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EVALUATION

An External Review of the Water & Livelihoods Initiative

August 2012

This report was produced for review by the United States Agency for International Development (USAID). It was Implemented by ICARDA.

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WATER & LIVELIHOODS INITIATIVE

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External Review:

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Prepared for the USAID Middle East Bureau by USDA-Agricultural Research Service

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This review team was commissioned by Dr. S. Christiansen (USAID) and consisted of Dr. C. A. Onstad (Collaborator) and Mr. K. Dodge, both of USDA-ARS and Dr. M. F. Rothschild from Iowa State University now on detail to USAID as a Jefferson Fellow.

Executive Summary

The Water and Livelihood Initiative (WLI) aims to boost the livelihoods of communities where water scarcity and quality deterioration are prevalent. As of 2012, the WLI focuses on the quality of life of those living in agricultural areas in seven Middle East countries. While the overarching goals of the Initiative are humanitarian and development-oriented, there are various benefits of engaging with governments of this politically sensitive region. Working with the International Center for Agricultural Research in Dry Areas (ICARDA) has increased the prestige of the WLI in the region and captured the attention of many American scientists who have contributed a high degree of technical skill and superior science engagement. ICARDA is also an important partner to the WLI due to their long standing relationships within the Middle East with the National Agricultural Research and Extension Services (NARES), along with ties to local and regional research institutions.

Linkages with USAID and the prospects of donor funding contributes to the ability of the WLI to supplement established research priorities in water management for agricultural production. The strength of the WLI is greatly enhanced by the engagement of ICARDA's established partners in the region and the ability to supplement ongoing activities with WLI funding in exchange for access to established research stations where they can cooperatively gather data. During this review, it was clear that ICARDA is a logical partner of USAID in the Middle East and this relationship should be held in high regard; however there are aspects of the WLI objectives that may be better realized if ICARDA brings in additional partners in later phases of the program. In recent years, agriculture and Science and Technology (S&T) have not been prioritized by USAID for investment in the Middle East. Due to the fact that the United States does not currently have an existing "Feed the Future" focus country in the Middle East, the WLI offers an opportunity to reach a widely established network of researchers, community organizers, extension workers, and educators all with a common goal of establishing food security in target countries.

The enclosed review of the WLI will give a careful overview of the program, analyze management deficiencies from the perspective of the donor, the implementer, and local partners, and offer suggestions to enhance investment in the program. One systemic issue that the reviewers noticed at each location was the lack of investment and engagement by the bilateral USAID Mission. Each Mission expressed the view that because USAID Washington did not engage the Mission at the time of inception of the WLI, they have paid little attention to the Initiative. While the lack of involvement can also be attributed to turnover of Mission staff, such disengagement highlights a concerning overarching management issue that likely goes much deeper than one particular program or review. Programs such as the WLI are platforms that easily complement objectives of bilateral Missions and have flexibility that should appeal to the Mission. However, there appears to be a prevalent belief that if a program is not established with direct coordination with the Mission, then the Mission tends avoid engagement and neglects to take any ownership over its objective. USAID should strive to synchronize their headquarters and Mission implemented programs, which would be a better use of complementary resources. This would also attract multi-donor buy in.

Established in 2009, the WLI has not yet had the opportunity to gain enough traction to publish data collected or demonstrate the gains to the communities in a formal sense. However, as the review will note, there is solid level of informal evidence to date that suggests it is accomplishing its objectives. Additionally, while the Initiative is financially supported, at a minimal level, by the USAID Middle-East/Asia Bureau in Washington and a strategy exists to attract additional donors, the in-kind contributions of the partners appear to outweigh any current financial contributions. Therefore, there will be a time when the WLI will realize lethargy in activity due to a lack of financial support. To attract this funding, ICARDA will need to become more flexible in its mission as a public international research

institution and take more of an extension and implementation role that USAID Missions and other donors favor. Another, possibly more attractive, alternative would be for USAID to preserve the identity of ICARDA as a research institution and encourage a partner for the extension and economic development goals of the WLI. Described within this review is a delineation of the WLI into three program phases where Phase I and II would be focused on gathering research partners, institutional capacity building for data collection and scientific paper publishing to disseminate information for increased agricultural production. Phase III would be focused on local, national and international market opportunities for this increased agricultural production. This final phase would be best for ICARDA to delegate to a partner with expertise in agricultural market development which addresses the ultimate WLI goal of boosting incomes of communities at WLI benchmark sites.

The review team recommends that the WLI Project Manager be delegated budget authority for the regional effort and uses this budget to encourage National Coordinators to tighten their scientific methodologies, data collection and publication. Emphasis for this higher quality work could be given by USAID by requiring a refocusing of the objectives in each country to address a problem of collecting the monitoring and evaluation data in that is too general to be useful. We recommend that Phase I and II should focus on superior science and creating a better out-scaling scenario to encourage agricultural production. It is clear that much of the success of the WLI is based on efforts of the local research institutions, but they require training to communicate this with the broad scientific community. ICARDA, ARS and Land Grant University partners are an available resource to utilize for document review while national research institutions strive to publish their data.

Lastly, this review aims to give perspective on how to better fulfill WLI's existing goals while enhancing its ability to create lasting, diplomatic partnerships within the Middle East.

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The authors express their appreciation to all reviewers of this document. They offered numerous constructive comments and suggestions. The authors are particularly grateful to ICARDA for reviewing and offering suggestions and reactions for the report. We are especially grateful to them for providing their response to the report as the implementer of the WLI. That response is appended to this document as Annex 5.

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List of Acronyms

ARS	Agricultural Research Service
ICARDA	International Center for Agricultural Research in Dry Areas
IFAD	International Fund for Agricultural Development
IWMI	International Water Management Institute
LGU	Land Grant University
NARES	National Agricultural Research and Extension System
NCARE	National Center for Agricultural Research and Extension (Jordan)
NGO	Non-Governmental Organization
PA	Palestinian Authority
PI	Principal Investigator
SAG	Site Advisory Groups
S&T	Science and Technology
SWAT	Soil and Water Assessment Tool
WLI	Water and Livelihoods Initiative
USDA	United States Department of Agriculture
USG	United States Government
USLE	Universal Soil Loss Equation

Section I. Introduction

The WLI contributes to the efficient, sustainable, and productive use of water resources to improve rural livelihoods. The Initiative provides a platform for international research cooperation and development within identified benchmark sites of seven countries in the Middle East. Current WLI countries include Syria, Lebanon, Jordan, Palestinian Authority (PA), Iraq, Yemen, and Egypt. At the end of 2011 it was agreed that Libya and Tunisia be encouraged to join the WLI. Algeria is also interested. The visibility of the WLI has grown since its 2009 inception to a point that the time is ripe to produce data and/or publications on regional cooperation or some notable achievements in the living standards within the communities of the benchmark sites. Baseline data have been or are being collected for benchmark sites crossing three agroecological zones, including: (1) rainfed systems; (2) rangeland (badia) systems; and (3) irrigated agricultural zones. These are the three major growing regions that are found throughout the Middle East. These baseline data were captured by a significant NARES team coordinated by ICARDA that included the International Water Management Institute (IWMI), national and regional universities, NARES, and five United States Land Grant Universities (LGU). This well regarded consortium of institutions has coordinated around the common goal of increasing food security and the quality of life within the benchmark sites of the WLI.

Specific objectives of the Initiative are to:

i. Develop and test integrated water and land use strategies in each of the three major agroecosytems.
ii. Enhance capacity of national research systems through the training of scientists and encouraging regional cooperation on common research topics.
iii. Engage stakeholders and potential donors to increase awareness and recommend policies for better management of regional natural resources.

Expected outcomes of the Initiative are:

i. Adoption of new livelihoods strategies and production systems.
ii. Better water management systems.
iii. Improved natural resource management techniques.
iv. Diversification of livelihood proposals.
v. Improved research and extension capacity.

When analyzing WLI, the review team noticed numerous challenges to the WLI team's goal of boosting incomes of communities within the benchmark sites, within the benchmark sites visited(See Annex 3 for the itinerary of the review team). Obstacles range from managing a program across a region with significant safety concerns to carrying out the objectives of programs that go beyond the scope of the WLI. It is important to note that some challenges that were identified did not appear very daunting, such as the need for improved marketing of its program to local donors, which could be easily accomplished by utilizing the talent of the WLI partners.

