



Innovation for Agricultural Training and Education



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Jordan: AET Assessment Report

Recommendations and Strategies to Modernize the Capacity of Agricultural and Technical Education in Jordan to meet the Demands of Water Saving Agriculture

Submitted to the USAID Mission in Jordan by the University of Florida innovATE Project Team

February 24, 2014

USAID/BFS/ARP-Funded Project

Award Number: AID-OAA-L-12-00002



Acknowledgements

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The team would like to acknowledge and thank Ra'ed Daoud, Zeina Masannat, and the team at EcoConsult for their participation and support in the scoping study.

We wish to thank the literally hundreds of people we met with who were gracious with their time and thoughts.

This document was written as part of a series of InnovATE AET assessment reports. An AET assessment report documents a scoping analysis conducted at the request of a USAID mission. These reports identify gaps in the human and institutional capacity of in-country AET systems. Examples of good practices identified and recommendations for next steps are included in these publications.

The InnovATE project was made possible by the United States Agency for International Development and the generous support of the American people through USAID Cooperative Agreement No. AID-OAA-L-12-00002.

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EXECUTIVE SUMMARY

In support of USAID's Development Objective to improve essential services to the public (DO 3) and, in particular, to develop an accountable system for water resources management (IR3.3), the WRE office seeks to achieve efficiencies in agricultural production through the use of various water saving technologies. More "crop per drop" can be achieved by improving the efficiency of water resource allocation and use (Sub-IR 2), resulting in the production of new crops and exploration of new agricultural value chains, identification of new markets, and improving the technical and advisory services to producers overall. Such initiatives have the potential to create between 8,000 – 15,000 new jobs in agriculture (USAID Jordan, 2013-2014; 2003 Water Resources Group Report). This will not happen without significant investments in water saving agriculture (WSA) skills training for numerous stakeholders. These stakeholders include many who need training in the use of new WSA practices and technologies (e.g., small and large scale producers, processors, CBOs, WUAs), and others who need capacity development to be able to deliver training and technical assistance for WSA (e.g. public and private advisory service providers/extension agents, NCARE and NGOs).

Building capacities in WSA and water conservation practices (WCP) will be successful if the importance and impact of sound extension services is recognized. Allied with this is the need for strong community development programs that determine and incorporate local needs into programs. Water saving agriculture programs must also develop increased capacity for agriculture training and education programs. Lastly, WSA and WCP programs will be successful when linked to strong workforce development efforts.

- To achieve these objectives, a dramatic shift in agricultural practices is needed. This will only be accomplished through a concurrent program of skills training and capacity building in WSA. The agriculture sector in the Jordan Valley is a complex and complicated situation, involving multiple stakeholders who need multilevel skills development and institutional capacity building.
- The purpose of the innovATE Scoping Assessment was to develop an understanding of the current and future demand for human resources in the agricultural sector. The scoping team: (1) conducted a situational analysis of the current agricultural education and training systems in Jordan, (2) identified employment demands, especially in extension and technology transfer in the agricultural sector, and (3) identified skills gaps as perceived by both employers and educational institutions.
- The methodology included a comprehensive review of relevant literature and interviews and focus groups with stakeholders including farmers, processors and exporters, input suppliers, community based organizations, water user associations, non-government organizations, extension agents, university researchers and government representatives.
- Results indicated a significant lack of capacity at all levels of the agricultural workforce in relation to WCP and water saving agriculture WSA. Farmers and local community organizations have little knowledge about or access to new WSA and WCP approaches. Training and information dissemination via the extension system is inadequate and limited research has been conducted to field test new

technologies and practices. Existing training and education programs do not adequately prepare graduates for careers in agriculture. There is a poor perception of agricultural employment among the general public and political support for the agriculture sector is lacking. Gender disparities exist in access to and benefit from education and employment in the agricultural sector for women.

- The recommendations encompass both training and institutional capacity building for the multiple stakeholders involved in agriculture and water management in Jordan. The recommendations include a multilevel, multi-scalar and multi-stakeholder approach to achieve the goal of a comprehensive program for water conservation in agriculture that is sustainable for the long term. The program's goal will be achieved through two components which will increase water conservation in agriculture through:
 1. Strengthened support for WSA and water conservation
 - Build water management capacity of farmers, processors, CBOs, and WUAs through a multi-level training program in collaboration with local and international NGOs
 - Facilitate community level dialogue and enhance stakeholders access to WSA information, with special attention to vulnerable populations, especially women and youth
 - Improve WSA through capacity building of extension and advisory services at NCARE and in the private sector
 - Support advocacy efforts for policy and legislative reforms related to water management through both national and local level dialogue with stakeholders
 2. Increased workforce training in WSA and WCP
 - a. Enhance workforce capacity to provide WSA improvements through collaboration with the TVET institutions to provide vocational and workforce training in WSA
 - b. Build gender equitable opportunities using gender analysis of key agricultural value chains, peer-to-peer training for women's groups and targeted financing through a revolving loan program managed by local and international NGOs
 - c. Build capacity at AET institutions to prepare graduates for WSA employment and to conduct research to support WSA and WCP implementation. Support for curriculum development, student internships and practical training and faculty development would be provided by US universities.
- The interconnectedness of agriculture with water conservation practices and technologies is strong, but implementation will require training and capacity building for multiple stakeholders.
- These recommendations are well-aligned with existing USAID/Jordan interventions in workforce development and gender (USAID, 2013) The WRE activities outlined above would support and leverage other programs to enhance the Development Objective and maintain and improve the standard of living of Jordanians, thereby promoting stability in the region.

1. Introduction

1.1 Why this scoping assessment?

One of the key components of USAID/Jordan's work is on essential public services including sustainable agriculture and water management. In support of USAID's Development Objective to improve essential services to the public (DO 3) and, in particular, to develop an accountable system for water resources management (IR3.3), the office of Water Resources and Environment (WRE) office seeks to achieve efficiencies in agricultural production through water conservation practices (WCP), with a focus on the Jordan Valley which produces the most profitable crops. By achieving "more crop per drop", the looming water shortage could be averted or at least delayed, and a more efficient agricultural sector would create new employment opportunities. But in order to convince water users to use less water, training and capacity building are needed – for the farmers and processors, the community based organizations (CBOs) and water users associations (WUAs), the extension service, government agencies, education and training institutions, and the non-governmental organizations (NGOs) that work with farmers and CBOs. The innovATE team was asked by WRE to conduct a scoping study of the agriculture and technical education (ATE) system to inform mission programs to improve water management in agriculture and build existing capacity in WCP. This will enable Jordanians to improve their agricultural water efficiency through improved irrigation or by switching to different crops or, in some cases, to move to alternative livelihoods. (Please note that AET and ATE are used interchangeably in this report, depending on the data sources.)

The Innovation for Agricultural Training and Education (innovATE) is a USAID/Washington-funded project supporting the capacity development of agricultural training and education systems at all levels - from primary school through secondary institutions as well as youth programs, vocational and technical schools, and universities. The innovATE program, implemented by a consortium of U.S. universities led by Virginia Polytechnic and State University and including Pennsylvania State University, Tuskegee University, and the University of Florida, aims to strengthen the range of institutions that train and educate agricultural professionals (innovATE, 2013).

1.2 Structure of the report

This report is divided into six sections. After the introductory section, the next section presents a review of AET in Jordan addressing the educational situation overall and the specifics of agricultural training and education, from primary to tertiary and including vocational. The relevance and quality of AET, along with notable gender disparities, is also reviewed. In the third section, the drivers of change for AET in Jordan – notably, the agricultural and water markets – which demand new capabilities in the workforce to be met by new educational approaches, are discussed. In this section and the following section, data and interviews with key informants provide strong commentary for change. In the fourth section, which is based primarily on key informant data, the strengths, weaknesses, opportunities and

challenges facing the agricultural education landscape in Jordan are presented. The section outlines the policy environment, higher education, community college and vocational education, technical training and extension, and other types of advisory services and community engagement as the key components of the AET landscape. Finally, conclusions and recommendations based on the assessment are presented in sections five and six respectively. This section will form the basis for planning investments in revitalizing existing systems and formulating new programs that will help meet Jordan's critical need for increased food supplies, quality and exportable products, and increase employment opportunities in the agricultural and related sectors, while conserving water resources.

The Terms of Reference (ToR) for the scoping can be found in Appendix A. Briefly, the team sought information on AET in Jordan to: (1) conduct a situational analysis of the current agricultural education and training systems in Jordan, (2) identify employment demands, especially in extension and technology transfer in the agricultural sector, and (3) identify any skill gaps as perceived by both employers and educational institutions.

A team of university faculty and specialists from Virginia Tech, University of Florida, and University of California-Davis spent three weeks in Jordan conducting the assessment. A desktop study was completed before the team arrived in country. A local firm, ECO Consult, was contracted to assist with the assessment activities. The key institutions visited are presented in Appendix C. Survey questions were devised prior to arrival for the different types of institutions to be visited (Appendix D). Where possible, focus groups were used so as to get in-depth information from a greater number of people. In addition to specific questions about the institutions, key questions also asked were:

- What human resources are needed to increase productivity and profits in the various agricultural sectors?
- What are the expected sources for trained agriculture, water, and extension specialists?
- What is the state of extension education? Who participates? Where do they get trained or educated? Where are the gaps between what skills are provided to the workforce and what skills are needed by the employers?

2. Status of AET in Jordan

2.1 Overview of education in Jordan

Before focusing on the agricultural education and training situation in Jordan, it is important to examine the education system as a whole. Education in Jordan is primarily overseen by three ministries: Education, Labor and Higher Education and Applied Scientific Research (Georg Eckert Institute for International Textbook Research [GEI], 2009). The Ministry of Agriculture has no specific responsibility for AET per se. At the level of basic and secondary education, the Ministry of Education provides 70.5% of the educational services, private school organizations provide 19.2%, the United Nations Relief and Works Agency (UNRWA) provides 8.9% of educational services primarily to Palestinian, Iraqi, and Syrian

refugee students, and other non-governmental and governmental organizations provide the remaining 1.4% (European Training Foundation [ETF], 2000; Ministry of Education [MOE], 2004). This latter category includes the Armed Forces Department of Education which offers educational services to students in remote and poor areas. The Ministry of Labor provides education to students who enter the applied secondary vocational track which is intended to provide technical skills-based labor (Al-Sa'ad, 2007).

Basic education is free and compulsory beginning from ages six through 15, and includes the first grade through the tenth grade. All public schools are segregated by gender with the exception of some remote rural schools (Al-Sa'ad, 2007). After the completion of the 10th grade the Ministry of Education places students into one of two academic secondary tracks or into applied vocational training based on their school scores from the eighth through the tenth grades, students' expressed interests, and the availability of spots in academic programs (ETF, 2000). The academic tracks, called the comprehensive secondary stream, include an academic or vocational sub-stream. The academic sub-stream includes scientific, literary, or religious specializations, while the vocational sub-stream includes 32 specializations in commercial, agricultural, nursing, hotel and catering, home economics, and education fields (Figure 1). Our visits to and interviews at many of these institutions informed many of our findings and recommendations.

