer Dodge (USDA/ARS), and Dr. Max Rothschild from USAID, met with partners of the WLI in Egypt, Jordan and Palestine to conduct an external management evaluation. The review is expected to analyze management and programmatic practices from the perspective of the donor, the implementer, as well as local partners and offer suggestions to improve the performance of the program in meeting its objectives and mobilizing additional investment in work on sustainable livelihood enhancement in participating countries.

**ICARDA assessment of progress at WLI benchmark sites in Egypt (June 9-14, 2012):** The new WLI Manager, Dr. Caroline King, and WLI focal socio-economic expert from ICARDA, Dr Boubaker Dhehibi visited the benchmark sites in the old and salt- affected land to assess the progress made in data collection and analysis and discuss potential areas of collaboration. The visit included meetings with WLI partners in Egypt including partners from the Agricultural Research Institute (ARC), the National Water Resource Center (NWRC), and Zagazig University.

**Meetings at NCARE, Amman, Jordan (June 25, 2012):** A series of meetings on WLI issues were held under the supervision of Dr. Fawzi Al-Sheyab - the new Director General of NCARE in Jordan. These included discussion of achievements on gendered data collection by Dr. Samia Akroush and graduate students from the University of Florida. A presentation of research opportunities with the University of Florida was made for NCARE staff by Jeff Ullman. Dr. Fawzi Al-Sheyab and Dr. Samia Akroush (NCARE), Dr. Scott Christiansen and Dr. Emilie Standers (USAID), and Dr. Nasri Haddad, Dr. Caroline King and Mrs Bezalet Dessalegn (ICARDA) met to discuss the future WLI activities in Jordan.

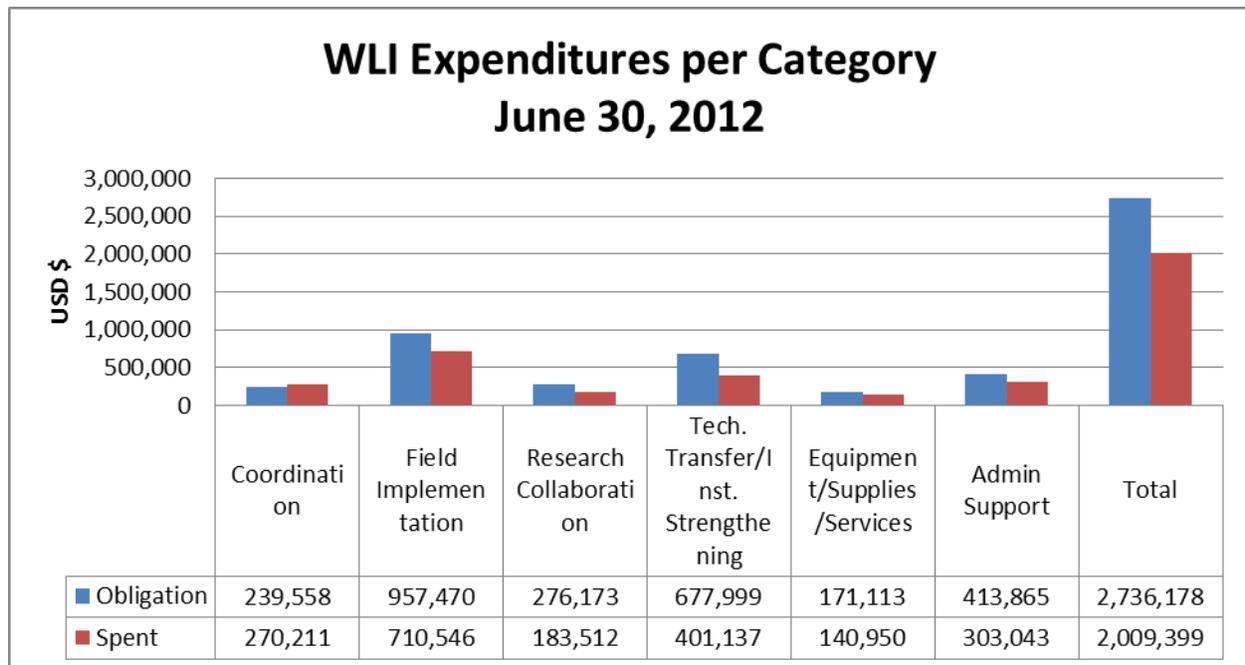
**University coordination meeting, Amman, Jordan (June 27, 2012):** Dr. Omar Kafawin (University of Jordan (UJ), WLI Regional hub university and WLI Steering Committee representative of national and regional universities met with Dr. Nasri Haddad, Dr. Caroline King and Bezalet Dessalegn to discuss coordination and communication issues.

**Assessment of socioeconomic data collection at the benchmark site in Lebanon (June 24 -28, 2012):** Dr. Boubaker visited the WLI benchmark in El Qa'a, and met with the WLI socio-economic and biophysical team from the Lebanese Agricultural Research Institute, as well as members of the community - including the head of the Water User Association at the benchmark site. The socio-economic work was reviewed, particularly looking at the household data collected and the analysis to be conducted.