While the end goal of the WLI is to boost the income and quality of life of individuals within the benchmark sites, this program complements a wider diplomatic effort of the United States Government at a politically sensitive time in the region's history. To have an established platform such as the WLI

engaging with several countries that have recently changed (or are changing) governments in the Arab Spring is a diplomatic opportunity for the United States to demonstrate values of living in a democratic society. The world has seen that some of the WLI partner countries have left behind the idea that they are inhabited by passive populations, but rather by a predominantly young energetic people demanding transparency in their governance. They are demanding fair opportunity for their futures. The WLI LGU partners have already initiated degree earning programs for Middle East nationals through the WLI, which should be further promoted and expanded as exchange programs to send American students to study and conduct research in WLI countries. At this critical time in Middle East history, a program like the WLI will be an important investment to enhance a science and development platform with the capacity to produce results.

a. Water and Livelihood Initiative (WLI) overview

Each country WLI partner identified "Benchmark Sites" recognizing locations where the Initiative would likely have the greatest impact increasing the quality of life of the communities. Engaging in activities related to policy, capacity building and stewardship of ecological resources, increased the likelihood that the overall goal of improving livelihoods in the benchmark site would be realized. Some of the benchmark sites were originally identified in a previous project, the Water Benchmark Project, funded by the International Fund for Agricultural Development (IFAD), the OPEC Fund of International Development (OFID), and the Arab Fund for Economic and Social Development (AFESD). Others were selected at international meetings coordinated by ICARDA where a network of stakeholders identified locations where existing work would complement the WLI goals with intervention of a network of new partners.

The selected benchmark sites are all located in arid lands where food insecurity is of major concern. Interventions from WLI partners to develop water wise agronomic choices can boost the economic activity and food security of the communities within these sites. Activities occurring within each benchmark site include researchers collecting data on water harvesting, irrigation efficiencies, salinity buildup, and cropping patterns to inform agricultural extension agents as well as policy makers. These sites can be scaled out to regional activities in similar agroecological zones.

b. Evaluation rationale

The merit in reviewing the structure of the WLI during the third year is to determine if the goals can be met with the implementer's current capacities and management structure.

Over the course of the review, the reviewers have had the chance to meet with ICARDA management, ICARDA researchers, NARES researchers/management, country university researchers and management, U.S. University Researchers, USAID Mission Officers in Egypt and Jordan, and farmers in the benchmark sites. Learning from these various perspectives enabled the review team to form a comprehensive and independent judgment.

The WLI project has three main objective tracks: (1) integrated water and land-use strategies for policy making/ sustainable benchmark management/ community inclusion; (2) knowledge, skills and qualifications for key stakeholders including NGO's, co-ops and Site Advisory Group's (SAG); and (3) rural livelihoods of farmers via adoption of land and water management practices and livelihood strategies,

ecological rehabilitation, and improved biodiversity for increased economic activity. The reviewers of the WLI have worked to delineate these objectives and determine the effectiveness of the implementer and partners toward their ultimate goal of increasing the quality of life of community members within the benchmark sites.

c. Water and Livelihood Initiative Implementation

The WLI project has interventions in three distinctly separate agroecological zones: rainfed systems; rangeland systems; and irrigated systems.

1. Rainfed System: The WLI benchmark sites in Lebanon and Syria were selected as representative of agricultural production in those countries. ICARDA and their partners work to provide supplemental irrigation.
2. Rangeland Systems: The WLI benchmark sites in Jordan and the Palestinian Authority are largely badia. Badia is defined as a rangeland receiving less than 200 mm of rain annually. In Jordan, this comprises about 80 percent of the available land and about 70 percent of this land receives less than 100mm of rainfall annually. Partners in this agroecological zone work with the Bedouin herders to develop programs to benefit small ruminant nutrition. WLI interventions in these areas are in water harvesting for increased forage production.
3. Irrigated Systems: Egypt, Iraq and Yemen benchmark sites depend on irrigation for agricultural production.

Egypt: There are three distinct benchmark sites in the Nile Delta region of Lower Egypt:

(1) El-Bustan 'New-lands' is characterized as having poor fertility, crust formation, water runoff, low water absorption, and a high water table. This area has been newly reclaimed from the desert through government investment in irrigation.

(2) There are two separate 'Old-Land' sites located in the Sharkia Governorate in the East Nile Delta and in Damanhour city. These sites are characterized as being inside the historical flood plain of the Nile River and thus with fertile soils. They have been irrigated since the building of the Aswan High Dam, which has enabled farmers to develop one or two more crops annually.

(3) The salt affected soil site on the El Husainia Plain is a reclaimed site from a brackish lake. This area has extremely high salinity, but the WLI partners were researching with a package of soil amendments and irrigation levels to determine production levels. In this second growing season they were able to increase production dramatically.

Section II: Evaluation Components, Observations, and Recommendations

The following are the necessary components for a comprehensive evaluation of a project. Comprehensive comments will be made later in this document

a. Accountability

There are several relevant questions that address the accountability issue:

(1) *Are resources being used effectively?* Since the beginning of the WLI in 2009, a total of $2.7M has been pledged by USAID Headquarters as shown in Annex 4. The original design for the WLI was to have resources pledged from USAID Headquarters, mainly for coordination, with resources pledged

from the USAID bi-lateral Missions from each of the seven participating countries. To date, only the Headquarters funding has materialized, although there are positive signs for additional funding from two bi-lateral Missions. Of the Headquarters funding, a large portion, about 73%, of it goes to coordination, field implementation, collaboration, and administrative costs. These are necessary expenditures particularly for the start-up of the WLI. As the project matures and additional funds are made available for in-country activities, the proportion of funds available for field implementation activities are expected to increase significantly.

(2) *Can objectives be accomplished?* Reviewers, as well as USAID Mission staff, noticed that the indicators selected by each country team are rather vague. While the selected indicators are relevant to the programming under the WLI, it would be difficult to measure these indicators because of their general nature. It is suggested that the indicators selected to evaluate the success of the specific benchmark should be more specific. Such indicators could align with promoting scientific methods rather than general economic development trends, which may result in countering the current belief of many that the WLI is not focused. All indicators should be specific and focused toward the end goal of the WLI.

(3) *Are resources allocated properly?* At first glance, the opinion of the reviewers was "no." While browsing international development projects with similar goals in the Combined Federal Campaign, many of the better performing institutions keep their administrative costs below 20 percent, saving the bulk of the funding for research/programs. At this point in WLI, according to Annex 4, resources identified as "Administrative Support" are about 15% of the total available, which is in line with other similar projects. If coordination and collaboration expenses are included as administrative costs, the percentage increases to about 38%. Again, as the WLI matures and more funds become available, these percentages are likely to decrease.

(4) *How should additional resources be deployed if they did become available?* Additional resources could be used to "fill gaps" in research or used to strengthen ongoing successful work. The reviewers recommend the latter. Gaps often exist because the subjects that are represented are of lower priority. Current examples of positions of strength of the WLI include the outsourcing of accomplishments, though undocumented by sufficient data, which have been achieved in water harvesting in Jordan. Additionally, Soil and Water Assessment Tool (SWAT) modeling efforts often produce huge potential benefits and assist with the prioritizing and rehabilitating soils and land use practices, particularly in rangeland and rainfed ecosystems. Lastly, after approximately one more year of collecting data, significant recommendations can be made regarding fertility levels and water use in the Nile Delta on each of the three conditions: newlands; oldlands; and salt-affected lands.

Finally, another important point under accountability, all the scientists need to be encouraged and held accountable for presenting the data that they have collected. This review recommends that the scientific effort be conducted by subject matter as a regional project rather than country by country. This would promote international cooperation since the three agroecological zones investigated in the WLI do not fit neatly within geographic borders, and more data would be published. Reviewers realize that this does create another challenge that if the WLI is seeking donor funding from Bilateral Missions whose jurisdiction are within the borders of a country, they would need to be careful in how they invest

these resources. Scientific credibility is on the line for every researcher in the WLI as well as the sponsoring and employing organizations. Encouragement to conduct all of these above tasks should be the responsibility of the WLI Project Manager.

a. Project design and implementation

Reviewing project design and implementation require evaluating whether the objectives of the projects/partners are relevant and focused. The collection of sufficient baseline data needs to be addressed, as well as the issue of replication and statistical significance.

The review team observed a possible disconnect between the mission of the donor (USAID), which emphasizes economic development, and the implementer (ICARDA), which places greater emphasis on research. While there is a definite crossover between the priorities of these two organizations, they do not appear to place equal focus on the same aspects of project design. Better coordination would be beneficial and easy. For example, in order to emphasize research, ICARDA must diligently collect data and replicate it over a number of years in order to collect enough information to publish. During this time, the project can maintain an overall focus on the broader economic development efforts included in the donor's mission. After the scientific information is formally published, these data can be used to scale up implementation of the recommendations leading to economic development.

The current WLI project design has the goal of increasing the income of community members within the benchmark sites. This may be a premature goal when you consider the missions and competencies of the implementer and their regional partners. Currently there is no partner within the WLI partnership with the mission of economic development. These are research institutions with the goal of a pursuit of creating knowledge (and some with a joint goal of extension to end users). It would suit the WLI well to take on a partner with the explicit expertise of market access of agricultural products.

From the perspective of the reviewers, an effective Phase I focus of the WLI (the current status of the program) would be to identify partners (this seems to be complete in most circumstances) and for ICARDA to build the institutional scientific capacity of these partners. The reviewers have seen the encouraging signs of this scenario in Jordan and Egypt. This research phase of the WLI could focus on developing best practices for agricultural production. Phase I should also identify socio-economic challenges relating to improving livelihoods relating to agricultural production. Generating sex-disaggregated data will be useful to give an in-depth look into household composition, specific challenges faced by each member of the household, as well as their current and potential contributions to household income and the overall livelihood of the household.