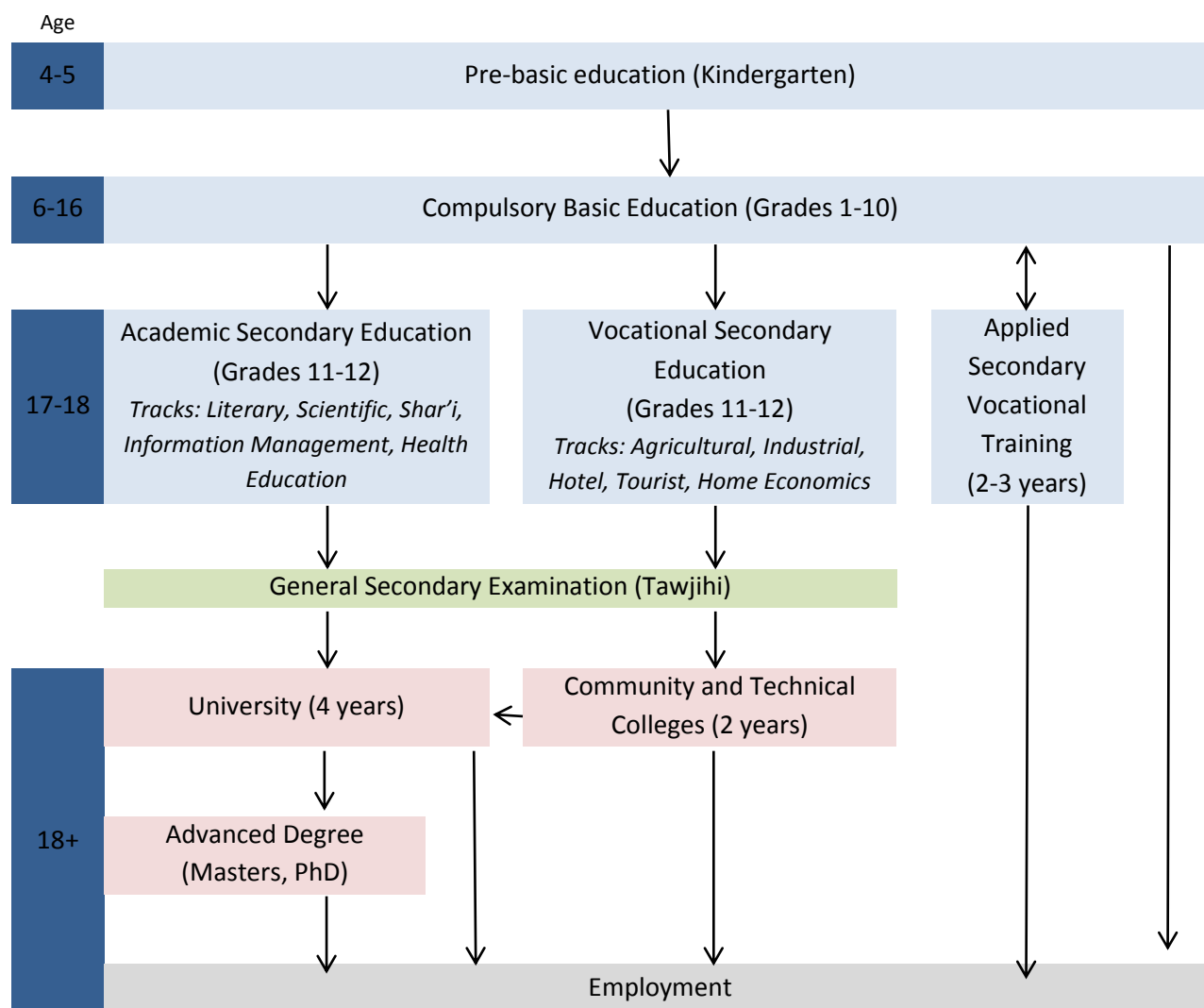
When finishing at secondary school, students in both the academic and vocational sub-streams sit for the General Certificate of Secondary Education Exam, known as the Tawjihi, which determines entry into higher education (Al-Sa'ad, 2007; GEI, 2009). Typically, students from the academic sub-stream are placed into higher education institutions and students from the vocational sub-stream are placed into community colleges or technical schools (ETF, 2000).

The applied vocational track is under the auspices of the Ministry of Labor and is intended to prepare students for direct entry into the workforce (GEI, 2009). The applied track is a three year program including two years of training and one year of supervised employment, with most programs in industrial and women's craft fields. This work experience helps the students develop confidence in the work place and helps the employers give experiential training to potential employees. The hotel and tourism vocational training institutions that we visited seemed to have developed cordial relationships with private sector employers. Students who participate in the applied track are ineligible to participate in the Tawjihi and thus are unable to enter into higher education (Al-Sa'ad, 2007). Although none of the vocational education programs focus on agriculture, there seem to be several opportunities for incorporating water saving agriculture (WSA) content to their existing courses or to develop new courses and certificates in WCP.

Figure 1 shows the structure of the education system in Jordan, which creates both duplication of efforts and gaps in the AET system. Students may follow a vocational track in high school, take vocational courses outside of high school, or study agriculture in the university, depending on their Tawjihi scores, parental pressure, and other factors. Higher education is available in two year community and technical

colleges, only two of which teach agriculture, and in four-year university level BSc programs. The approximately 60 community colleges in Jordan are overseen by Al Balqa' Applied University (BAU), which is also responsible for the accreditation of private colleges (ETF, 2000). There are 26 four year universities in Jordan, ten of which are public. Only six Jordanian universities offer degrees or teach agriculture-related subjects including water and natural resources management.

Figure 1: Structure of the Educational System in Jordan



Adapted from: MOE, 2004; WB, 2005a; UNESCO, 2011

2.2 Curriculum and availability of agricultural education

Jordan has a standard curriculum that is taught in every public school throughout the country and standardized state-mandated grading procedures (Adely, 2004). Education reforms were undertaken in the 1990s and 2000s which still “perpetuate traditional social norms, which run counter to the country’s current vision for a fair and open society for all” (World Bank [WB], 2005b, p. xvi) and which continue to

limit the options for students who wish to change secondary tracks (Shepp, 2013). The high emphasis placed on the Tawjihi maintains the culture of teaching to the test (ibid, 2013). Primary school students can receive four hours a week in pre-vocational education (PVE) and can choose two subjects of which agriculture is one (WB, 2005a).

Upon entering secondary school, students in the applied secondary vocational schools and students in the academic vocational secondary schools have the option to specialize in agriculture. In 2009 there were an estimated 10,000 students in the applied vocational schools and 20,000 students in the academic vocational sub-stream (Engel, 2012) distributed over a total of 190 schools. In both the applied and academic vocational schools, industrial, hotel, and agricultural tracks are almost exclusively male-dominated, whereas home-economics and nursing are female-dominated (WB, 2005a). In addition to public academic vocational secondary schools, the Armed Forces Department of Education oversees 20 schools, from kindergarten to high school for an estimated 12,000 students, providing infrastructure support and school supplies as well as supporting schools that specialize in agriculture (MOE, 2004). Feeding the population is a critical strategic need. Hence, this seems a good opportunity to assess and then insert training that increases the recognition of water and agriculture as important pieces of the armed forces mission and a viable career after completion of military service.

The gross enrollment ratio in tertiary education in Jordan is 38%, with a gender parity index (GPI) of 1.16, indicating significantly more female students attending than male students (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2012). Enrollment in agricultural programs at the tertiary level has declined since 2004 and 2005 when participation was as high as 6% and 9%, respectively. The trend since 2006 has been between 1-1.7% of tertiary enrollments in agricultural programs, with 2011 reporting only 1%. Of these enrollments, from 2004-2010 more female students were enrolled in agricultural programs than male students and in 2011 there was

Table 1: Tertiary agricultural education in Jordan

Year	Tertiary Enrollment in Agriculture				Tertiary Graduates in Agriculture	
	Total Tertiary Enrollment	Enrollment in Agriculture (%)	Total Enrollment in Agriculture	Female Enrollment in Agriculture (%)	Total	Female (%)
2004	28,255	6	1,599	54	763	56
2005	42,714	9	3,797	54	899	60
2006	31,156	1.2	3,768	55	-	-
2007	31,625	1.2	3,800	54	705	54
2008	32,842	1.3	4,131	56	-	-
2009	32,613	1.5	4,745	52	-	-
2010	24,734	1.7	4,286	52	-	-
2011	48,667	1	4,715	50	1,822	73
Source: UNESCO Statistical Database (UNESCO, 2013)						

an equal split of 50% of male and female in enrollments in agriculture related programs. Interestingly, the graduation rates of students in agricultural fields is highest among female participants in all four years reported, with the highest number in 2011 at 73% of agricultural graduates as female (Table 1). This is particularly interesting when considering the streaming of girls away from agricultural fields in secondary vocational schools, and may be attributable to the participation of female students in the

fields of nutrition and dietetics, which fall under the agricultural umbrella and are considered appropriate for female students. Only one of the vocational programs offer courses related to WSA. There seem opportunities to add WSA and WCP related courses in several other programs.

Cursory investigations of the 26 public and private four-year universities in Jordan have shown that four public institutions and two private institutions offer agricultural, natural resources and water management programs at the tertiary level. The University of Jordan (UJ) offers the greatest variety of programs, including eight bachelors and masters programs and six PhD programs. The Jordan University of Science and Technology (JUST) offers four bachelors programs and five master's programs in agriculture. Mutah University and BAU offer four bachelors and one master's programs, and the Jerash Private University offers four bachelors programs. We did learn that the Hashemite University has a program in natural resources and water management, however the innovATE team did not visit this institution during the scoping assessment. Many of the community colleges are satellite programs of UJ and BAU. A few courses in the agricultural curricula focus on water saving or conservation issues. Again, curriculum development would seem a sound investment to help correct this gap.

2.3 Technical and Vocational Education and Training

There is a prevailing negative perception with significant bias against vocational education in Jordan and globally, for that matter, on the part of both parents and students. For example, being placed in the vocational track is a frequently cited reason for girls being removed from secondary school, as this level of education is deemed less worthwhile (Adely, 2004). This bias stems, in part, from a system where streaming into the vocational school tracks is associated with low performance on the Tawjihi examination, and in large part based on low perceptions of the value of manual or skilled labor and a prevailing bias towards white-collar jobs (ETF, 2000; Adely, 2004; The United Nations Children's Fund [UNICEF], 2007). "The preference for academic education instead of vocational education is historically based on the sociocultural development of our value system which, over the years, has given white collar professions like medical doctors, engineers, and lawyers a higher prestige and reputation than blue collar occupations like mechanics, carpenters, bakers, or even farmers. Even our social relations, customs and such traditions as marriage have been deeply affected by such a negative value system" (Al-Sa'ad, 2007). However, these attitudes are in direct opposition to the demands of the labor market where over two-thirds of jobs require vocational skills (UNICEF, 2007). We did note at the Madaba Vocational Training Center (VTC) campus that women students were active participants in all of the classes observed, were seemingly more confident with English speaking than male students, and were comfortable discussing their career plans. The Madaba campus had regular job fairs on campus where private sector employers set up booths and met with students. Parents and other family members are invited to these events as well. This is a key strategy to get more families supporting their students working on degree paths that lead to viable careers. The same could be started and would help increase acceptance for WSA related courses and certificates.

2.4 Gender disparities

Gendered barriers to education in Jordan are largely reflected in curriculum bias, conflicting discourses on the value of women's education, gendered streaming into fields that are deemed appropriate for men and women, and an inability to enter the workforce once education is completed. Women and girls typically enroll in secondary and tertiary programs that support their roles as wives and mothers, in fields of art, humanities, education, and the medical sciences, with far fewer women entering the fields of social sciences, natural sciences, business, law, and engineering (WB, 2005a).

We found that women were very interested in studying agriculture but that few found jobs in the sector or could work outside their hometown after graduation (unless they had family members to live with near the job sites). For example, the University of Jordan requires agriculture students to spend one semester at the research station in the Jordan Valley about 3 hours' drive from Amman. The current class at UJ's field station in the Jordan Valley was 55% female and 45% male. All students were housed there during the week in (separate) dormitories, and together take classes, conduct field-based projects, and take field trips in the Jordan Valley. We again found that the women students in this group were eager to engage with the scoping team (as noted above for Madaba), interacting and asking questions in English. This gave us confidence that increasing opportunities for women in the workplace should have a positive impact on recruiting and retaining women students in WSA education and training programs. Fostering employment opportunities in the private sector will not be difficult once residential and other cultural challenges are met.