## Expenditure and Burn Rate Analysis

USAID initial funding support of \$350,000 in Fiscal Year (FY) 2008 was used for three planning workshops held in Cairo, Aleppo, and Amman between April and May, 2009. USAID subsequently appropriated \$913,978 in FY 2010, \$535,000 in FY 2011, and \$937,200 in FY 2012 to launch regional and bilateral foundational activities. Taking the cumulative total of these obligations, the unspent balance as of June 30, 2012 is **\$726,779** and is illustrated by category of expenditure in the chart below:

**Figure 2: WLI Expenditures June 30, 2012**



## Overview of Progress Towards WLI Goal and Objectives

The goal of the WLI is to improve the livelihoods of rural households and communities in areas where water scarcity, land degradation, water quality deterioration, food security and health problems are prevalent in the seven participating countries, focusing initially on selected benchmark sites. The country teams have achieved the selection of the benchmark sites, and are all succeeding to implement research activities in them addressing livelihood improvement under water scarcity. In Egypt, research has also been conducted outside the benchmark site. During this quarter, security constraints limited activities at some of the sites, particularly those in Syria and Yemen.

The WLI objective for integrated water and land-use strategies for policy-making, tools for sustainable benchmark management and organizational mechanisms for community inclusion at the benchmark site has been addressed through research conducted across a range of scales– from the watershed level to the field level. On the strategic level, insights from a previous initiative focusing on strategic and policy issues have been fed into the WLI through the closing workshop of the OASIS project (see Regional Training and Workshops). Progress towards the creation of decision support tools at the watershed scale has included work on the development of geographic information systems for land suitability mapping and hydrological modeling. Field scale interventions have addressed water harvesting (Jordan and Palestine) and irrigation improvements (Egypt, Iraq, Lebanon, Syria, and Yemen). Even under security constraints, work on farms and gardens has succeed to produce results.

Knowledge enhancements have been reflected in publications reported in both English and Arabic during this quarter. Further publication outputs listed in the country workplans are under development and will be reported in the annual reports from each country. Skills improved through regional trainings addressed scientific writing, collection of gender disaggregated socio-economic information, SWAT modeling and land and water policies to sustainably improve food security (see Regional Training and Workshops). At the national level, the Iraqi team trained selected farmers on optimal irrigation and fertilization routines as well as best practices for protected agriculture; while the Palestinian team offered training on the role of women in food security. Enhanced qualifications achieved included a PhD awarded in Syria.

Concerning the objective to improve rural livelihoods of farmers in the benchmark sites, as of this quarter, baseline studies identifying sustainable land and water management practices and livelihood strategies are in place in Egypt, Iraq and Palestine. In Syria, Lebanon and Yemen, baseline socioeconomic data has been collected but remains under analysis. In Jordan, the research team is still working on the WLI baseline data collection, building on a characterization of the watershed and local livelihoods that was developed under a previous project. With the baseline studies in place, research teams will be able to track the adoption of sustainable land and water management practices and livelihood strategies.

Ongoing analyses of the baseline datasets are enabling the identification of additional options for livelihood improvement by the research teams. These and other emerging recommendations have fed

into the external management review process for the Initiative, and will be further pursued as the teams conclude their research activities for 2012 and prepare their workplans for 2013 in consultation with the Site Advisory Groups (see Annex 2).

## Upcoming Events

**Student Researcher Joseph Monical (July 20, 2012 – August 26, 2012):** a PhD student from the University of Illinois at Urbana Champaign (UIUC) is expected to begin his research at the WLI benchmark site in Jordan. Joseph will work with Dr. Feras Ziadat from ICARDA, and the bio-physical team from the National Center for Agricultural Research and Extension (NCARE) to compliment on-going research on SWAT modeling.

**USAID Grant Writing Workshop for MENA water scientists (2012):** USAID's Office of Science and Technology is organizing Partnerships for Enhanced Engagement in Research (PEER) Grant Writing Workshop for the Middle East and North Africa Region around the theme of water research. The date and venue has not been confirmed yet, but it is expected that the list of potential participants identified by WLI will be able to attend and benefit from the training.

**National Coordination for 2013 Work Planning:** WLI teams in participating countries will begin planning work to be undertaken during 2013, and prepare to submit their reports on activities completed so far, in light of the accelerated annual schedule and forthcoming coordination meeting to be held in November.

**3<sup>rd</sup> Quarterly Reporting:** The 3<sup>rd</sup> Quarterly Reports are due in September, and will include reporting on the six selected FTF indicators listed in Annex 1.

**WLI Annual Coordination Meeting (November 19-21):** The WLI Annual Coordination meeting and Steering Committee meeting will be held in Cairo, Egypt. This is a change of foreseen location due to security constraints preventing travel to Lebanon for Jordan and US Government employees. The WLI will hope to take up the offer received from Lebanon to host the meeting when the situation improves.