Phase II of the WLI could be focused on implementation of recommendations made by ICARDA and scientific partners. Reviewers see Phase II as transferring the site specific technology and scaling up the implementation of best practices of agricultural production. This phase would need to be done sequentially after recommendations can be made by the researchers.

Phase III of the WLI program may wish to seek the expertise of an implementer with more experience in market development, post harvest technology, and export quality control, mainly for horticultural crops. It would be possible for Phase III to occur in parallel with Phase II, and it returns the focus to the donor's goal of economic development. This phase will develop an outlet for increased local production and develop off farm activities identified in Phase I. It also will take advantage of the gender oriented trainings of accounting and business promotion.

The overall goal of the WLI is to boost the livelihood of communities within benchmark sites. At strategy sessions while establishing programs, indicators were selected by national organizations and their points-of-contact to evaluate their success at doing this. It seems that the indicators chosen for the target sites that were visited during the review, when properly focused, are attainable and scalable based upon the amount of resources invested in NARS projects; however we again feel that they may be too general to garner the attention of some donors. Reviewers would recommend that the implementer may have a separate set of indicators for the whole project they select. Again, we believe their comparative advantage will be in institutional capacity building for training scientists in scientific methodology, data collection, and scientific writing. While ICARDA, as a research institution, has a unique role to play in Phase I and II outlined above, the reviewers believe it might be necessary to bring in fresh faces and ideas to complete the program with the economic development Phase III.

b. Project performance

Project performance needs to be assessed on a regular basis, such as monthly or quarterly. Three subjects that should be incorporated in such an assessment include: (1) assessing whether the data are collected in a timely manner; (2) considering whether there are holes in the data; and (3) considering whether progress towards the accomplishment of the objectives is occurring in a timely manner. To encourage regional cooperation, a monthly conference call among WLI partners to provide updates, which can be used in the WLI quarterly report, would be fruitful. Coordinating the project performance assessment should be one of the responsibilities of the new WLI Project Manager.

c. Impact

A comprehensive evaluation must assess whether the achieved results have changed the behavior of the target of the research. Impact is often directly linked to the amount and value of existing technology transfer. Technology transfer has at least two components. The first component is the transfer of knowledge from scientist to scientist. For example, the transfer of expertise between a fundamental scientist and an applied scientist for use in developmental research helps contribute to the impact of the research, keeping in mind the end user. In the WLI, this concept is demonstrated by transfer of information from a process modeler to a scientist or group of scientists seeking to develop alternative scenarios to evaluate solutions to a problem using modeling technology. The second component of technology transfer, and the ultimate goal, is applying pertinent information and technology to the end user in the field (farmer) changing the behavior of the user to improve the livelihood of the household.

d. Gender issues

Gender issues are an important component of the socio-economic objectives of the WLI and a vital part of any evaluation. Components of a gender evaluation include assessing the role of women in a farming

practice relative to type of farm, such as crop production or animal production. The contribution of females to the total income of the household is also of important. To contribute to the integration of gender into the WLI, a small workshop was held in May, 2012 with the country leaders to develop a uniform questionnaire that would be administered in each of the participating WLI countries to establish a gender baseline. It is important that questionnaires be uniform throughout the WLI.

e. Other issues

At least two other components need to be considered when discussing an evaluation of the WLI. The first is the issue of improving harvest and post-harvest technology for use by the producers. The reviewers learned that up to 50 percent of the vegetables that are produced by small farmers in Egypt are wasted because of market uncertainties and lack of on-farm storage. This is an unacceptable situation; therefore, evaluations should start to examine the existence, effectiveness, and viability of post-harvest technology. Research should be conducted to evaluate procedures to provide on-farm storage facilities to extend the shelf life of fragile vegetable and fruit products. The value of extending the shelf-life for just one or up to a few days could be investigated through actual repeatable scenarios at several locations and for several fragile cash crops. Another way to address this issue is the possibility of having post-harvest processing facilities in the vicinity of the markets to utilize the leftover produce at the end of the market day.

The second additional issue that is recommended to be considered when evaluating the WLI is that of increased and improved livestock production as an enterprise, or at least part of a farming enterprise, in any of the three agro-economic regions under study. Many of the farmers, even in the irrigated region, had one or more animals that were being used for draft purposes and milk and meat for family use. Considerable time and effort are placed on caring for even a single animal. Animals play a role in economic development but are also an important part of the cultural fiber of the community.

Water is essential for livestock production. For small holders, water is often hauled to the limited numbers of livestock. In some cases, women herd the animals to the water source. Such activities limit production and income and are detrimental to families of small holders. Available water resources (wells, catchments, and irrigation systems) need to be managed properly to increase crop and livestock production. Evaluation of water management best practices for small holders and their villages should be considered in future WLI activities. Water meters and soil water measurement devices are not evident for assessing water use. Irrigation scheduling technology is apparently not being employed by individual farmers or groups of farmers.

Alternative scenarios should also be evaluated to understand if increasing livestock production is possible in which water management is successful on a larger scale. Consideration of methods to expand water harvest could provide for dairy herds which will be possible for expansion of milk production and sale of milk or cheese.

Such water management practices would warrant a change in land/water use practices to grow more fodder for the animals and use them as the principal source of income for the small farmers. USAID's Sustainable Intensification program could be expanded to partner with the WLI in such cases.

In the rangeland ecosystem, grazing goats and sheep are already the main source of income for the farmers. Most of these animals graze and sometimes over graze in the rainfed agro-ecosystem. Research efforts to evaluate land and water management practices are crucial. Therefore, the question is whether efforts within the WLI should be extended to evaluate such scenarios in the irrigated and rainfed ecosystems.

Section III: Water and Livelihoods Initiative; Methods and Objectives

a. International research

Although WLI research is being conducted in seven countries at present, the research topics regarding water are placed into three categories: rainfed agro-ecosystems, rangeland agro-ecosystems, and irrigated agro-ecosystems. Each participating country lists a set of objectives, usually very general, outlining research to be done. Therefore, the research being conducted is delineated by country rather than by subject matter. This results in an artificial geographic delineation that does not promote cooperation across the region. This fact was very evident during the annual planning meeting held in Amman during December 2011. Representatives from each country summarized progress during the year from their predominant agro-ecosystem without any mention of cooperation with scientists from other countries working in the same subject matter area.

Determining objectives based on research topics, rather than geographic boundaries, would likely be more effective. However, increased coordination can help overcome some of the obstacles in the current format. The reviewers encourage future annual meetings to rearrange the agenda in order to encourage cooperation within disciplines. For example, both Jordan and the PA are dealing with problems relating to rangeland ecosystems. There should be a single international team working on problems relating to rangeland that can jointly report on this issue at annual meetings and WLI publications. Similarly, it would be productive to have international teams designing research to solve similar problems for both the rainfed and irrigated agro-ecosystems. Members of each of these teams should meet periodically to discuss problems, plan research, present data, and combine and publish results. Such activities would enhance the likelihood of success and bring enhanced credibility to the research results and to the scientists, themselves, and their organizations by publishing in regional and international journals on subject matter important to a critical region of the globe.

Additionally, an entire WLI annual session at an international scientific assembly devoted to Middle East research activities concerning water can be envisioned. This would require each international subject matter team to elect a spokesperson to make the presentation with input from all team members. This concept would generate collegiality among international team members in the region, increase the likelihood that joint scientific papers will be published with authorship from multiple countries, and create a spirit of international cooperation that is critically important to the success of the WLI.

<u>Strengthening scientific methods:</u>

On nearly every document that the reviewers have seen regarding WLI research, the scientific objectives are very generally stated. Researching “integrated water harvesting and soil productivity” and assessing “the impact of applying water use technologies and land management practices on improving rural livelihoods” are examples of two scientific objectives. Rather than focused objectives, these are

statements of overall goals of the WLI project. Use of general scientific objectives raises concerns related to the scientific methodology of projects. While the reviewers have examined data that has been collected in support of the WLI, specific research plans with detailed focused research objectives where not apparent. Such plans should be in place at a central location for ease of access by individual participants and utilized for documentation for donors. The reviewers expect that ICARDA has the comparative advantage to build the capacity of partner institutions in the region in regards to the scientific methodology.

Concerns regarding the WLI objectives being too general have been expressed to the reviewers by potential donors. Without accessible, targeted objectives, almost any natural resources research involving water could be included under the Initiative. Objectives must be strengthened to increase the comfort level of donors to the WLI. Specific objectives, which should be formulated and documented at a central location, need to be published along with results, even preliminary, in order to increase buy-in from donors.

b. Hydrological process modeling

Data collection related to hydrological process modeling is important to understanding agricultural production in arid regions so that recommendations can be made for where, how much, and which types of inputs to disseminate. Modeling, using SWAT is related to the WLI objectives because it will give communities in the benchmark sites a good idea of the carrying capacity of their land given available inputs. Several individuals in the Middle East have been trained to use SWAT technology, and plans are underway to train additional individuals. With the employment of this technology throughout the region, the potential exists to recommend remediation measures to protect and rehabilitate the land resource of the region.