2.5 Education relevance and quality

There are significant gaps in the relevance and quality of education in Jordan where there are severe mismatches between the supply of students from the secondary and tertiary systems versus the demands of the labor market. At the vocational level, employers and trade unions are represented on the boards of training institutions nationally and often times at a local level. However, "although employer representatives are appointed on the board of most vocational education and training institutions they complain that vocational education and training programs provided by those institutes are not relevant to their needs and that school graduates need several months to a year to integrate into the workplace. Moreover, they argue that besides low technical skills, graduates show weaknesses in work attitudes, behavior and in social skills" (ETF, 2000, p. 24). Additionally, employers claim that students are not trained with the skills needed for the workforce and that training in vocational schools is poor with many teachers lacking relevant experience and qualifications themselves (ETF, 2000). Employers also contend that students graduating from academic secondary schools are not prepared to enter the workforce, lacking both practical skills and confidence. This indicates that experiential learning (such as internships) may prove valuable to both graduates and their employers.

Key informant interviews echoed that students graduating from academic secondary schools are not prepared to enter the workforce. The agriculture curriculum at the secondary and tertiary levels in Jordan focuses on theories and scientific processes; students rarely have the opportunity to get practical, applied experience. Faculty members defend this by saying that students must have the solid scientific grounding but in contrast, employers believe the graduates are simply ill-prepared for real world work. This emphasis on traditional educational approaches and learning philosophies (top down, didactic, rote memorization) completely ignores the skills training that employers globally, not just in Jordan, desire in their new hires (communication and leadership skills, ability to work in teams, analytical thinking). As noted in a report by IFPRI, transforming the current cultures and behaviors of AET systems could occur if the educational system understood the market for change, “educating to create new applications of existing knowledge and information, products and processes, and organizational structures and management” (Davis, Mekasha, Ochieng, Spielman, & Zerfu, 2007, p. 16). As an example, faculty at UJ noted that it is easier to develop a new degree or certificate than to change existing curriculum.

3. Drivers of change in Jordan’s AET

The drivers of change for AET should be the agricultural and water markets, and the pressing need for water conservation. The rapidly evolving geo-political situation makes investments in AET to assure continued, improved agricultural production critical. The country is dependent on domestic food production for its own security but also for the growing influx of refugees. Despite the closing of the Syrian borders and traditional trade routes to markets, Jordan is still a food exporter to the rest of the region and to Europe. The official percentage of population engaged in Jordan’s agriculture in 2013 is estimated at 2.7% (CIA: The World Factbook) but many informants thought a better estimate was closer to 10%.

3.1 Demand for new capabilities/new educational approaches

On numerous occasions, informants told us that the perception of the general public is that agricultural employment is equated with being a farmer. Parents and students alike had an understanding of agricultural employment that neither included the vast array of employment opportunities along a comprehensive value chain of any sort nor included any notion of entrepreneurship. The goal of most seemed to be the government job, any government job, because of the benefits available to government employees. At the tertiary education levels, faculty members were likewise unaware of employment opportunities and were rather educating students in basic science, using traditional methods of pedagogy, presumably for government jobs.

3.1.1 Over-production of university graduates

There are far more graduates coming into the market place than the agriculture and related sectors can absorb given the above understanding about employment opportunities. Because the faculty and students are not well informed about these opportunities, the curriculum offered by the faculty and the perceived opportunities for the students leads to disappointment upon graduation. Employers do not want the types of graduates currently being produced. To be fair, it is difficult to supply appropriately skilled and ready to work graduates well-matched to the demand in the sector if the employers and the educators do not communicate. This disconnect continues despite complaints on all sides about the situation. It will be important to seek ways that employers can communicate skills needed to schools and students.

3.1.2 Underproduction of skilled agricultural workforce

Most farmers that we spoke with said that skilled and interested workers were not adequately trained to handle production and processing duties. For instance, one farmer said that he needs one worker per greenhouse. Many farmers have from a few to dozens of greenhouses, yet there is a serious lack of workers who understand how to operate greenhouses, including the irrigation systems, pest management, and harvesting. This leads to declining production levels, less efficient water management, and poor quality products. The farms are less likely to be profitable, and investment in the sector is not encouraged. It is time for investment in the training of the agricultural labor force.

The Government of Jordan launched the National Employment Strategy action plan in June 2012. To date, there appears to be little coordination between those organizations that oversee education and training and those that would link training programs to current trade and industrial policies. The ETVET (Ministry of Labor) is just beginning a large multi-sector project on 22 different labor markets, with agriculture being one of these. Supported by the EU, they will be establishing a labor market information system. They have already gathered information that highlights some important skills gaps, e.g., pruning of citrus trees and grapevines, but are still surveying producers to get more information on the needed skills. This will be the first time that ETVET has focused on the agricultural sector. They are especially interested in occupations at the technician level, which is where Jordanians would be employed, as opposed to the unskilled labor market that is mostly filled by young, male guest workers (Egyptians, Palestinians and, lately, Syrians).

As noted above, the understanding and vision of potential jobs in agriculture is limited by educators, students, and their families. Examples of the range of occupations and jobs available in the fruits and vegetable value chain are highlighted in the table below; this could form the basis of a strong certification program, for both the public and private sector, and become part of the education and labor reform efforts underway.

3.1.3 Underproduction of entrepreneurs

A number of studies have noted a lack of entrepreneurial skills training in general in Jordan. Few students have the vision or the opportunity to pursue entrepreneurial ideas while in school and once out of school, do not have the skills to do so. One strategy would be to help graduates know how to set up and manage an enterprise - whether it be for profit or not for profit (government or NGO). A donor-funded pilot program to advise students was set up at UJ and ran for five years. A small office on the UJ campus where students can access computers and get some career advice still exists, although it is not fully staffed or efficiently focusing on private agricultural advisory services. While the focus in the pilot program was on creating small and medium enterprises, entrepreneurial training would be especially helpful for graduates who might want to become private extension agents. Again, this highlights the need for a multi-level training program.

Table 3: Job profiles in the fruit and vegetable value chain

Position	Formal education requirement	Skill level required
EXPORT PRODUCTION		
Harvest worker	No formal education required	L
Tractor/truck operator	License/certification	L-M
Pesticide handler	Technical education	M-H
Irrigation technician	Technical education/BSc	M-H
Quality control	Technical education/BSc	M-H
PACKING AND COLD STORAGE		
Packing worker	No formal education required	L
Labelers	Literacy and numeracy skills	L-M
Transport driver	Literacy and numeracy skills	M
Managers (line/shift)	Technical education	M-H
Inspector	Technical education	M-H
Packing manager	BSc	H
Quality assurance manager	BSc/MSc	H
PROCESSING		
Line workers	Literacy and numeracy skills	L-M
Mechanics & machinery maintenance	Technical education	M-H
Production supervisor	BSc	H
KEY: L Low, no formal education; experience L-M Low-Medium, literacy and numeracy skills; experience M Medium, technical education, certification M-H Medium-High, technical education/undergraduate degree H University degree and higher		

Source: Adapted from Table 10, Duke CGGC, 2011, p. 54.

There is a lack of good extension and advisory services available to farmers at most levels. Larger farmers can afford and have the contacts to hire (usually) foreign consultants. Smaller farmers do not see these experts and in any case, they cannot afford this help. At the same time there are wide gaps in skills and confidence of agricultural graduates to meet the extension needs of the smaller farmers. The mindset that extension agents are government employees, that there are few extension agents due to

hiring freezes in the Ministry of Agriculture, and that being an extension agent means living in rural areas only leaves the field of extension and advisory services wide open for entrepreneurship. In Jordan currently, much of the work of extension is done through community based organizations (CBOs) which are managed by national or international NGOs, e.g., Jordan River Foundation or Mercy Corps. There are opportunities in these organizations for graduates, especially those who have skills in financial management. The NGOs noted that they would rather hire an agricultural graduate and train him/her in financial management than hire business graduates.

3.1.4 Youth unemployment

Unemployed and underemployed youth are a significant issue in Jordan, where the youth unemployment rate is three times that of the adult unemployment rate (Guarcello, Kovrova, & Lyon, 2012). First-time job seekers make up 53.4% of the unemployment rates and overall participation in the labor force is low (Engel, 2012). A 2005 World Bank report puts the unemployment rate of youth under 25 at 60% and among 15-29 year olds at 76%, this latter group includes 82% of women (WB, 2005b). A similar report prepared for the 2012 Education for All Global Monitoring report on Youth and Skills places the unemployment rate of youth in Jordan at 19.4% with 16.2% of men unemployed and 32.3% of women, with over 25% of youth who have achieved higher education in Jordan as unemployed (Guarcello et al., 2012). When using a more relaxed definition of unemployed that includes youth who are not actively seeking employment, the number of unemployed youth increases to an average of 25.2% across education levels, and up to 30% of tertiary level graduates (Guarcello et al., 2012). This is further illustrated by a 2013 World Development Report that places the unemployment rate of youths at closer to 22% for men and 45% for women (Shepp, 2013), and a statement in 2012 by the labor minister that only half of the 50,000 Jordanians that graduate from universities are able to find employment (Shepp, 2013). Underemployment is also an issue in Jordan where employees often take jobs for which they are overqualified. This is particularly true for female workers where there are significant disparities between the level of educational attainment and job placement. For example, Jordanian women must attain an additional 1.7 years of schooling than men for the same job placement (WB, 2005b).

Some of the issues contributing to underemployment include: job creation primarily found in Amman while many unemployed are living in rural areas, brain-drain as highly educated people migrate abroad for better paying jobs, secondary school training that is seen by employers as inadequate – particularly for the provision of skilled labor, and prevailing bias against vocational training in an economy that is shifting towards skilled jobs (Engel, 2012). These latter two issues are illustrated by a World Bank report (2009) that states that only 36% of applied vocational students went on to fulltime employment with a continuing decline in participation in vocational training. In addition to the prevailing bias against vocational training, employers also state that secondary school graduates “are ill prepared for work, despite the ambitious standards demanded of them... the Ministry of Education is not interested in training students for the labor market and that, even in the vocational stream where students are prepared for higher education, the curriculum is too theoretical” (ETF, 2000, p. 14).

3.1.5 Women's workforce participation

The high levels of educational attainment of women in Jordan are not resulting in women entering the workforce where there are significant cultural barriers to mobility and where acceptable work for women is narrowly defined. In 2010 the Jordanian Ministry of Labor reported that the unemployment rate of women was 21.7% compared to 10.4% of men. When looking at economic participation, they report that participation of women is at 14.7% compared to 63.5% of men (United Nations Development Programme [UNDP], 2011). Unemployment of women by level of education is also revealing where 55% of unemployed women have graduated from tertiary education with a bachelor's degree, a rate that is three times that of men with the same level of education (UNDP, 2011).

Participation of women in the workforce is largely skewed towards fields that are deemed socially acceptable for a woman including nursing and in the civil service, with the majority of women working in education (Al-Manasra, 2013). The public sector provides the majority of jobs for women. Private companies are significantly less likely to hire women; small-medium enterprises are employing 4.28 times more male employees than female employees (UNDP, 2011). Women are more likely to take jobs that pay less than the minimum wage, are more often found in entry-level administrative jobs and in education, and must achieve a higher level of education for the same job than men. Due to social pressure, women prefer to live at home or close to home. Moreover, women prefer government work, if they can get it, because it is socially acceptable and there are opportunities for advancement. When women are able to attain jobs outside of education, they face significant vertical discrimination with male employees given preference for bonuses and promotions, and gendered gaps in pay with women earning 88% of male wages (UNDP, 2011; Al-Manasra, 2013).

3.2 Supply and demand

Among the drivers of change in Jordan are the new markets for agricultural products in Jordan, the Middle East and North Africa (MENA) region and beyond combined with the very dire situation of water availability which all but agricultural producers seem to recognize as a problem. As many of the key informants mentioned, graduates are ill-prepared to meet the newer labor demands, which is a reflection of the AET system overall and the lack of communication between employers and educators.