**Proposed Training on Socio-economic and Policy Research:** A regional training for WLI teams working on socioeconomic and policy issues has been proposed. The content, schedule, location and participants to be included in this training remain to be confirmed.

## Annex I: FTF Indicators

WLI Participants have identified six FTF indicators that are feasible to report without need for additional resources:

- Number of food security private enterprises, producers' organizations, fishing associations, water users' associations, women's groups, trade associations and CBOs receiving USG assistance.
- Number of individuals who have received USG short-term agricultural sector productivity or food security training (disaggregated by sex)
- Number of technologies or management practices in one of the following phases of development:
  - Under research
  - Under field testing
  - Made available for transfer as a result of USG assistance
- Number of stakeholders implementing risk-reducing practices/actions to improve resilience to climate change as a result of USG assistance (disaggregated by sex)
- Number of farmers and others who have applied new technologies or management practices as a result of USG assistance (disaggregated by sex)
- Number of hectares under improved technologies or management practices as a result of USG assistance.

Complete definitions of the indicators have been circulated to all national coordinators. The deadline for reporting is 30 September 2012.

In case of any problems or needs for further information, please contact Mrs. Bezaiet Dessalegn, WLI Communication and Project Management Specialist.

## Annex 2: Site Advisory Groups (SAG) at WLI Benchmark Sites

<p><b>Egypt</b></p> <ul style="list-style-type: none"> <li>• Ministry of Agriculture and Land Reclamation (MALR) &amp; Agriculture Research Centre (ARC)</li> <li>• Ministry of Water Resources and Irrigation (MWRI) &amp; National Water Research Center (NWRC)</li> <li>• National Universities (Cairo Univ. Aln Shams Univ., Zagazig Univ., &amp; Banha University)</li> <li>• West Noubaria Rural Development Project (WNRDP) IFAD funded</li> <li>• East Delta Rural Development Project (EDRDP) WB &amp; IFAD funded project</li> <li>• Water Users Associations; WUAs</li> <li>• Community Development Associations.</li> <li>• Agricultural Co-operatives</li> <li>• Farmers and farmer leaders</li> </ul>
<p><b>Iraq</b></p> <ul style="list-style-type: none"> <li>• WLI National Coordinator</li> <li>• Representative of the national universities</li> <li>• Hope to add representatives from the Farmers' Association (FA), Farmers' Interest Group (FIG), and Water User Association (WUA) in 2012</li> </ul>
<p><b>Jordan</b></p> <ul style="list-style-type: none"> <li>• Ministry of Agriculture Muagar Agriculture Directorate</li> <li>• National Center for Agricultural Research and Extension (NCARE)</li> <li>• Municipality/Muagar Municipality</li> <li>• Representative of the University of Jordan</li> <li>• Representative of Farmers' Interest Group (FIG) – Muharib community</li> <li>• Representative of Farmer Association (FA) - Al-Rahmanyia cooperative/Majedyia</li> <li>• Representatives from Nqera women Cooperatives and Muharib cooperative</li> <li>• Nqera-Muharib-Majedia committee –Al-Rahmania cooperative/Majedyia</li> </ul>
<p><b>Lebanon</b></p> <ul style="list-style-type: none"> <li>• National Coordinator: Eng. Randa Massaad (LARI)</li> <li>• Representative of civil society: Mr. Assaad El Tawm (009613 737544-009618 225224)</li> <li>• Representative of the associated hub university: Dr. Nadim Farajallah (AUB) (<a href="mailto:nf06@aub.edu.lb">nf06@aub.edu.lb</a>)</li> <li>• Representative of Farmer Association (FA): Mr. Assaad El Tawm(009613 737544-009618 225224)</li> <li>• Representative of Farmer Interest Group (FIG): Mr. Massoud Mattar</li> <li>• Representative of Water User Association (W UA): Mr. Eid Mattar (009613593067)</li> </ul>
<p><b>Palestine</b></p> <ul style="list-style-type: none"> <li>• Representatives from LRC and ARIJ</li> <li>• Representatives from NARC</li> <li>• Representatives from Hebron University</li> <li>• Representatives from Hebron and Tammun Farmer Associations</li> <li>• Key field-crop farmers and livestock herders as representatives of Farmers' Interest Group (FIG)</li> </ul>

### Syria

- The General Commission for Scientific Agricultural Research (GCSAR)
- Directorate of Modern Irrigation
- Directorate of Extension
- Directorate of AlGhab Development
- National Universities (Damascus, Aleppo)
- Farmers union
- Commission of Planning and International Cooperation
- Ministry of Irrigation

### Yemen

- Agricultural Research and Extension Authority (AREA), represented by Elkod Research Station
- National Water Resources Authority (NWRA), represented by Aden branch
- Aden University represented by Nasser Agricultural Faculty
- Agricultural Office – Extension Department
- Agricultural Farmers Union – Abyan Branch
- Representatives of Farmer Interest Group (FIG)
- Representatives of Water Users Associations (WUAs)