For example, in Jordan the reviewers observed evidence of three types of data collection for modeling hydrological processes. First, monitoring equipment was in place to collect wind-blown sediment samples on the instrumented experimental watersheds. Such data would be used to parameterize a wind erosion model. Second, runoff plots were in place to evaluate parameters for the Universal Soil Loss Equation (USLE). This is a widely used model to predict soil erosion by water. It was developed in the United States in the early 1960s and is used extensively world-wide as a dependable empirical model. One of the parameters being estimated using these data is the soil erodibility factor. Even though rainfall in this region is very small, the storms that do occur are very intense and soil erosion by water is an important problem to maintaining the land resource even in these arid regions.

The third, and probably the most significant approach being used in the region, is the use of SWAT. This is a computer-based model developed in the United States in the mid-1980s. It is a model that simulates the hydrological process on a watershed basis. It is being used in all parts of the world, including the arid regions of the Middle East, Asia, and North Africa. Data are being collected to validate the model for use in the Middle East. When validated, SWAT is capable of evaluating various scenarios for the protection and reclamation of degraded watersheds. Indeed, it is used to provide treatment scenarios to protect and rehabilitate any countries most valuable natural resource, its soils and watersheds from erosion, nonpoint pollution, and mismanagement.

Several individuals in the Region have been trained to use this technology and plans are underway to train more individuals in its use. In our opinion, SWAT has the potential to be used throughout the WLI region. Already, plans are being made to use the model in un-gauged watersheds throughout the badia and scientists from the PA will be cooperatively using this technology for watersheds in the West Bank. With the employment of this technology throughout the region, the potential exists to recommend remediation measures to protect and rehabilitate the land resource of the region.

c. Socio-economic Research

Socio-economic research topic is highly important but very difficult to conduct because it involves people, particularly those living on the land in the WLI region. However, it is the results of this research that will determine the overall effectiveness of the WLI. That is, socio-economic research answers the question of whether the people living in the research region are "better off" with the implementation of WLI achievements. In order to gather this information, questionnaires must be carefully designed and implemented at the beginning of the project. The questionnaires must ask personal questions involving income, family matters, current water management activities, involvement of women and children in the affairs of family decisions, and other delicate personal and family matters.

The first objective of obtaining socio-economic information is to assess the traditional and potential options for improving the rural livelihoods through the empowerment of women, as well as improving the knowledge and skills of the stakeholders. The aim is to improve the livelihoods of women, youth and families as a result of improved water management at the farm level. Such documentation will reflect changed behavior as a result of the interventions imposed on the farms and lands where families reside.

A second important socio-economic goal is to establish farmer associations to provide better leverage for marketing of produce and livestock products. Small subsistence level farmers are often the victim of marketing ploys. They usually do not have enough produce to influence the potential buyers of the product. However, if associations involving several to many producers could be organized, they, collectively, could influence the price of their products at the markets. Traditionally, in this region, farmers hire a transporter of their produce to markets in the city. As a result, they most often are not present when their produce is sold. The transporter takes a percentage of the income for their services. If farmer associations could be formed, someone from the association could be present at the market and otherwise represent the group during negotiations for sale. Another resolution to this potential dilemma would be to have the transporter or middleman actually purchase the products from the farmer, thereby transferring ownership to the middleman. This would improve the chances that the farmers would get a fair share because ownership has been actually been transferred and the farmer would not be subject to the vagaries of the marketplace.

Third, a very important socio-economic goal would be in conjunction with an important bio-physical goal. While in the West Bank, we heard a presentation in which several slides were shown of severely eroded and degraded agricultural watersheds. The watersheds depicted were 200-300 hectares in size with practically no vegetation and with large gullies as the waterway. They were severe cases of land degradation with little, if any, effort of rehabilitation. With the use of SWAT or similar models, various scenarios, such as terraces or strip cropping, could be evaluated to rehabilitate the land. However, the issue of land fragmentation is an enormous obstacle to accomplish the task. The speaker indicated that

there may be more than 100 land owners on these modestly sized watersheds, making the task of rehabilitation very difficult from the socio-economic perspective. A daunting, but extremely important, task would be to get all of the landowners to participate in the rehabilitation of the land. A possible scenario would be a cost-benefit analysis for each of the land owners. Obviously, the position of a landowner's farm on the watershed landscape would greatly affect the cost-benefit ratio during and after rehabilitation. However, probably the most important natural resource of any country is its soils and lands and extreme measures should be taken to protect these resources. To demonstrate the benefits of this approach, a small watershed with a limited number of landowners should be selected and funded by the WLI to demonstrate what could be done. Great care would need to be taken to assure success on a demonstration watershed. Such an approach would be a scientific achievement as well as an achievement of extension activities.

Section IV: Water and Livelihoods Initiative Outreach Objectives

a. Bio-physical research results

Of critical importance to the success of WLI is the outsourcing of research results to farmers and landowners in the region. Research results are of limited importance until they are utilized by their target customers of the region to change their behavior and improve their conditions. Not all research being conducted by scientists in the WLI is at a point where application should be expanded. However, there are already a few examples that should be outsourced to their intended customers.

Two game-changing technologies that the WLI promotes have a proven success record and are ready to be used more broadly to other areas in Jordan that experience extremely low rainfall (between 120-200 mm annually) as well as similar areas in the West Bank. The first is the concept for water harvesting using terraces on the contour. This concept has been demonstrated in Al Majedeyia experimental watersheds near the Amman airport. On one of the watersheds, the terrace interval is kept completely bare and herbaceous shrubs are planted in the terrace channel. On the other watershed, the terrace interval is again completely bare with shrubs again planted in the terrace channel but also planted is a strip of barley about three meters wide just upslope from the terrace channel. Although we saw no data, it was obvious that the concept was working well. Shrubs and barley capable of being grazed were growing well and quite lush. This was in stark contrast to the third watershed managed by the farmer in the traditional manner of planting barley, without any attempt to harvest any runoff. On that watershed, very little vegetation was present, certainly not enough for animals to effectively graze.

The operation to construct terraces on the contour was also unique. This was accomplished using the Vallerani machine. This is an Italian manufactured ditching implement attached to a medium sized tractor that was guided by the operator using a laser leveling instrument. An instrument delivering a rotating laser beam is set at the level desired for the construction of the terrace. The tractor operator has a target upon which the laser beam is sensed. The operator then drives the tractor keeping the laser beam within a tolerance that enables the machine to form a terrace channel on the contour desired. In this setup, there is a human that controls the tractor and equipment. With additional control equipment, it is possible for the tractor to be guided automatically using hydro-electric guidance controls. Of course, this addition would be quite expensive to implement, but depending on the amount of terrace construction being done, the additional expense may be justified.

The other success that WLI touts for the rangeland ecosystem, also in Jordan, is the concept of trapping runoff water in a series of water retention dams in the channel of a watershed. This concept is called the Murrab method. This concept was demonstrated in a watershed in the Muharrib benchmark site of Jordan. At the outlet of the watershed, a series of seven detention structures were built. Each structure downstream was at an elevation allowing several centimeters of runoff water to be retained before overflowing the structure into the next structure downstream. In the watershed that we saw, there was a series of seven of these water retention structures. Very lush growths of barley were observed behind the top six structures. The area having lush growth was several hectares, certainly enough for harvesting and for increased grazing of a number of animals for a considerable period of time. In addition this vegetation is being realized without any added fertilization since it is at the natural watershed that has collected nutrients from upstream.

The retention structures were constructed using rock and soil across the channel bottom of the watershed. Each of the structures was several tens of meters long in the demonstration watershed. A spillway was constructed in each structure such that several centimeters of water were retained before draining into the next downstream structure. It was a very simple concept that worked very well and is certainly successfully demonstrated to be effective although no production data or construction expense data were shown. It is also clear that it could be replicated relatively easily.

In the irrigated benchmark sites that we visited in Egypt, not enough data have been collected to make recommendations regarding water management and fertilizer recommendations on sugar beet, wheat, barley, tomatoes, berseem, and fruit trees with any statistical significance. The data being collected, however, were probably within a year of having statistical significance and as such being able to make definitive recommendations for use within the region. The same is true for the barley variety trials in the several regions of the West Bank. These trials also needed to be repeated and statistically tested for definitive recommendations to be made.