3.2.1 Skills needed in the agricultural sector

Interviews with employers noted several key areas where they find recent graduates lacking. Why is there a lack of practical training or experience for students? First, teachers and professors teach as they were taught, have heavy teaching loads, with little time or reward for innovation in the classroom. The level of adopting new teaching styles is low, the level of IT use in Jordan is low (aside from mobile phone usage), and government regulations in fact are a disincentive to introducing innovative methods of teaching using online materials and practices. Second, employers are slow to communicate back to educators what skills they want to have in the graduates they hire. Third, the limited availability of

internships and practicums ensures that only a few students have these opportunities and the disincentives for using online simulations and cases to teach practical skills limit using IT as a way to meet this need for practical training. The job market in the agricultural production and water management is ill-defined. Not all jobs are in rural areas, not all agriculture graduates become farmers.

The lack of career guidance, lack of communication from employers, and lack of discussion about career possibilities prevents an expanded vision of the agricultural sector's employment opportunities. We came across jobs in import and export sales, service and law, in marketing (communication, public relations, sales), in food inspection, and transportation. We heard about the severe lack of skilled agricultural labor at the vocational levels, with large producers using expatriates with skills in preference to hiring Jordanians without skills. Employees who know how to manage greenhouses and irrigation systems or citrus, stone fruit or date orchards were highly sought, for example. NGOs, on the other hand, want to hire agricultural graduates who know how to work at the community level, who have good communication skills, empathy with local people, and the ability to bring solid agricultural technology and water management advice to farmers.

Finally, as the range of potential jobs is revealed to be rather wide, the lack of training in business skills or entrepreneurship for agricultural students was surprising. While a small farmer on his own, for example, is unlikely to buy a lot of fertilizer or hire a technical advisor, a CBO or a WUA might do so. Mid-level farmers are ripe for entrepreneurship, either via their own sons and daughters or by hiring it, to ramp up their production to reach new markets. Especially at the high end of export production, we found that most employers rely on imported technical assistance, whether in terms of production technologies, processing equipment, or technical advice. The table below highlights what kind of skills is needed by farmers at all levels.

The assessment team spent a considerable amount of time meeting with private sector producers, to elicit the types of skills they want to hire. These basically fell into three categories:

1. Specific skills such as harvesting, pruning, and weeding. Workers tend to be expatriate, young male guest workers (e.g., Egyptians) and often hired on a seasonal basis.
2. Basic literacy and numeracy skills which can be supplemented by on the job training.
3. Agricultural BSc or higher graduates. Even with these, the producers noted that they have to provide additional practical training to the university graduates.

Private sector producer members of the Association of Agriculture Engineers (AAE) sought new hires with practical skills. But in many cases, since such graduates are not available, they will offer practical, company-led training and experience once the newly hired person is on staff. For instance, Agri-Jordan mainly seeks people that have a general education or experience in agriculture. Much of the skills required are learned on-the-job. At Engicon, the new staff employees come with some water experience (usually with utilities) and have a BSc, MSc or PhD from Al-Balqa University or Jordan University. The company gives two months training to 15-20 University of Jordan engineering graduates every year.

Graduates are selected from a pool of 100 candidates by the university, and short CVs sent to Engicon Human Resources Department.

Table 3.1: Understanding the agricultural skills market

Agricultural system	Skills needed	Advisory & Extension Services (AES) sources	Gaps
Small, poor subsistence farmers	Water management, new technologies	NCARE, NGOs	Limited access to NCARE
Small farms operating in domestic market (horticultural and livestock)	Skilled workers, marketing, distribution, improved water management, veterinary care	NCARE, NGOs CBOs Private suppliers	Expertise specific to their domestic markets on new crops and water management, on marketing, on distribution channels
Farmers with potential to become commercial	Entrepreneurial, marketing, distribution, new varieties, improved water management	Unclear, possibly NCARE and input suppliers, WUAs, CBOs	In any new value chain
Large commercial farm operators, high value, export oriented	Advanced technologies (greenhouse management, irrigation), exporting rules, marketing for export, distribution	External to Jordan	Expertise specific to Jordanian conditions

Source: Adapted from Davis et al., 2007

Many of the private sector firms only require basic literacy and numeracy, not necessarily training in agricultural engineering. At AgroCare the management only needs workers that can read and write so they can manage labeling plants for breeding purposes. The manager teaches them how to emasculate and pollinate plants. He also wants people he can trust since breeding requires honesty between the breeder and the farmer. He does not want to train someone who will steal his proprietary seeds. Likewise at Wadi Exports (dates and vegetables) the manager prefers people with little or no technical training. He works with new hires for about three months until he feels that they are ready to start working in his business. The main need at Arar Farms is for new workers to have some formal education, but not advanced degrees. Of the 17 employees, only three are agricultural graduates. The farm has an internship program arranged through the AAE to help students acquire job training.

The team met with several input supplies. The Sukhtian Group considers first agricultural engineers with some experience. They currently employ 12 BSc engineers for their showrooms and field sales centers distributed across the Highlands and the Jordan Valley. They do not hire women as their positions require a lot of travelling and being out in the field. The company participates in the engineering internship program providing half the salary and the other half provided by the German Government (GIZ). The number of interns trained each year depends somewhat on the needs of the company but usually they will take at least one even if they don't have a full time position to fill.

Marketing and entrepreneurial skills are in great need. Often graduates have learned much about production (from a theory perspective), but don't have the skills or confidence to operate a business. Export marketing in particular is a dire need. For Jordan's agriculture sector to be competitive especially in export markets it needs to have employees that understand and possess skills in business planning, efficient processing, international marketing, and communication skills.

3.2.2 Labor data

The Ministry of Labor is currently directing significant efforts to improving employment prospects coupled with enhancing vocational and technical education and training (E-TVET), to reduce the high rate of unemployment. The Ministry notes there is a mismatch between labor supply and demand, the participation rate of women in the labor market, the lack of and need to develop a coherent policy and approach to poverty reduction, and to reduce inequalities of participation in the labor market (The Ministry of Labour). The team met with E-TVET to discuss their plans to reform the sector in 22 key areas, including agriculture. This would include new policies, revision of existing bodies, and improving the Quality Assurance Agency, instructor training and re-equipping TVET institutions. While this reform will mostly target agricultural vocational training and job skills programs, there are likely to be ripple effects onwards to higher education and the Ministries of Education and Agriculture. Or so it is hoped.

It is extremely difficult to get data for agricultural labor in Jordan, primarily because many of the workers work "off book". Nevertheless, the data available (Table 3.2) points to significant youth and female unemployment issues in Jordan overall.

Table 3.2: Recent Labor Market Data for Jordan

Labor	Actual
Unemployment rate, total, % of labor force, 2005-2009	12.90
Unemployment rate, male, % of labor force, 2005-2009	10.20
Unemployment rate, female, % of labor force, 2005-2009	24.77
Extent of staff training (1-7), 2010	3.60
Brain Drain (1-7), 2010	3.40
Labor force participation rate, total, 15-24, 2005-2009	27.03
Labor force participation rate, male, 15-24, 2005-2009	43.91
Labor force participation rate, female, 15-24, 2005-2009	24.08
Labor force participation rate, total, 15-64, 2005-2009	51.77
Labor force participation rate, male, 15-64, 2005-2009	77.83
Labor force participation rate, female, 15-64, 2005-2009	24.08
Females in labor force, % of total labor force, 2009	23.00

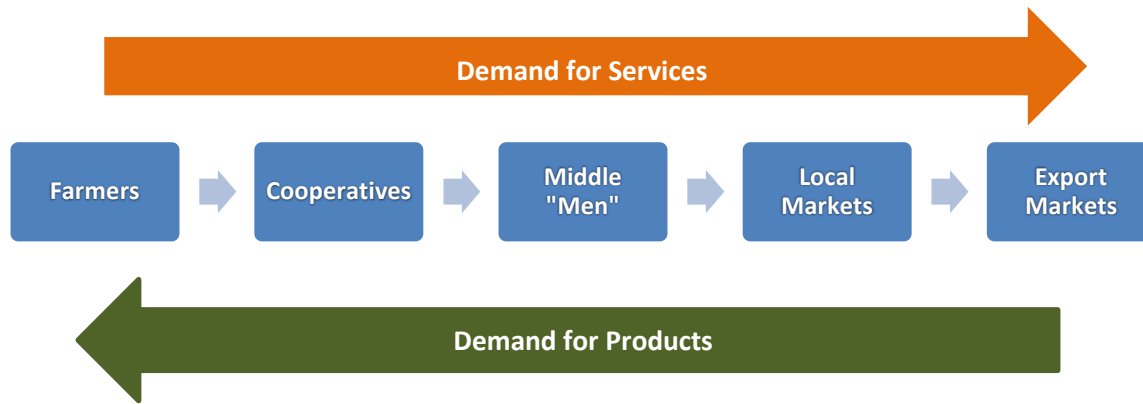
Source: World Bank, 2013

The current AET system produces agricultural graduates who are for the most part unemployed and unemployable in Jordan. Graduates we interviewed mentioned repeatedly the lack of opportunities for practical training; employers mentioned the difficulty of finding graduates who want to work in rural areas. Large producers noted that the entrepreneurial spirit is absent in agricultural graduates. Farmers mentioned that extension agents do not have the information they need while extension agents are unable to get practical information from the researchers. The very best graduates may go on to graduate school, with a very small number of them obtaining jobs at Jordanian universities or in the public sector. Others leave to work in other MENA countries, especially in the Gulf region where wages are significantly higher.

There seems to be a failure to recognize the different opportunities and types of agriculture in Jordan and to tailor training and education of the workforce to the needs of those segments of the agriculture labor market. The skills needed are wide-ranging in levels (from basic pruning to export licensing), level of education (primary through tertiary including vocational), location (rural, urban, and international) and disciplines (irrigation to marketing to entrepreneurial). Specific examples of employment opportunities in three Jordanian value chains are noted in the following three figures: tomato, citrus and Badia.

3.3 Value chain examples

Figure 3.1: Tomato Value Chain, Jordan Valley



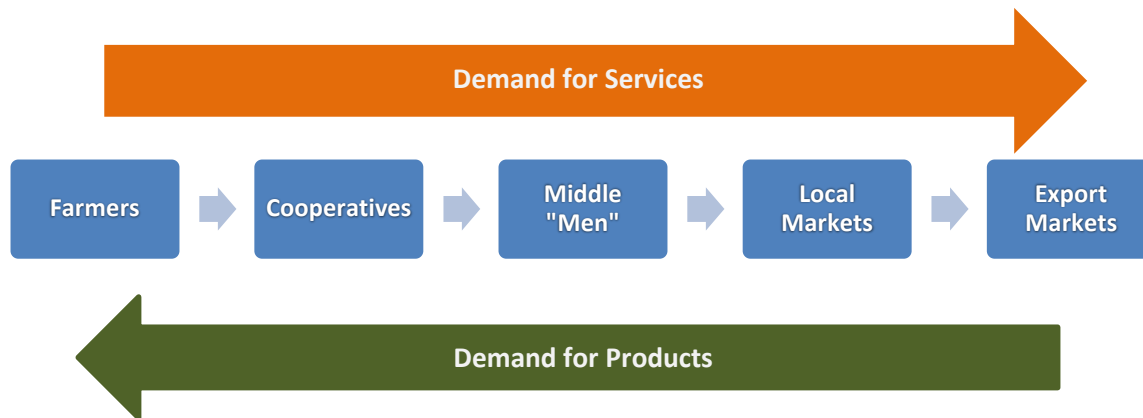
Advisory Services:

1. Information on new varieties of tomatoes, including fertilizer advice and seed sources
2. Market information – target local or export markets. If the former, identify consumer demands; If the latter, need information on standards
3. How to form a cooperative/producers group to better compete, enhance their capacities to vertically integrate
4. If exporting, need help with certification, grading, access to transportation
5. New varieties of tomatoes that use less water

Employment Opportunities and level of education:

1. Expert advisors in horticultural products, BSc.
2. Expert advisors in marketing, including advertising, BSc.
3. Expert advisors in forming producer groups, BSc.
4. Expert advisors in export certification processes, BSc., possibly lawyer
5. Tomato breeders, BSc. or MSc.
6. Government extension worker, BSc
7. Food inspection services, BSc.
8. Agricultural economist, BSc. or MSc.
9. Transportation logistic manager, BSc.
10. Community development advisor, BSc.
11. Storehouse managers, BSc.
12. Packing house supervisor, VoTech