In the research/extension work of the National Center for Agricultural Research and Extension (NCARE) in Jordan, it seemed to the reviewers that methods of water harvesting were robust and successful. Recommendations for these sites would be to use the scientific method. There does not seem to be any publishable data being collected. ICARDA is in a strong position as a regional scientific organization to build capacities of the local NARS to establish publication track records. The legwork needs to be on collecting publishable data which is replicable in either time, space or preferably both. On the other hand, this site is a useful extension site to demonstrate beneficial aspects of water harvesting to land owners. The problem is that it is available to only a small number of individuals that are able to visit Jordan. If properly documented in the scientific literature, the methodologies could be replicated in arid regions globally, and this would elevate the profile of the researcher, the employing organization, and the WLI.

b. Socio-economic research results

At this stage of WLI research on this topic, there has not been enough time to make any meaningful observations regarding behavior changes of the target customers. However, the baseline socio-economic data that have been and are being collected in all seven countries and on all three agro-ecological zones should be published as soon as possible. Such data will provide valuable information regarding the characteristics of the livelihoods of populations living in the agro-ecological zones being

investigated. These data will be representative of the populations living on the millions of hectares representing the three agro-ecological zones of the Middle East under present conditions.

It is our opinion that strong consideration should be given to establish a methodology on how to involve landowners in an effort to rehabilitate severely degraded agricultural watersheds on the West Bank. If this could be done, it would be an extremely significant socio-economic accomplishment of the WLI as well as an extremely significant accomplishment of the WLI in rehabilitating any nation's most significant natural resource, its soils and lands.

Section V: Management Issues and Recommendations

a. Administrative Authority

Funds for the WLI are provided by the USAID headquarters, located in Washington, DC. In-kind contributions are also made by several partner organizations to the WLI. A potential strength of USAID is the existence of bilateral Missions, which are located on-the-ground within several of the seven countries where WLI projects are currently being conducted. However, these bilateral Missions have had little or no interest in providing support to the successful WLI project occurring within their "front yard". Therein is a dichotomy that is difficult to understand. This appears to be an organizational malfunctioning that results in less than optimal management of taxpayer resources for an important foreign aid project. USAID operates not as a single foreign aid program for international development directed from headquarters but has many decentralized and largely independent bilateral national missions that operate with their own agendas and resources. A remedy should be found to create better generalship in Washington to decide upon regional projects that are important enough for bilateral Missions to be involved. Once an agreement is made for the regional agenda , then each Mission should be responsible to headquarters for the conduct of their agreed upon part of the program. If this review sets into motion a remedy for the current system, it will have made a great contribution to USAID.

ICARDA is responsible for the conduct of the WLI. The actual conduct of the project is performed by regional universities and national centers for agricultural research and extension in each of the seven countries participating in the project. Security concerns in many of the participating countries make the project difficult to administer and monitor progress in some countries. Because the mission of ICARDA is research, not enough emphasis is placed on extension, outreach, or outsourcing. The extension commitment in each of the countries visited is poorly executed and administered. This is an historical problem that exists worldwide, even in the US. Yet, outsourcing the results of the research conducted is paramount to the success of the WLI. As such, more emphasis should be placed on the extension component of the WLI, perhaps through increased cooperation with national extension entities. Such cooperation with NARES is a most significant strength for the conduct of the WLI.

b. Supervisory Control

The day-to-day operations of the WLI are conducted by the NARS partners in each of the participating countries. Responsibilities for the overall conduct and progress of the project should be the WLI Project Manager who is an ICARDA employee supervised by the Principal Investigator (PI). The Project Manager should have some budget authority, that is, the ability to make decisions to augment a successful part of

the project or redirect resources for a part of the project that is not performing up to expectations. That person should also have supervisory control of each country coordinator. If each of the country coordinators were an ICARDA employee, such an arrangement would be relatively easy to implement. However, some of the country coordinators are not ICARDA employees. As such, an ideal Project Manager will possess managerial and scientific credibility, which will increase the likelihood that country coordinators will respect the decisions of the Project Manager and implement them accordingly. It is also of paramount importance that the ICARDA leadership in each country recognizes the responsibility and authority of the Project Manager. The Project Manager should be a visible position that is held responsible, internationally, for the conduct of the WLI. Obviously, this can only happen if the implementing organization, ICARDA, allows this to happen. Security problems in several participating countries are of significant difficulty for the WLI. Travel to these countries was not possible at this time, so that frequent communications by telephone or email are paramount to the success of the WLI in those countries. This also highlights the importance of the Project Manager having the authority to work outside of his/her country. Project Managers should be given the authority to broadly coordinate with others working on similar subject matters under the WLI. As stated earlier, changing the operation of the WLI from a country perspective to an international subject matter perspective will prevent researchers from countries having security problems from becoming isolated. Measures to prevent isolation of participating scientists are paramount to the success of the WLI. The WLI Project Manager must play a dominant role in assuring that such a problem does not prevail.

The Principal Investigator (PI) is a position currently filled since the beginning of the WLI and has the ultimate authority for the implementation of the project consistent with donor requirements; however, he must also be a modern manager of the staff in charge of implementation, especially since it is a mixture of ICARDA and NARES staff. As such, the PI should charge the Project Manager with the responsibility of the day-to-day management of the project with some supervisory and budget control but maintain overall control of the project in an almost invisible way.

The WLI Steering Committee is comprised of a representative from each WLI country plus a representative from the partnering U.S. universities and the donor organizations. It is chaired by the Assistant Director General of ICARDA. The meeting that was attended in December 2011 was the fourth annual meeting of the Steering Committee. An agenda was presented that was vigorously adhered to. The real purpose of the group was not obvious. It did present and agree on a general budget for the upcoming year but the actual allocations were not clearly spelled out and approved. It was general in nature. There was little discussion regarding focused objectives for the coming year and the Committee gave no specific direction to the Principal Investigator or the WLI Project Manager, especially with regard to the role of each. This group appears to have the authority to provide direction, at least in the short term to the WLI; however it chose not to do so. The Steering Committee should provide support and direction to the WLI managers and to the project itself. This would provide a strong continuum of support for the entire WLI program, including the balance of responsibility between ICARDA and NARES.

c. Cooperation, Leveraging, Capacity Building:

As stated, international cooperation among the participating scientists in the WLI is important to the success of the WLI. For purposes of building capacity both in education and research, cooperation is necessary with regional universities, U.S. universities, and U.S. research agencies. Cooperation for such

purposes already exists with regional universities in most of the participating countries. There are agreements that exist not only for the conduct of the WLI, but also for advancing the education of participating scientists. It is wise with limited resources to leverage the expertise of those interested institutions that have a common mission rather than engage in parallel projects.

For example, the reviewers are aware that IWMI is a partner of the WLI. IWMI is working in Lower Egypt on research activities consistent with the goals of the WLI and building a small team for this purpose. Much of this research is being funded by the Government of Australia. For a relatively small investment from ICARDA, the WLI would be able to leverage the collective expertise of this IWMI team to involve them in activities benefiting all parties.

WLI also has existing agreements with several U.S. universities, which are coordinated by the University of Florida. Other participating universities include Utah State, University of California-Davis, University of Illinois, and Texas A&M. These institutions bring important capacity building components to the project. Individuals from each university are well-known to the WLI community and bring expertise in terms of research and education advice to the WLI. Of particular importance is the guidance being provided to the WLI team in terms of socio-economic procedures and goals. Students from participating countries are onsite at these universities obtaining advanced degrees and using WLI problems on which to conduct their dissertation research. Each of these universities provides significant in-kind contributions to the WLI.

Another important U.S. research organization that is currently not a partner in the WLI is USDA's Agricultural Research Service (ARS). ARS is a large national mission-oriented research organization with many laboratories throughout the U.S. dealing with agricultural and water management problems similar to those in the WLI. Scientific expertise in ARS is outstanding and could investigate WLI problems given the proper incentive. Such an incentive would be a relatively small amount of seed money for travel to the region by an ARS scientist or for travel to an ARS location by a participating WLI scientist. To be able to participate, an ARS scientist would need to be working on a problem that was common between the U.S. and the WLI. If such agreements and arrangements could be arranged, significant in-kind contributions of ARS scientists would be made. A number of ARS research laboratories have expertise that could impact on the WLI. ARS, as a government agency, has a large investment in research. It is consistent with the wider strategy of USAID *FORWARD* to leverage these government resources of a federal institution when missions of the two agencies overlap. In this case reviewers see much overlap in the ARS National Program 211 for water quality and availability. Included in a list of relevant ARS resources to be considered are research units in the following locations: Bushland, TX; Columbia, MO; Florence, SC; Fort Collins, CO; Kimberly, ID; Lubbock, TX; Maricopa, AZ; Parlier, CA; Temple, TX: and Riverside, CA.

d. Budget evaluation

The WLI concept and commitment originated in the mind of its principal donor representative, Dr. Scott Christiansen, several years before it came to fruition. Before USAID Headquarters formally initiated the WLI, Dr. Christiansen met with leaders of USAID bi-lateral Missions in the participating countries to seek their support for the upcoming WLI project. He familiarized the Missions regarding the goals and objectives of the project, sought input from the appropriate program managers regarding the WLI, and

also sought their financial support for the future of the project. However, to date none of the Missions has contributed financially to the project. The review team is unsure of the reasons for this inaction.

Funding for the WLI began in 2009 with an allocation to ICARDA from USAID Headquarters of $350,000. Of this, over $133,000 (44 percent) was distributed to the partners to begin field research. Since that initial donation, a total of $2.7M has been pledged through 2012 by USAID Headquarters, which averages to $684,000 yearly. For USAID, this is not a significant investment. Despite the efforts of Dr. Christiansen, there have been no commitments made by USAID bi-lateral Missions to allocate their resources to support the WLI in any of the participating countries. It should be noted, that the Iraq Mission is currently considering funding for the WLI in a new program of support to the MOA.

In meetings organized by the review teams with the Missions, several reasons for lack of fiscal support by the Missions have been suggested. One is that they felt that they had not been consulted regarding the development of the project since its inception. However, documentation exists indicating that the WLI concept and project had been discussed with them within the year and their input sought before the commencement of the project. Another criticism from the Bilateral Missions was that the objectives of the project were too general. In some WLI documents, this perspective is shared by the reviewers. Nevertheless, suggestions were not forthcoming to correct that problem to their satisfaction. Reviewers explained that the vague nature of WLI information was by design and allowed Mission buy-in at any angle that complemented their current programs. We have noticed increased communication between Missions in WLI countries and the Middle East Bureau that we considered to be critical to the success of the WLI.

Reasons for such attitudes are unknown, but a couple of issues may contribute to the situation. First, is the issue discussed earlier in this section, that Missions are very strongly decentralized from Headquarters, which is a fact that many in USAID insist is correct and essential to avoid second guessing of programming and politics at the bi-lateral level. Second is that since 2008, staff at the Missions have probably turned over more than twice so that there is little, if any, institutional memory. Such rapid turnover is not conducive to continuity of important programs such as the WLI and other such programs. Such rapid turnover seems counter-productive, inefficient, and ineffective, and makes an important entity of the US Government non-committal in the eyes of its beneficiaries, that is, the regional government entities. It is doubtful whether this issue is verbalized by NARES officials in the presence of US government representatives.

e. Budget implementation

The WLI has made considerable progress since its 2009 inception. Some parts of the project have been in existence for only a year or less, such as Palestine. Others have had longer tenures, such as Egypt, which has enjoyed ongoing research projects in the field for over two years. As mentioned earlier, security issues in some of the countries have curtailed progress particularly in Yemen, Iraq, and Lebanon. Recent ongoing security problems in the host country of ICARDA, Syria, are creating problems with leaders and other foreign personnel having to relocate to more secure locations. All of this takes time and creates havoc with ongoing programs. Yet, WLI personnel are to be complimented on taking such problems in stride while still performing their jobs to the best of their ability.

Since the inception of the WLI up to March 31, 2012, about $2,737,000 has been committed to ICARDA in support of the WLI of which $1,387,919 has been received and $1,895,445 has been expended. Of this about $671,000 has been allocated for field implementation, a rate of just over 35 percent. For coordination, administrative support, and collaboration about $732,000 or about 39 percent has been committed. Although coordination, collaboration, and administrative support costs are lumped together here, arguments can be made that coordination and collaboration should remain entities separate from administration. About $493,000 or 26 percent has been committed for technology transfer, institutional strengthening and equipment supplies and services with the remainder not received or uncommitted. The remaining $842,000 of the pledged amount has not been designated for the rest of 2012. Hopefully, much of it will go toward field implementation and technology transfer.

In addition to the direct appropriation to ICARDA for the implementation of the WLI, there exist large donations of in-kind contributions to the WLI, including the time spent by this review team. Estimates of in kind contributions from the WLI partners alone in 2012 were over $678,000, a 4:1 contribution over the $175,000 allocated to the partners during 2012. This does not include the in-kind contributions of the U.S. university cooperators which are significant. Clearly, there is commitment of the partners and collaborators to the importance and support of the WLI for the future. Hopefully, direct support in terms of a budget increase from the Bilateral Missions is forthcoming. We attribute this strong commitment of in-kind contributions to the confidence partners have in the success of the WLI mission and what it means to the region. Our concern is that this confidence will not sustain itself indefinitely with unrealized successes. Our suggestion is that greater buy-in from bilateral missions to complement the core competencies of ICARDA and their WLI partners will be an investment well made.

A complete list of estimated in-kind contributions by all parties involved with WLI was available for 2011 and shown in Annex 1. For that year, a total of about $945,000 of in kind resources was contributed by all participants to the WLI. This includes in-kind contributions from U.S. universities, ICARDA personnel, WLI in-country partners, and USG personnel. In 2011, total direct appropriation for WLI from USAID headquarters was about $913,000 of which $175,000 was released to partners for field research. Those contributions represent a ratio of 1:1 for the entire appropriated budget and a ratio of over 5:1 when compared with research in the field. This ratio needs to be reduced to prevent “donor fatigue” and stagnation of the participants.

f. Budget projections

Reviewers understand that the PI of the WLI is optimistic for a future budget of $4M annually, a four-fold increase over current funding. Several important management decisions will need to be made before the WLI is prepared for such an increase in its budget. First, will be the need to accommodate the mandates of the USAID. With this funding level this review recommends that ICARDA investigates opportunities in line with the Phase II and III outlined in Section III of this review, which would be focused on increasing the quality of life of target populations through market access of their increased agricultural production. If budgeting for Phase I, the research phase, increases consideration should be given to employ overall subject matter experts to coordinate increased research activities in each of the three agro-ecosystems. To truly build regional cooperation, priority should be given to partners within countries sharing production challenges with the same agronomic attributes. Increases in management expense should occur at the partner level rather than at the Principal Investigator level. Ideally the

percentage of the funding for indirect costs at the desired $4M investment would be much less than they currently are.

Section VI. Priority Actionable Items

Presented here are actionable items for improving the WLI and its management. Items are abstracted from information presented in the body of this document. Items are organized into four categories as follows: Research, Extension, Capacity Building, and Management.

Research:

1. The paradigm for research should be switched from research topics contained within country to research topics internationally with each country contributing expertise.
2. Each research project should have a comprehensive research plan developed by the research team, including literature review, statement of objectives, methodology, and responsible parties that is approved by the Principal Investigator and the WLI Project Manager.
3. All research plans for the WLI should be placed in a common site on-line for review by all interested parties.
4. Scientific objectives need to be specific within the research plan.
5. Socio-economic questionnaires should be designed and administered very carefully by fully qualified personnel.
6. Livestock production enterprises should be considered for inclusion in the WLI.
7. Post-harvest activities should be considered for inclusion at appropriate sites in the WLI.
8. Data from experiments throughout the WLI should be published as soon as possible in regional and international scientific journals. Publication should represent an international effort.
9. SWAT modeling technology should be used throughout the WLI to provide alternative remediation measures to rehabilitate degraded catchments.

Extension:

1. In general, extension activities in the WLI need to be strengthened.
2. Consideration should be given to creating local farmer organizations for marketing of produce.
3. Consideration should be given to creating local farmer organizations or re-engaging existing organizations to create animal health and production information to support increased livestock production.
4. Farmer organizations should be formed to deal with fragmentation problems for rehabilitation or protection of the land resource in agricultural catchments.
5. Water harvesting technology developed in Jordan using the Murrab concept should be extended to or accelerated to untreated catchments in the Badia of Jordan.
6. Construction of terraces using Vallerani technology should be extended to untreated catchments in the Badia of Jordan.

Capacity building:

1. Promising candidates should be encouraged to obtain advanced degrees from a regional university or an U.S. participating university.
2. Scientists from all participating countries should be trained in SWAT technology.
3. USDA-ARS research scientists from select locations should be invited to participate in the conduct of research or for training local scientists.
4. Potential additional donors should be identified and encouraged to be participants for acceleration of progress and expansion of the WLI within each country and to other countries in the region. In particular, USAID Bi-lateral Missions should be encouraged and brought into the WLI using any means possible. Their participation is critical to the long term future of the WLI.

Management:

1. The management continuum for the WLI should be clearly defined stemming from the Steering Committee through the Principal Investigator through the Project Manager to Regional and National Coordinators and to the scientists performing the research.
2. The Steering Committee comprised of participating country and donor representatives should set the priorities and develop the budget within each participating country and the timeframe for accomplishment.
3. The Principal Investigator is responsible for implementing the decisions of the Steering Committee including the budget provided.
4. The Project Manager, under the supervision of the Principal Investigator, is responsible for the day-to-day conduct of all the activities of the WLI. To do this, the Project Manager should be given authority to make decisions regarding the conduct of the research, including its timeliness, cooperation, and scientific performance and credibility. This should include performance assessment on a regular basis. Such activities should include regular visits, where possible and regular conference calls with participating scientists to keep everyone apprised of WLI activities.
5. The WLI budget should be redesigned with more resources being sent to the field. Of the resources committed to date, only about 25 percent have been used for field implementation. Field activities and results should drive all other components of the budget.
6. During 2011-12, in kind contributions from partners of the WLI are about four times the actual money allocated to WLI partners showing great commitment of the partners. This ratio cannot continue without effort and performance stagnation on the part of the partners.