Figure 3.2: Citrus Value Chain, Jordan Valley and Highlands



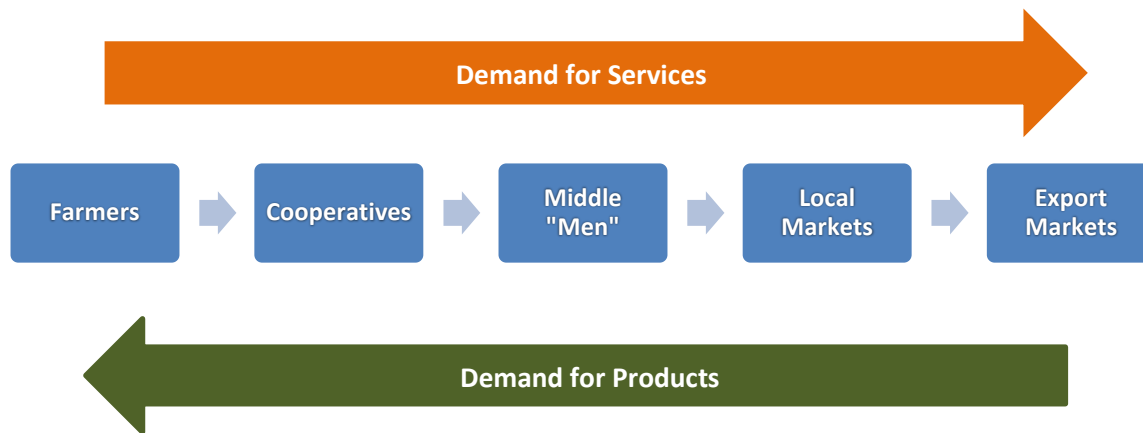
Advisory Services:

1. Information on new citrus varieties, integrated pest management, and fertilizer management
2. Citrus tree pruning training
3. Water saving drip irrigation training including irrigation scheduling and use of treated waste water
4. Pump station operation and maintenance
5. Post-harvest and market information – target local markets; Identify consumer demands and cold storage facilities so citrus crop does not flood the market all at once lowering prices
6. How to form a cooperative/producers group to better compete, enhance their capacities to vertically integrate
7. Target export markets; Grading, transportation

Employment Opportunities and level of education:

1. Expert advisors in tree pruning, BSc.
2. Expert advisors in irrigation and irrigation equipment maintenance (including pumps), VoTech to MSc.
3. Expert advisors in integrated pest management and fertilizer use, BSc.
4. Expert advisors in postharvest and marketing, including advertising, BSc. or MSc.
5. Cold storage services, VoTech to BSc.
6. Storehouse managers, VoTech to BSc.
7. Expert advisors in forming producer groups, BSc.
8. Government extension worker, BSc.
9. Transportation logistic manager, BSc.
10. Community development advisor, BSc.
11. Export marketing, BSc.
12. Staff training, BSc.

Figure 3.3: Rangeland Value Chain, Badia



Advisory Services:

1. Livestock nutrition including concepts of rotational grazing and reduction in numbers of stock
2. Rangeland rehabilitation
3. Animal care, e.g., para-veterinary services
4. Use of biosolids to restore rangelands, land management overall
5. Alternatives to olive production
6. Non-agricultural income earning alternatives

Jobs (illustrative examples):

1. Livestock owner
2. Herder
3. Veterinary services provider
4. Dairy processing
5. Marketers (meat, dairy products, hides, wool)
6. Rangeland specialist (rehabilitation, forage specialist, soil remediation)
7. Socio-economist (for income generation)
8. Community development organizer/mobilizer

Employment Opportunities and level of education:

1. Expert advisor on animal nutrition, BSc.
2. Para-veterinarian, Vo-Tech
3. Expert advisor on rangeland rehabilitation, MSc.
4. Expert advisor on soil remediation, BSc or MSc.
5. Community development advisor, BSc.
6. Marketing alternative products expert advisor, BSc.

4. SWOC analysis

To help generate consensus and develop recommendations, we conducted an analysis to identify strengths, weaknesses, opportunities and challenges (SWOC) of the information collected during our scoping mission. Five tables summarizing these results (Appendix E) cover the policy environment, higher education, community colleges and vocational training, technical training and extension, and the private sector. These findings are the results of interviews and focus groups conducted with all of the key informants. While each meeting is documented in our meeting notes, it is beyond the scope of this document to provide here full details; instead, below are summaries highlighting opportunities and illustrative examples from the SWOC analysis and interviews.

4.1 Policy environment

It is clear from the interviews that overall educational reform is needed in Jordan, not just for AET but inclusive of primary to tertiary levels (See Table D1). It is also clear that some efforts are being made at this (e.g., by the Ministry of Labor, the 2012 National Employment Strategy). The ripple effect of non-education policies on education is felt all along the agricultural and water value chains. As an example, because inspections and grading facilities are under-resourced, producers have a hard time exporting their products, often losing production during the wait for inspection or abandoning a promising market because inspections cannot be guaranteed. Yet, there are opportunities for employment precisely in these occupations that the AET system seems to be unaware of. Another example of how policy impacts the AET system is the low funding for agricultural extension, the lack of connection between research and extension, and the perception that agriculture is not important for Jordan's economic growth or national security.

On a positive note, current efforts by the Ministry of Labor, with support from the World Bank and the European Union, to identify skill set shortages in 22 sectors including agriculture has the potential to reform the vocational training system. Gaps in skilled and unskilled labor have been initially identified; this is the first time agriculture has been included. The effort by ETVET will be linked with the Center for Quality Assurance Office. These certification programs will provide opportunities for employment for Jordanians. For example, a pilot effort to revamp the tourism sector's vocational training has had great success in persuading parents and youth that good, socially acceptable jobs are to be found in tourism.

Another positive AET example is the water utilities certification and training program that developed four levels of training and certification for water utilities managers, enabling them to achieve credibility and increased income as they progress through the program (offered by Engicon). A new by-law was required to implement the certification program which indicates that policy change is possible with targeted, concerted effort in some ministries. This multi-level certification program is precisely the type of program needed to build capacity in extension and advisory services in WSA.

4.2 Education

Many factors were noted by informants that likely contribute to the mediocre performance of Jordan's AET system overall. Students are ill-prepared for the jobs that exist, educators are using outdated curricula and traditional methods of teaching, and there is little communication between educators and employers about the types of skills needed in the jobs market. Innovation is in short supply in Jordan as is entrepreneurship. Agriculture lacks cachet, vocational education is disdained by most families and youth, and few envision themselves working in agriculture or in rural areas. Multiple tracks in the education system could provide the skilled employees that Jordan needs to improve agricultural production and water productivity.

4.2.1 Higher education

Because many students are assigned to study agriculture due to their low scores on the Tawjihi, it is unlikely that enough jobs can be created for all of these students who, in many cases, may have little interest in actually working in agriculture after graduation (See Table D2 in the appendix E). For those, however, who do want to pursue agricultural careers, the opportunities are good if an expansive view of agriculture is taken. This means that all jobs along the agricultural value chain – from farmer and input supplier to export licensing, from pruning to winemaker, from irrigation maintenance to water utilities manager, from community trainer to extension agent – are there. What is required is better communication between all the players – the employers and the educators, the producers and the policy makers.

The strengths of Jordan's AET system lie in numbers – many students are in agricultural education programs, most are eager to learn, most want to find employment. However, the formal education system lacks practical application, often with outdated curricula, teaching methodologies and few internship opportunities. The Association of Agricultural Engineers (AAE) fills the role of integrator as its programs link graduates with government and the private sector through internships. AAE also provides six month post-graduate training courses, giving graduates practical training in many institutions throughout Jordan. Were career guidance available, were private sector employers regularly brought into classrooms to talk about their companies, and were faculty able to get into the field to see the employment possibilities, then perhaps graduates hopes for employment would be realized.

It must be noted that there are more women studying agriculture and graduating from agricultural universities yet few women find employment other than in the public sector. These gender constraints need further investigation; ways to involve these smart, enthusiastic women after graduation need to be developed.

4.2.2 Community college and vocational education

As is true globally, there is a high youth unemployment rate in Jordan – only 27% of the 15-24 year old cohort is employed. Yet, as noted throughout this report, the vocational education or training track is dismissed by families as a valid employment route (See Table D3 in Appendix E). However, it is in this area of AET that the most exciting opportunities currently are being developed in Jordan. The VTC has 44 centers across the country, the public schools offer a few two year agricultural programs, Al-Balqa Applied University manages all of the community colleges, some of which have agricultural programs. The short term nature of the courses, the engagement with families and employers, and the engaging learning environment are elements that are replicable both up and down the AET system. As the reputation of these vocational programs improves and as graduates are finding jobs, more students will become interested in vocational education. There is a golden opportunity to develop quality agriculture and water management programs for high demand jobs. Existing certification programs, e.g., for water utilities managers, could be replicated for agricultural jobs, e.g., irrigation managers, greenhouse managers, etc.

4.2.3 Technical training and extension

Medium and large scale producers tend to get their information from several sources, both within Jordan and externally (See Table D4 in Appendix E). This means that extension and advisory services should be up to date with information and technologies, which essentially is not the case in Jordan. Although government extension agents have opportunities to participate in training, the quality and usefulness of the training is not always the best. The NCARE website is in English while farmers and extension agents need information in Arabic. The upswing in the provision of extension and advisory services by NGOs is notable and opens windows of opportunities for agricultural graduates. Similarly, if there were up to date information available, and graduates who understood it, the large producers would not have to go outside the country to get technical assistance.

An example of an opportunity for collaboration between research and extension is around the introduction of new water saving crops in the various agro-ecosystems of Jordan. Usually, there is one country-wide set of recommendations for production of pomegranates, as an example, with one irrigation schedule for the Jordan Valley. If a farmer wants to plant pomegranates with a different type of irrigation or in another agro-ecosystem, the existing recommendation domain will not work. This makes resource poor farmers reluctant to switch to a water-saving crop but also provide an opportunity to link researchers with extension through demonstration plots in different eco-zones. It is also an opportunity to work with local communities to assist them with the transition to a crop that is more water-saving.

The good work of AAE in providing post graduate technical training might usefully be directed towards identifying upcoming areas of skills and knowledge that are needed and training graduates in those

skills. Likewise, as the large NGOs identify farmer needs, they could work with AAE and others to develop technical training programs more suited to immediate needs of producers.

4.2.4 Advisory services and community engagement

As Jordan seems to consider agriculture a low priority, devoting limited resources to AET and extension services, the NGO community has stepped in, most often with donor and Royal Family funding, to meet the needs of local communities (See Table D5 in Appendix E). The NGOs interviewed described the large number of projects and even larger number of communities with which they work and noted that almost every community has an NGO representative working there, doing whatever community development is needed. In some cases, these NGO staff members are agricultural graduates. The NGOs prefer to hire employees with practical, technical skills, who are from the area, and who are willing to work with the communities. The mismatch between these types of employment opportunities and the education students receive in university is startling. Agricultural students receive no training in community development, business/entrepreneurial skills, communication and financial management, all of which are needed to be advisors at the community level.

4.2.5 Private Sector

The team had the opportunity to visit a wide array of private sector employers (See Appendix C and Table D6 in Appendix E). They were all uniformly positive about agricultural markets inside and outside Jordan and the opportunities for growth (with the usual grumbling about various government policies, of course). Many of them provide opportunities for graduates to do practical training, either through internships or on-the-job training after they are hired. They require a higher, more sophisticated level of technical services and advice, and do not rely on government for this. A surprisingly high number have employed women graduates to manage greenhouses and packing plants; many of these women are from the Jordan Valley. In fact, most of the graduates employed in private sector jobs were from the Jordan Valley, dispelling the myth that agricultural graduates do not want to work in rural areas.