Section VII. Conclusion

The WLI has made significant progress since its inception three years ago. In each of the seven participating countries, significant activities toward accomplishing the goals of the Initiative are underway despite security problems in the region. An implementation structure is in place to conduct and supervise the activities in each country. However, the review team recommends that significant modifications be made to the structure and conduct of the operation to assure effective and efficient continuation of the Initiative as it grows in importance and stature in the region in accomplishing its stated goals.

Modifications being recommended are in the general subject matter areas of research, extension, capacity building, and management. In general, research needs, activities, and results are the driving force for all others activities in the Initiative. As such, the bulk of the resources available should be devoted to these activities. Available documentation indicates that adjustments should be made to assure such goals.

Managing numerous researchers in multiple countries is difficult. However, to date, WLI project management has been working well despite the normally difficult startup conditions and with changing personnel and movement because of security concerns. However, the roles and responsibilities of key personnel need to be clearly defined to assure efficient and effective management now and in the future with, hopefully, additional resources being added to the Initiative by both governmental and private donors. Clear Initiative goals and management structure are key to convincing potential donors to contribute to achieving the goals and objectives of the Initiative. The review team has had the privilege of visiting several locations and observing dedicated personnel working diligently to accomplish their part in achieving the goals of the Initiative. We thank them for allowing us to intrude on their everyday activities to show us their work and the progress that they have made.

Annex 1: 2011 In-kind Contributions to WLI

ORGANIZATION	**AMOUNT**
US universities for WLI students	$52,000
US university staff and faculty	$54,600
ICARDA staff	$108,000
US government cooperators	$36,763
Other US including AAAS Fellows	$16,000
NARES cooperators	
Egypt	$136,200
Iraq	$29,916
Jordan	$228,263
Lebanon	$175,200
Palestinian Authority	$38,700
Syria	$36,000
Yemen	$33,853
TOTAL	**$945,015**

Annex 2: Selected ARS Complementary Research Projects in Water with suggested partner researchers. The entire ARS National Program 211 for Water Availability and Watershed Management five year plan can be viewed here:

http://www.ars.usda.gov/SP2UserFiles/Program/211/NP211%20FY11-15%20Action%20Plan%20Final%20102711.pdf

Soil and Water Management Research Unit
Bushland, TX

http://www.ars.usda.gov/main/site_main.htm?modecode=62-09-05-05

Improving water productivity and new water management technologies to sustain rural economies

Cropping Systems and Water Quality Laboratory
Columbia, MO

http://www.ars.usda.gov/main/site_main.htm?modecode=36-22-15-00

Improving irrigation management for humid and sub-humid climates

National Peanut Research Laboratory
Dawson, GA

http://www.ars.usda.gov/main/site_main.htm?modecode=66-04-00-00

Development and transfer of peanut management technologies for irrigated and non-irrigated systems

Coastal Plains Soil, Water, and Plant Research Center
Florence, SC

http://www.ars.usda.gov/main/site_main.htm?modecode=66-57-00-00

Managing water availability and quality to maintain or increase agricultural production, conserve natural resources, and enhance environmental quality in humid regions

Water Management Research Unit
Fort Collins, CO

http://www.ars.usda.gov/npa/ftcollins/wmr

Management strategies to sustain irrigated agriculture with limited water supplies

Spatial modeling and scaling of landscape processes and conservation effects in agricultural watersheds

Northwest Irrigation and Soils Research Laboratory
Kimberly, ID

http://www.ars.usda.gov/main/site_main.htm?modecode=53-68-00-00

Soil and water conservation for Northwestern irrigated agriculture

Cropping Systems Research Laboratory
Lubbock, TX

http://www.ars.usda.gov/main/site_main.htm?modecode=62-08-00-00

Managing and modeling deficit irrigation and limited rainfall for crop production in semi-arid regions

U.S. Arid-Land Agricultural Research Center
Maricopa, AZ

http://www.ars.usda.gov/main/site_main.htm?modecode=53-47-00-00

Reuse of treated municipal waste water for irrigation as a means to increase alternative water supplies

Enhancing water conservation and crop productivity in irrigated agriculture

Water Management Research Laboratory
Parlier, CA

http://www.ars.usda.gov/main/site_main.htm?modecode=53-02-15-05

Developing sustainable cropping systems to improve water productivity and protect water and soil quality in irrigated agriculture

Crop Production Systems Research Unit
Stoneville, MS

http://www.ars.usda.gov/main/site_main.htm?modecode=64-02-55-00

Development of water management technologies for the Mid-South

U. S. Salinity Laboratory
Riverside, CA

http://www.ars.usda.gov/main/site_main.htm?modecode=53-10-20-00

Development of solutions to problems of crop production on salt-affected soils

Annex 3: Reviewers schedule of activities.

Egypt: 21-30 September, 2011
Participants: K. Dodge and C. A. Onstad

21 September
Meeting at ICARDA:
Fawzi Karajeh, Regional Coordinator, ICARDA
Francois Molle, Principal Researcher, IWMI
Yasser Arafa, Professor, Agricultural Engineering, Ain Shams University

Meeting at USAID:
John Irons, Office Director, Agriculture, Environment, Antiquities, and Water
John Pasch, Water and Engineering Team Leader
Sheri Cahill, Agriculture Officer
Mark Peters, Regional Water Advisor, Office of Middle East Programs
Wafaa Faltaous, Team Leader, Water Resource Management
Fawzi Karajeh, Regional Coordinator, ICARDA

22 September
Visit to Newlands Benchmark Reclamation Site:
Yasser Arafa, Ain Shams University(escort)
Diaa El-Ansary, Precision Agriculture Laboratory-El Shatby, University of Alexandria

25 September
Meeting at US Embassy:
Jonathan Gressel, Agricultural Minister Counselor, FAS
Salah Mansour, Marketing Specialist, FAS
Rachel Aicher, Economic Officer, ESTH Officer, DOS
John Ragheb, Public Affairs Specialist, DOS

26 September
Meeting at ARC National Gene Bank(NGB):
Hanaiya El-Itriby, President, NGB, Ministry of Agriculture and Land Reclamation
Neveen Abd El-Fathah, Senior Researcher, Tissue Culture Laboratory, National Gene Bank

Meeting at Union of Producers and Exporters of Horticultural Crops(UPEHC):
Assem Shaltout, Chairman

27 September
Visit to Old Lands Site of Ain Shams University:
Yasser Arafa, Ain Shams University(Escort)
Abel Ghany El-Gindy, Emeritus Professor, Ain Shams University
Ali Abdelaziz Ali, Vice Dean for Education and Student Affairs, Ain Shams University

28 September
Visit to 6th of October Wholesale Market:
Yasser Khayal, Marketing Technology Information Manager, UPEHC

Jordan: 10-16 December, 2011
Participant: C. A. Onstad

10 December
Visit to Jordan Benchmark Site near Amman Airport:
Yasser Mohawesh, NCARE(Escort)
Floyd Horn, USDA-ARS(retired)
Scott Christiansen, USAID
Don Suarez, USDA-ARS
Clarissa Hageman, USAID
Fahdi Karam, ICARDA

12 December
Visit to NCARE:
Faisal Awawdeh, Director General
Yasser Mohawesh, Scientist
Scott Christiansen, USAID
Floyd Horn, USDA-ARS(retired)
Don Suarez, USDA-ARS

Visit to ICARDA:
Fahdi Karam, ICARDA
Hala Hamadi, ICARDA

13-14 December
Attended all sessions of 3rd Annual Coordination Meeting, WLI

15 December
Attended 4th Annual Meeting of the WLI Steering Committee

Egypt, Jordan, Palestine: 21 April-5 May, 2012
Participants:
C. A. Onstad(Egypt, Jordan, Palestine)
K. Dodge(Egypt, Jordan)
M. Rothschild(Egypt, Jordan)

22 April (Egypt)
Meetings with ICARDA, ARC-SWARI
Fawzi Karajeh, ICARDA Regional Coordinator
Atef Swelam, ICARDA, National Professional Officer, Water Management
Francois Molle, Principal Researcher, IWMI
Abd El-Moneim El-Banna, Vice President for Production, ARC

Kamil Mettias, Vice President for Research, ARC
Samiha Ouda, Director, Soil, Water, and Environment Research Institute, ARC
Enas Abbas Saleh, Coordinator of Socio-Economic Survey, Zagazig University
Mohammed Sherif Saad Shehata, Associate Professor, Ministry of Water Resources and Irrigation
Adel M. Aboul-Naga, ARC-Animal Production Research Institute
Ahmed R. Elbeltagi, ARC-Animal Production Research Institute
Veronique Alary-ICARDA, Socio-Economist

23-25 April (Egypt)
Field visit to Old Lands Benchmark Site in Sharkia, Zagazig University, and Port Said and to Salt Affected Soil and Old Land Site for Modeling:
Atef Swelam, ICARDA, National Professional Officer(Escort)
M. Bassem Ashour, Zagazig University,Vice President
Hassan Siliha, Zagazig University, Dean, Faculty of Agriculture
S. Magdi El Hefnawi, Zagazig University, Professor, Postharvest
Ayyat M. S., Zagazig University, Head, Animal Production
Yosri Ibrahim Mohammed Atta, General Coordinator, Water Management Institute
Mahmoud El-Kholy, Director, East Delta Development Project

26 April (Jordan)
Meeting at NCARE:
Faisal Awawdeh, Director General
Mohammed A. Jitan, Irrigation and Water Management Director
Samia Akrousch, Socio-Economist

28 April (Jordan)
Meeting with ICARDA:
Theib Oweiss, Director, Water Management
Nasri Haddad, Regional Coordinator
Mohamed Boufaroua, Water Resources Specialist
Feras Ziadat, Soil Conservation/Land Management Specialist

29 April (Jordan)
Field visit to water harvesting benchmark sites(Majedyia and Muharib):
Yasser Mohawesh, NCARE(Escort)
Mohamed Mudaber, NCARE
Ali Asker Al-Rahmaia, Muktar, Majedyia

30 April (Jordan)
Indepth visit on modeling and socio-economic research:
Yasser Mohawesh, NCARE
Samia Akrousch, NCARE
Feras Ziadat, ICARDA

Visit at USAID:
Wayne Frank, Economic Growth Officer

1 May (Jordan)
Palestinian visit to discuss WLI program there:
Nader S. Hrimat, Deputy Director General, Applied Research Institutute
Nasser Sholli, National Coordinator, National Agricultural Research Center
Abdallah Alimari, ICARDA, Palestine National Coordinator

4 May (Palestine)
Visit to Tammun Benchmark Site:
Nader S. Hrimat, Deputy Director General, Applied Research Institute
Nasser Sholli, National Coordinator, National Agricultural Research Center
Abdalla Alimari, ICARDA, Palestine National Coordinator
Mark Peters, USAID, Cairo
Scott Christiansen, USAID, Washington

Annex 4: WLI Statement of Expenditures(ICARDA)-US Dollars

Particulars	**Total Budget**	**01-10-08 to 30-09-09**	**01-10-09 to 31-12-09**	**01-01-10 to 31-12-10**	**01-01-11 to 31-12-11**	**01-01-12 to 31-03-12**	**01-04-12 to 30-06-12**	**Total 01-10-08 to 30-06-12**	**Balance Available**
Coordination	239,558	17,584	15,425	125,304	99,368	12,530	--	270,211	(30,653)
Field Implementation	957,470	133,434	--	70,005	447,380	20,278	39,449	710,546	246,924
Research Collaboration	276,173	38,968	--	39,738	66,078	30,720	8,008	183,512	92,661
Tech Transfer/ Institutional Strengthening	677,999	84,087	--	126,869	150,155	8,045	31,981	401,137	276,862
Equipment/ Supplies and Services	171,113	21,454	1,257	16,506	71,164	13,149	17,420	140,950	30,163
Administrative Support	413,865	54,473	2,502	66,791	148,742	13,439	17,096	303,043	110,822
Total	**2,736,178**	**350,000**	**19,184**	**445,213**	**982,887**	**98,161**	**113,954**	**2,009,399**	**726,779**

Annex 5: ICARDA's Response to Review Document as Implementer

ICARDA's Response as Implementer

ICARDA wishes to express its appreciation to the reviewers for the highly constructive and thought-provoking review of the ongoing orientation of the Middle East and North Africa Water and Livelihoods Initiative (MENA-WLI). A particularly valuable element of this review is the inclusion of a clear list of actionable items to be considered by ICARDA and its partners in follow-up to the recommendations. The following initial response from the perspective of the implementer is presented in recognition of the value of these recommendations. Full consultation with all partners on issues will take place during the next coordination and planning meeting in Cairo during November 2012:

Action Items on Research:
The reviewers have identified the emerging research strengths of the WLI programme in connecting improved technologies for water productivity management to watershed models that can help to target their application and quantify their impacts on water availability at the basin scale (e.g. particularly SWAT modeling, as used by the WLI in Jordan). As the reviewers have recommended, ICARDA is now working to elevate the presentation of research in its quarterly and annual country reports to the level of international scientific discussion and publications. This is being done progressively through the creation of international thematic research groups, research issue-oriented trainings, introduction of thematic presentations in the annual meetings, the design of a scientific publication series to publish research results by international research teams working on key topics, and encouraging researchers to list papers for submission to international journals amongst their planned research outputs.

As the reviewers observe, the WLI has now reached the stage where a first crop of research data and outputs is ripening, and critical reflection involving all of the partners is needed. The review comments on the scope for raising the bar for research outputs are therefore particularly timely, and come at an exciting moment for WLI. The reviewers have devoted some consideration to whether it is most opportune for the WLI to fill gaps in existing research agendas amongst WLI participating institutions, or to focus on consolidating existing strengths. In this regard, they have picked up on the case for increased attention to livestock production and post-harvest technologies. The observation is welcome, and well in line with the emerging findings of the research teams. The reviewers' recommendation to revisit the project objectives as the WLI continues to bring in fresh ideas and expertise, will be essential to ensure progress, while keeping all existing partners on board. We could not agree more.

Action Items on Extension:
The reviewers have emphasized the need to strengthen work on extension, which is carried out through the National Agricultural Research and Extension Systems (NARES) in participating countries. All of the actions recommended by the reviewers for creation of farmer organizations to work on marketing of produce, animal health and production information to support increased livestock production, land tenure issues that may be hampering rehabilitation and protection of land, etc. have been explored by the NARES. This work now needs to be scaled up through country level programs. The initial design of the WLI included seven country programs and an overarching regional coordination component. So far, only the regional coordination component is up and running. However, by providing seed-funding, WLI has now been able to build the capacities at the NARS that would be required to launch the fully-fledged Country Programmes.

The reviewers observed in their report that while the Initiative is financially supported, at a minimal level, by the USAID Middle-East/Asia Bureau in Washington and a strategy exists to attract additional donors, the in-kind contributions of the partners clearly outweigh the current financial contributions

from USAID. They therefore recommend that to attract further funding, ICARDA will need to become more flexible in its mission as a public international research institution. In this regard, the reviewers present two strategic options for discussion: either ICARDA should take more of an extension and implementation role that USAID Missions and other donors favor, or USAID could encourage a partner with particular expertise in agricultural market development to support ICARDA in developing a third phase of WLI to be focused on local, national and international market opportunities. ICARDA prefers to go to partners that have comparative advantages or expertise in extension. This could be further discussed with USAID.

Action Items on Capacity Building:
The reviewers have recommended that "potential additional donors should be identified and encouraged to be participants for acceleration of progress and expansion of the WLI within each country and to other countries in the region. In particular, USAID Bi-lateral Missions should be encouraged and brought into the WLI using any means possible. Their participation is critical to the long term future of the WLI." ICARDA certainly welcomes this recommendation, and will continue to welcome USAID Country Offices and other potential donors to review the growing body of evidence to support the case for enhanced WLI programs at the country level. Two country programs are expected to be launched in 2013. If the WLI succeeds to roll out at least two country programs per year each year, the USAID investment made so far to enable regional coordination and institutional capacity building will clearly have paid off.

The reviewers have also paid attention to the WLIs ongoing work to build the individual capacity building of scientists, recommending continuation of necessary and valuable work at this level on the encouragement of promising students and ongoing training of scientists by ICARDA and its university partners. The interest expressed on behalf of USDA-ARS in participation in such activities is gratefully welcomed and acknowledged by ICARDA. It should also be mentioned that ICARDA will be linking WLI to country supported projects on water such the recently approved project in Libya supported by the Libyan Government with large component on water management. This project has a major degree (6 MSc. and 3 PhD. degrees on water management) and non-degree training component.

Action Items on Management:
Finally, the reviewers have made some clear and sound recommendations concerning the management of the project. A number of these steps have already become evident before the review was finalized and have been implemented (measures concern: responsibility of PI, appointment of a Project Manager and assignment of responsibilities for decisions concerning the conduct of research, its timeliness, cooperation, scientific performance and credibility, and sending more resources to the field). Other recommendations made concerning the role and function of the Steering Committee will be tabled for discussion by the Committee at its next meeting.

We share the reviewers' desire to see rewards for those who have invested time and energy to enable the WLI to achieve the results that it has done so far. We therefore hope that USAID and other donors will see the 4:1 leverage ratio for in-kind investments leveraged in participating countries to every dollar of USAID funds transferred through ICARDA to the NARS as a clear justification for an increase in the size of funds to be made available to our partners. We hope that USAID will take the necessary steps to enable the launch of the WLI Country Programs based on the demonstration of capacity now in place. In the meantime, we are delighted by this evidence generated through the review process that the WLI is already very clearly providing good value for money for all involved.