Private sector employers welcome the opportunity to work with the AET systems but are not always asked to do so. Some are on advisory boards for some of the higher education institutions, the AAE, and the WUAs. Opportunities for faculty to work with these employers, to better understand the types of jobs available for graduates, might prompt curricular reform or even career guidance. The private sector is also willing to experiment with new crop options in WSA and may be willing to collaborate with university researchers.

The JVA and WUAs are beginning to offer training courses for farmers which could be done in collaboration with the private sector. This, too, becomes an employment opportunity (as trainers) for graduates who have good communications skills. JVA will be renovating a training center in the Jordan Valley.

5. Conclusions

The assessment team recognizes that a rapid assessment misses a lot of important people and issues. We did not discover anything new and unusual about AET in Jordan which has not been written about and discussed before. We simply attempt to place what was learned into the context of the questions we were tasked with answering, but framing these into the WSA context. It is with these caveats in mind, that we present the conclusions, framed around the initial questions:

- What human resources are needed to increase productivity and profits in the various agricultural sectors?
- What are the expected sources for trained agriculture, water, and extension specialists?
- What is the state of extension education? Who participates? Where do they get trained or educated? Where are the gaps between what skills are provided to the workforce and what skills are needed by the employers?

As a middle-income country in the MENA region, Jordan is solidly in the middle of the pack in terms of education and innovation. But being in the middle of the pack for MENA means being below average globally. The World Bank has developed a set of tools and database that can be used to analyze where a country lies in terms of knowledge and their economy. The Knowledge Economy Index (KEI) uses data such as economic incentives and the institutional regime, education and human resources, the innovation system, and availability and access to the information and communication technology to calculate how well a country is managing its human capital to meet employment and market demands. At the top of the list is Sweden, with a KEI of 9.43; the US KEI is 8.77. In the MENA region, UAE has the highest KEI at 6.94 (with many international universities co-located in UAE) while Jordan sits at 4.95 (http://info.worldbank.org/etools/kam2/KAM_page5.asp). Jordan's overall ranking has, in fact, gone down 18% since 2000, indicating that several things are amiss in the knowledge economy of the country.

Why is this important? We found the labor market demanding more skilled employees yet the higher education system continuing to produce unemployable graduates. We found that families and youth dismiss vocational education, yet this system is the most innovative of the education providers in Jordan. We found that graduates want to work in government but government barriers to employment (e.g., hiring freeze, ineffectual hiring processes, and lack of resources) prevent most graduates from obtaining government employment. The extension system lacks resources – human and financial. The few extension agents in the Jordan Valley, for example, can in no way meet the needs of all the farmers and producers there. The lack of innovation (low budgets for research and development) and the low levels of entrepreneurship combined with low ICT use (only 80 computers per 1000 people) (WB, 2013) foster attitudes of waiting for government jobs rather than creating new jobs.

In a recent report by Mourshed, Farrell, and Barton (2013), the journey or highway from education to employment has three intersections: finding a job, enrollment (e.g., being trained for the job market), and building skills. A world-wide survey of students, employers and educators showed that these three

groups live in parallel universes. Around the world, providers thought they are doing a good job of preparing new graduates for the workforce, while less than half of the youth and employers think so.

Students in Jordan get little to no assistance in defining a career, finding employment, or envisioning a different future. Family opinion counts for more than anything else (echoed in the Mourshed et al. study, 2013). For families, the highest imaginable pinnacle is to be a doctor, lawyer or engineer (again echoed globally in Mourshed et al. study, 2013). Agriculture is almost at the bottom, just above jobs that require vocational training. In fact, almost every job requiring less than a bachelor's degree is viewed unfavorably globally.

In Jordan, we heard that curricula are outdated. Students noted that professors bring in yellowing notes that are years old and lecture from these notes. Pedagogical methods remain traditional – rote memorization of facts, high reliance on tests, no opportunities for problem solving in teams or critical thinking. Most academic instruction is theoretical and, according to some faculty, “scientific” while young people prefer to learn through hands-on training. Even laboratory classes often consist of student watching someone do an experiment.

Graduates are trained for jobs that do not exist now and not for jobs of the future. Employers don't want the new graduates, believing they do not have the skills they need. It was clear that there are many potential and actual jobs in the agricultural sector that are going unfilled because of the limited vision of students, the lack of practical training given by educational institutions and the lack of communication from the employers back to the educators on the types of skills needed.

Learning how to learn, unlearn and re-learn, to paraphrase Alvin Toffler, is completely outside the thinking of both educators and students. In the US and Europe, educators know that the majority of children now in primary school will have jobs when they graduate that do not exist right now. Globally, only half of the students think their degrees helped them get a job (Mourshed et al., 2013). Jordan is still educating children for 20th century jobs and not to meet the needs of today's employers.

From this holistic view of the AET system, we come back to the question of how best to deliver information and technology to farmers, CBOs, and WUAs to achieve efficiencies and equity in WSA in the Jordan Valley. In summary what we found was that building capacities in WSA and WCP will be successful if the importance and impact of sound extension services is recognized. Allied with this is the need for strong community development programs that determine and incorporate local needs into programs. Water saving agriculture programs must also develop increased capacity in agriculture training and education programs. Lastly, WSA and WCP programs will be successful when linked to strong workforce development efforts.

6. Recommendations

In support of USAID's Development Objective to improve essential services to the public (DO 3) and, in particular, to develop an accountable system for water resources management (IR3.3), the WRE office seeks to achieve efficiencies in agricultural production through the use of various water saving technologies. More "crop per drop" can be achieved by improving the efficiency of water resource allocation and use (Sub-IR 2), resulting in the production of new crops and exploration of new agricultural value chains, identification of new markets, and improving the technical and advisory services to producers overall. Such initiatives have the potential to create between 8,000 – 15,000 new jobs in agriculture (USAID Jordan, 2013-2014; 2003 Water Resources Group Report). This will not happen without significant investments in WSA skills training for numerous stakeholders. These stakeholders include many who need training in the use of new WSA practices and technologies (e.g. small and large scale producers, processors, CBOs, WUAs), and others who need capacity development to be able to deliver training and technical assistance for WSA (e.g. public and private advisory service providers/extension agents, NCARE and NGOs). Partners in such efforts should include NCARE, NGOs and the universities and vocational training schools that will provide training and research support for new technologies and agricultural practices. At the same time, these organizations and institutions will have their capacity to deliver training enhanced by the collaboration with the US partners. A key way to achieve DO 3 in WRE, is to build capacity among all of the water resources management stakeholders.

This is a complex and complicated scenario as it involves multiple stakeholders, multilevel skills development and requires a comprehensive water conservation strategy for agriculture in the Jordan Valley. In order to be sustainable, training and capacity development must be undertaken concurrently. The US partners will both provide technical assistance and train the trainers (vocational training and university staff, NCARE research and extension staff) so that at the end of this particular project, capacity has been built to continue to meet the training demands of a water conserving agricultural sector.

The innovATE scoping report lays out the current situation in Jordan in AET and highlights opportunities for intervention that would support achieving DO 3. What we learned from the scoping visit was that setting up a program for WSA in Jordan will require building capacities in several areas, with many partners. Some of these challenges go beyond the scope of WRE's objectives, but could be linked to other USAID/Jordan programs in workforce development and gender. Therefore, we note areas where USAID could build capacity to improve WSA and other areas where collaboration within the Mission and with other agencies and institutions is required. This report provides a situational analysis of the current ATE system, but does not provide a complete assessment of the employment opportunities/labor market. This should be done as soon as possible, including a detailed assessment for job placement and a gender analysis.

For the Jordan Valley, water policy is established by the Ministry of Water and Irrigation, the Water Authority of Jordan and the Jordan Valley Authority (JVA). The JVA administers local Water Users'

Associations (WUAs) that are responsible for the delivery and service of water to individual farms within their area of jurisdiction. There is an increasing demand for water for both domestic and agricultural use. However, many users do not currently pay for water, due to a lack of a functioning system that links water delivery with payment for water. The JVA is now pursuing an initiative to empower the individual WUAs to both manage and charge for local water delivery. The GOJ is planning to begin increasing the amount farmers pay for irrigation water in 2015, with the ultimate goal of charging ten times the current amount, based on levels of consumption. Farmers will no longer “get away with” not paying for water. They will therefore have to adopt both WCP and WSA practices. As farmers face these challenges to conserve water, they will have to adopt new technologies, and farming practices, identifying new crops and new markets. As evidenced in this report, high-value producers already understand these linkages between water efficiency, new markets and paying for technical services when they lead to increased profits. Therefore, as small and medium producers adopt WSA and realize increases in earning potential and food security, their willingness to pay for technical services should also increase. The timing is right for this program to increase advocacy and build capacity for WSA.

This recommendations section designs a program for WSA based on the results of the scoping study.

A. Purpose

The goal of this project is to create a system of sustainable agricultural water management in the Jordan Valley, utilizing the available resources efficiently to achieve improvements in livelihoods local farmers. Achieving this goal will build capacity among producers, employers and employees in the agricultural value chains in the Jordan Valley, and will provide increased levels of food security and economic benefit at the local and national levels. The program will pay special attention to the concerns and needs of vulnerable populations, including women and youth. The program goal will be achieved through two components which will increase WSA and as a result, conserve water resources through:

3. Strengthened support for WSA and water conservation
4. Increased workforce training in WSA and WCP

The first component will be achieved by (i) building the capacity of farmers, processors, community based organizations (CBOs), and WUAs to understand and implement appropriate water saving agricultural practices and local water conservation programs; (ii) facilitating community level dialogue and enhancing stakeholders access to current information on WSA and WCP, with particular attention to vulnerable populations, such as women and youth ; (iii) improving WSA through capacity building of the extension and advisory services at NCARE and in the private sector to provide up-to-date technical support for producers and processors; and (iv) supporting advocacy efforts for policy and legislative reforms related to water management at both the local and national levels through stakeholder dialogue.

The second component will focus on (i) enhancing workforce capacity to provide WSA improvements, with an emphasis on vocational training; (ii) building gender equitable opportunities into both the AET environment and agricultural workforce; and (iii) building capacity at AET institutions to prepare graduates for WSA employment and to conduct research and training to support WSA and WCP implementation.

B. Overview

The scoping assessment identified a variety of challenges and opportunities in the AET and related WSA environments in Jordan, and these are outlined in the SWOC results tables in Appendix E.

With regard to the existing policy environment, it was noted that political support for agriculture, including WSA, is lacking and that there is a poor perception of agriculture among the general public. However, this proposal for intervention is supported by ETJET's new workforce development initiative that will certify professions in 22 sectors, including agriculture. Thus, advocacy for policy and legislative reforms related to WSA, facilitating community-level dialogue, and enhancing workforce capacity in WSA are well-timed to support the existing GOJ initiatives on workforce development.

A National Employment Strategy was released in 2012, with youth employment and human capacity development as high priorities. The Ministry of Labour is currently directing significant efforts to improving employment prospects coupled with enhancing vocational and technical education and training (E-TVET), to reduce the high rate of unemployment. The Ministry notes there is a mismatch between labor supply and demand, the participation rate of women in the labor market, the lack of and need to develop a coherent policy and approach to poverty reduction, and to reduce inequalities of participation in the labor market (The Ministry of Labour).

Related to the above mentioned challenges in the policy environment, the scoping assessment determined that almost all producers perceive extension and advisory services in Jordan as weak. The number of government extension agents is low and does not fully reflect the array of information channels through which producers get information. The scoping report details a number of reasons why the perception is poor and suggests that there are multiple opportunities to revamp the system to include both governmental and non-governmental advisory services. These would include building the capacity of community based organizations (CBOs), NGOs, WUAs and agricultural extension services to improve their ability to provide up-to-date information and training.

In addition, up-to-date, relevant information on new crops and WSA technologies are a critical need, as is on-farm testing throughout the Jordan Valley to refine the recommendation domains based on the specificities of the agro-ecosystem niches. There are great opportunities for collaboration between farmers, extension and advisory entities and research institutions. This program will facilitate such collaborations to conduct farm-level research on new crops, agricultural technology, water conservation practices and adoption of these by farmers.

Simultaneously, there is a need to improve the community-level engagement and understanding of the importance of adopting water saving technologies and new crops. Challenges identified by the scoping assessment include the need for reliable information sharing and advisory services. There is also the need to build trust with local communities and to understand the local context in order to garner community support. Previous experience suggests that working with local NGOs and CBOs is the most effective mechanism to facilitate change at the household and community levels and implement WCP initiatives. In order to encourage farmers, processors, communities and WUAs to adopt new technologies and approaches, it will also be necessary to have a revolving loan fund available that reduces their risk. This fund should be managed by well-established by local and/or international NGOs who have previous experience with revolving loan projects. It is anticipated that as farmers' incomes improve, thus validating the new approaches, they will be more likely to use and pay for advisory services.

These policy, community and farm-level initiatives must also be supported by parallel components to enhance capacity in both the vocational training and higher sectors. The higher education sector in agriculture is characterized by challenges of an outdated curriculum with a lack of practical experience. It is perceived to be unresponsive to employer's or producers' needs. However, the scoping assessment did identify opportunities to develop internships and practical experiences for students, partnering with local NGOs and professional organizations, such as AAE, and including curriculum and faculty development to introduce new technologies and concepts. With few exceptions, the vocational education sector also has outdated curriculum. USAID Jordan is developing a major program for workforce development targeting vocational education and youth. However, agriculture is not currently one of the sectors they are addressing in this initiative. The scoping assessment found a wide array of potential opportunities and jobs for youth to be employed in agriculture and these are highlighted in the report. Building capacity at these educational institutions and establishing links with the workforce development sector is needed.

Existing programs (e.g. in tourism and in water utilities management) can provide models for curriculum enhancement and new training programs in WSA. These programs use an enterprise-based approach that is responsive to employer priorities. This program will build on other successful public-private partnership models by engaging prospective employers in dialogue with the education and training providers to improve teaching skills, make course content more relevant, and develop training resources that meet the needs of those who hire graduates.

Throughout the scoping gender disparities were observed in access to, control over and benefit from education and employment. Although females make up the majority of undergraduates in agriculture, they do not find jobs. Meanwhile, vocational training and careers are rarely paths for females because of cultural perceptions that restrict both opportunities and mobility. At the community level, women are even more restricted from participation. Thus this program includes significant attention to building gender equitable opportunities throughout.

Program Activities

The main Jordanian counterparts for this program will be NGOs with experience working with CBOs and revolving funds, the vocational training and higher education institutions with potential capacity to provide training and research support in water resources management and agriculture, and NCARE as the primary government research and extension agency.

The program components described below are mutually reinforcing.

Component 1. Strengthen support for WSA and water conservation

i. Building the capacity of farmers and community-level organizations to improve water management

As identified in the scoping assessment, farmers and producers lack any real access to up-to-date information and training about WSA. Their production practices are poor and wasteful of water, they keep producing the same crops which flood the market and they don't recover the cost of production, which is in itself a wasteful water practice. They have no experience or skills related to using new, less water intensive crops and water-saving technologies. Nor do they understand the agribusiness environment, including developing new markets, financing, and post-production processing to add value to their crops. These are all aspects in which farmers, producers, processors, CBOs, and WUAs need skills up-grading and training.

The capacity building efforts in this program address these inadequacies through a multi-level training program that encompasses the target populations identified above. The US university partners in collaboration with local universities, NGOs and government agencies (NCARE) will provide training. There are several successful programs run by Jordanian and international NGOs, using training and revolving funds to both prepare and equip farmers and local communities. However, to-date these existing programs have not focused on WSA and WCP. This program will work with the NGOs and extension organizations to bring such information, training and resources to farmers and producers through the CBO and WUA organizations.

ii. Facilitating community level dialogue and enhancing stakeholders access to WSA information

Working with the partner NGOs, this program will initiate a series of community-level stakeholders meetings that are inclusive of vulnerable populations, especially women and youth. These initiatives will use a multiplicity of communication approaches to share information about WSA and WCP and stimulate community interest and willingness to adopt new practices at the local levels. It will involve communities in articulating their needs and constraints and will work with them to identify appropriate solutions to water resource challenges. Advisory boards, comprised of government and private sector experts, will be consulted to provide guidance to communities in topics such as water management, finance, marketing, regulatory and policy issues and the roles of WUAs in local water decisions.

iii. Improving WSA through capacity building of extension and advisory services

Extension and advisory services in Jordan need to be more responsive to the needs of farmers of all sizes, from subsistence to large, i.e., demand driven. A multi-level training program for government and NGO advisory services should be developed along the lines of the water utilities certification program operated by Engicon. Doing so would be a good way to get the private and public sectors working together. NCARE's capacity needs to be developed to make it an effective extension partner. While NCARE is an obvious partner (i.e., NCARE extension agents), so too should be one or more of the large NGOs already working in WSA, e.g., Mercy Corps, JOHUD, and JRF. Initially the training program will be developed in collaboration with interested Jordanian universities and vocational training centers so that a standardized curriculum can be offered across the country. At some point in the future, a formalized certification program could be implemented, if demanded. This initiative will also explore the possibility of revising existing curricula and certificate programs and will collaborate with ETVET and the Office of Quality Assurance.

Access to the training programs for extension should also be available to current and recent agricultural graduates so that they can get practical experience. Because the training program will be hands on, it would be good to hold various field activities not only at NCARE's research station but also at the University of Jordan's farm, at the new JVA training facility, and ideally, in farmers' fields. A mobile water testing lab that could be used all over the Jordan Valley to support the training program and expose farmers and producers, to the value of real time data for timely WSA management.

- iv. Supporting advocacy efforts for policy and legislative reforms related to water management.** In Jordan, more than one government ministry is involved in decision-making related to water use. Unfortunately the Ministry of Agriculture is the weakest ministry in this respect. Even though new water sources for domestic use have been identified, it is still imperative that agriculture producers become more water efficient. Whether a carrot and stick approach or both is used, inevitably farmers will have to pay more for water. An advocacy campaign that engages a variety of stakeholders in conversations regarding WSA should be developed. There are current dialogues at the policy level, facilitated by the World Bank and other donor agencies. A USAID supported program could help identify champions for WSA within the various ministries and local communities to support policy reform and strategic planning in the sector. Successful advocacy will need to be supported by evidence and research, sustained over a period of time, supported at multiple levels and by various partners, and linked to specific actions. The key need is to raise awareness and get buy-in for WSA improvement at multiple levels.

Component 2. Increase workforce training in WSA and WCP

- i. Enhancing workforce capacity to provide WSA improvements.** There are potentially a lot of jobs in agriculture if new value-chains and new markets are developed. For example, two recent reports note the potential for an increase of between 8,000 – 15,000 new jobs in agriculture if WCP and

WSA are adopted (USAID Jordan, 2013-2014; 2003 Water Resources Group Report). Also, with over 4,000 CBOs in Jordan, there are many opportunities for people with agricultural skills to work as community development officers for national and international NGOs.

However, current education and training programs are not preparing graduates with skills for jobs in the agriculture sector. Programs frequently use outdated training materials, lack practical skills development and rarely consult with employers regarding valued qualifications. Soft skills, such as communication, leadership, and entrepreneurship are also not taught. This program cannot address all the deficiencies in the current AET system. However, as many of the potential new jobs will require workforce training, a critical component of the program would include working with the TVET institutions to offer up-to-date agriculture curricula. Many can add WSA to their existing programs, raising the employability of their graduates, and meeting Jordan's need to better utilize its water resources.

These efforts must be accompanied by a simultaneous initiative to raise the profile and reputation of careers in agriculture. This will be modeled on the approach of the VTC which has created a positive image and strong demand for training in the hotel and tourism sector, through a variety of outreach and communication efforts. This requires the engagement with families and educational institutions, as well as with the private sector. Methods to specifically reach women, youth and other marginalized groups will also be a priority. Special programs (e.g. leadership courses, competitive grants for female graduates, mentoring etc.) to tap into the large pool of unemployed female BSc holders, perhaps linked with the USAID/Jordan gender programs already in existence, will be employed.

- ii. **Building gender equitable opportunities.** Gender analysis of key agricultural value chains will help direct programs that respond to the need for increased involvement of women in WSA decision making. Gender equity is closely linked with improving WSA capacity and progress in gender equity will be closely linked to progress in WCP. Among the opportunities is an increased recognition that women are involved in water management and agricultural decision making at household and CBO levels. There is need to develop methods to specifically reach women, youth and other marginalized groups. Lastly, programs are needed that tap into the large pool of unemployed female agriculture BSc holders.

At the community level, peer-to-peer training for women's groups has proved successful in other sectors in Jordan, and can be replicated and expanded in support of many WSA improvement activities. Providing women with leadership and technical skills gives them pathways to improving their livelihoods. Ensuring that there are safe spaces for women to meet and participate in training at the community level will be important. In addition, small grants through the revolving fund, can be set aside specifically for women's groups. Finally, it will be necessary to monitor and evaluate whether these efforts empower women at the local level to more fully engage within their local communities in WSA and WCP activities.

At the graduate level, the program will identify female candidates through a competitive process to participate in women's' leadership and entrepreneurship training. This would operate in partnership with AAE, which has a track-record of working with female agricultural engineers. The goal of the program will be to help women overcome gender barriers that prevent them from fully participating in the workforce.

iii. **Building capacity at AET institutions.** Curriculum development and reform is needed to meet current needs, raise awareness of water scarcity, and improve pedagogy to incorporate practical training. However, all informants noted the difficulties of reforming existing curriculum and have suggested that there are three ways to get new programs initiated in higher education:

1. Develop a stand-alone certificate program
2. Develop a new graduate-level program focused on WSA
3. Re-train existing faculty who are willing to take on the challenge of revising their own courses to incorporate WSA and related current topics and technologies

The program will explore all options, with the development of a set of multi-level training activities with the vocational education system as the first step. Future opportunities would include the development of a formalized certificate program similar to that developed by Engicon for water utilities managers. These initiatives all require the development of strong partnerships with the higher education institutions.

To support the expansion of WSA and WCP in Jordan, capacity at the local colleges and universities needs to be developed. Staff needs training to update their skills around current issues of water scarcity and improve their pedagogy. A competitive program that would require faculty to apply for faculty development opportunities will be developed with faculty attending professional development seminars to learn the latest scientific and pedagogical methods. This faculty development program will be open, as well, to the instructors at the vocational training centers.

With regard to practical training for students, internships will be developed with the private sector at tertiary level. The existing AAE program for graduates that offers six month internships post-graduate will also be expanded to include more students.

Although this is not a research project, building capacity at education institutions to conduct farm-level research on new crops, agricultural technology, water conservation practices and adoption of these by farmers, is an important component of practical training for students. It also serves the purpose of expanding the knowledge base around new crop production practices under different water management regimes. The information generated by the on-farm studies will provide data for the extension and advisory services and will support Component 1 to build capacity for WSA at the community level. Finally, studies will be necessary to understand farmers' adoption of new practices.

Summary: The interconnectedness of agriculture with water saving technologies is strong. But with increasing pressure on decreasing water resources these connections span other sectors as well. These recommendations are well-aligned with existing USAID/Jordan interventions in workforce development and gender (USAID, 2013). The WRE activities outlined above would support and leverage other programs to enhance the Development Objective and maintain and improve the standard of living of Jordanians, thereby promoting stability in the region. The innovATE program is well-equipped to help USAID plan and implement investments that are appropriate for the long-term and sustainable development in the WSA sector.

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Terms of Reference and Scope of Work to the USAID Mission in Jordan Submitted by the University of Florida on behalf of the *innovATE* Project for Scoping Visit on Agriculture and Technical Education in Jordan

The *innovATE* scoping visit will focus on understanding the current and future demand for human resources in the agricultural sector through interviews and data collection with a wide range of stakeholders. While certain to include USAID and Jordanian agricultural universities, it also may include selected value chain actors, micro, small and medium enterprise (MSME) and agribusiness employers, ministries of agriculture and education, NCARE and other research and extension institutions (e.g., Royal Science Society), farmer organizations, water user associations (WUA), and NGOs.

The scoping team will obtain information on ATE in Jordan with objectives to: (1) conduct a situational analysis of the current agricultural education and training systems in Jordan, (2) identify employment demands, especially in extension and technology transfer in the agricultural sector, and (3) any skills gaps as perceived by both employers and educational institutions. As an overview exercise and potential prelude to more in-depth design phase or other activities, the scoping team will identify data sources, strategic plans, stakeholders, key informants, and lead actors to describe overall system strengths, weaknesses, opportunities and threats.

Methodology

Prior to the scoping visit preliminary desktop research will be done to compile background information, collect data to frame the scoping visit, including with whom to meet initially, and further refine the field data collection priorities. The *innovATE* scoping team visiting Jordan will include specialists with MENA expertise from University of Florida, University of California-Davis, the *innovATE* Program Director from Virginia Tech, and ECO Consult/Amman. During the first week, the scoping team will gather additional information about ATE in Jordan and conduct preliminary meetings with stakeholders identified in consultations with USAID/Jordan. The Jordanian universities that offer an agriculture curriculum are:

- University of Jordan (UJ), national, Amman
- Jordan University of Science and Technology (JUST), national, in north
- Mutah University (MU), national, in south
- Al-Balqa Applied University (ABAU), national, near Amman
- Jerash University (JU), private, in north
- Al-Albayt University (AABU), private, Mafraq, aabu.edu.jo

After the first week, the team will conduct additional follow-up interviews and data collection using snowball sampling. They will compile and draft a report and recommendations, and present the preliminary findings to USAID/Jordan mission. The methodology for addressing the agricultural education/jobs interface will involve meeting with a wide range of stakeholders. To ensure both data

quality and scope of analysis, a set of rapid assessment tools involving semi-structured interviews and focus groups will be employed. Review techniques and analysis will involve four components (summarized below):

- An overview of the enabling environment;
- Characterization of AET within the Jordanian agricultural training and education institutions with emphasis on training for extension and advisory services especially related to water management;
- Characterization of agricultural sector employment structure; and
- An analysis diagnosing the needs for human capital in the agricultural sector that brings the previous two together.

Review of these four components will take place simultaneously when visiting various stakeholders and key informants, including: NCARE, student representatives, value-chain actors (producers, processors and shippers), MSME and agribusiness employers, farm and community-based organizations, water user associations, NGOs, and Ministries of Agriculture and Education representatives, as well as universities named above. Some key actors may be the subject of return visits as we focus in on critical information. Once an overview of the landscape has been completed, the following questions will drive the rest of the scoping team's mission:

- What human resources are needed to increase productivity and profits in those agricultural sectors?
- What are the expected sources for trained agricultural and extension specialists?
- What is the state of extension education?

1. Overview of the ATE environment:

The ATE enabling environment will be characterized through the identification of key ATE system actors (policy makers, private sector stakeholders, ATE administrators, etc.) and mapping out their roles and relationships. The landscape will be captured by focusing on the policy framework, funding mechanisms, and an ATE system map. This overview will provide a roadmap for *innovATE's* work and ensure *innovATE* clients will understand how individual ATE institutions fit into the larger ATE system. We would be interested in learning more about the agricultural education programs, and how they fit into the Jordan Valley agricultural environment.

2. Institutional (supply) characterization:

There is likely to be existing information on ATE in Jordan that needs to be gathered and synthesized. In developing the overview of ATE, it will be necessary to characterize the ATE institutions which will involve obtaining: an institution's mission statement; documentation of the curriculum; faculty qualifications and responsibilities; students and student services; infrastructure, resources and external support; and administration and governance procedures. Although it will not be possible to collect all of

the necessary documentation in the short period of this scoping visit, the key data can be collected from interviews, institutional catalogs and brochures, and additional data bases should be identified by partners, USAID missions, key local informants, and other stakeholders.

3. Agricultural sector (demand) characterization:

Characterizing the professional needs of agricultural sector involves both focusing on the full range of potential employers as well as key value chains and weak links. The aspect of critical interest is a description of the employment structure along each targeted value chain (e.g., horticulture, fruits, dates, nuts, milk, etc.) from farm input supply through production, packaging and transformation, quality assurance, transportation, wholesale and retail, and other regulatory and supporting services.

Also, in the Jordan Valley, the importance of water management and the water user associations are key factors around which the assessment will be constructed. In particular, we will look at the linkages between existing extension services to farmers and WUAs in light of their needs. Quantitative data to document agricultural employment may be obtained from the ministries of agriculture and labor, or World Bank and other organizations, as well as interviews and special studies.

4: Diagnosis of needs for trained human capital:

Finally, valuable interpretive data will be collected through discussions with key informants and other agricultural sector stakeholders (student organizations, producers, processors and shippers), MSME and agribusiness employers, farm and community-based organizations, NGOs, and Ministry of Agriculture representatives, as well as NCARE. Following the demand-driven perspective, we expect the stakeholder discussions to focus on graduate employability, productivity and expansion of the agricultural sector, and the human capital needs of private sector firms, NGOs, and government.

Outputs:

At the end of this scoping visit, the *InnovATE* team proposes to draft an ATE landscape scoping (overview) report that:

- Analyzes the sector's supply and demand for agricultural professionals, especially water and crop extension agents and technology transfer specialists
- Provide recommendations that will inform planned activities with the WUAs in the Jordan Valley
- Provide an action plan for design and implementation activities to be covered under an associate award which we will discuss with USAID/BFS and USAID/Jordan.

Appendix B: Schedule of Appointments

Schedule of Appointments

November 1 – 19, 2013

Friday November 1

Sandra Russo and Nikki Kernaghan (UF) and Khaled Hassouna (VT) arrive

Sunday November 3

10:00 -12:00 ECO Consult (Ra'ed Daoud and Zeina Masannat)

1:00 – 3:00 USAID Jordan (Scott Christiansen)

Monday November 4

9:00 – 11:00 NCARE (Hussein Abo Rebehah and Samia Akroush)

12:00 – 2:00 Vocational Training Corporation (Susanne Grigeloet)

3:00 – 5:00 Royal Scientific Society (Wael Suleiman and Bayan Athamneh)

Jim Hill and Nicholas Madden (UCD) arrive

Tuesday November 5

10:00 – 12:00 Ahmad Shadeed El-Hweitat, Director of Vocational Education and Production, Ministry of Education (Retired)

12:00 – 2:00 Jordanian Hashemite Fund for Human Development (Muttasim Al-Hayari)
Tom Hammett (VT) and Lindsay Parish (USAID Washington) arrive

Wednesday November 6

Group 1

9:00 – 4:00 Al-Balqa University, Salt (Ihab Husni Mohammed Ghabeish, Samih Abu Baker, and Tariq Al Azab)

Group 2

10:00 – 12:00 Ministry of Agriculture (Jamal Al-Batsh, Salah Yousef Tarawneh, Omar B. Allahham, and Suliaman Sawalha)

12:30 – 2:30 Association of Agricultural Engineers (Khetam Seriand Ahmad M. Amro)

3:00 – 4:00 Jordan Valley Authority (Qais Owais)

Thursday November 7 (National Holiday)

1:00 – 2:00 Omar Kafawin

2:00 – 5:00 InnovATE Scoping Team Meeting

Friday November 8

9:00 – 4:00 NCARE Research Station in Jordan Valley (Nabeel Bani Hani)
Samira Daroub (UF) arrives

Saturday November 9

10:00 – 12:00 Agri Jordan farm (Sami Shawabkeh and Adan Maradat)

2:00 – 4:00 Arar Farm (Nedal Slebe Derallah-Albalawugh, Walid Awward, and Abdullah m. Al Juraind)

Sunday November 10

Group 1

9:30 – 11:30 AgroCare, Agricultural Materials Care Co. (Fouad Salama)

12:00 – 1:00	Engicon (Firas Matar)
<u>Group 2</u>	
10:00 – 12:00	Ministry of Education, Vocational Education and Production (Nuwat Al-Doghmi)
<u>Groups 1 & 2</u>	
2:00 – 4:30	Full team meeting with USAID Jordan Mission (Scott Christiansen and Angie Haddad)

Monday November 11

<u>Group 1</u>	
10:00 – 12:00	Mercy Corps (Rania Zoubi and Ahmad Alulayyan Bani Ata)
<u>Group 2</u>	
11:00 – 1:00	University of Jordan, Water, Energy and Environment Center (Ahmed Al-Salaymeh and Abbas Al-Omari)
1:00 – 3:00	University of Jordan, Faculty of Agriculture (Hani Sauob)
<u>Group 3</u>	
11:00 – 12:00	Jordan University of Science and Technology, Faculty of Agriculture (Munir Aziz Turk, Zakaria Al-Ajlouni, and Maher Tadros)
1:00 – 3:00	Jordan University Science and Technology, Faculty of Agriculture (Firas Abu-El Samen, Laith Rousan, Kamel Mahmoud, and Mamoun Gharaibeh)

Tuesday November 12

<u>Group 1</u>	
9:30 – 12:30	Madaba Vocational Center (Mahmound Maharmeh, Hiba Bdoh, and Esam Al-Tosham)
<u>Group 2</u>	
10:00 – 12:00	ETVET Council (Nadera Bakhit and Raja' Fayyad)
2:30 – 3:30	Zumot Wines (Omar Zumot)
4:00 – 5:00	Munir Sukhtian Group (Samer Fawaz and Deemah Sukhtian)

Wednesday November 13

<u>Group 1</u>	
8:00 – 5:00	Water User Associations # 55 and #14, Jordan Valley
<u>Group 2</u>	
2:00 – 4:00	Mutah University (Rita A. Shibli, Dafer Y. Assarairah, and Sulaiman Salem Al-Sarayih)
<u>Group 3</u>	
10:00 – 3:00	Employment-Technical and Vocational Education and Training (E-TVET) National Policy Meeting on Agricultural Sector

Thursday November 14

<u>Group1</u>	
8:00 – 5:00	NCARE Research Station (Moayeh Radaydeh, M. R. Abu Raddaha, Imad M. Shaikal, and Akram Tehabsim) and visits to two small farms nearby University of Jordan Research Farm (Fawzi M. Elayyan, Amer Salman, Fawzi Aluaian, and Fakhri Qouzah)
<u>Group 2</u>	

9:00 – 11:00 As-Samra Biosolids Management Feasibility Study, USAID Jordan Water Reuse and Environmental Conservation Project (Charles Darnell, Mike Giddinge, Abdullah Khair and Rania Taha)

Group 3

9:00 – 11:00 GIZ-ISSP Program (Nour Habjouka)

Groups 2 & 3

12:00 – 1:30 Jordan River Foundation (Ban Masadeh and Anwar Elhalah)

3:30 – 5:00 Education Reform Support Program (Katherine A, Merseth)

Friday November 15

8:00 – 5:00 Data analysis and presentation preparation

Saturday November 18

Data analysis and presentation preparation
Jim Hill departs

Sunday November 17

Group 1

9:30 – 11:00 International Youth Foundation (Rana Al Turk and Najwan Shiber)

Group 2

10:00 – 12:00 Jordan Exporters and Producers Association for Fresh Fruit and Vegetables (Nadal Jweihan, Mazen B. Al Hamarneh, and Zuhair Arif Jweihan)

Group 3

10:00 – 12:00 Nuzha Vocational High School (Rajaa Mohammad Bader, Jeries Shafeg Al Ghattas, and Fayza Alamouch)

Full InnovATE Team

3:00 – 5:00 Scoping Assessment Presentation to USAID Jordan Mission
Samira Daroub departs

Monday November 18

Sandra Russo, Nikki Kernaghan, Tom Hammett, and Khaled Hassouna depart

Tuesday November 19

Nicholas Madden departs

Appendix C: Stakeholder Interviews

Stakeholder Interviews

The InnovATE scoping team interviewed a wide range of stakeholders during the November 2013 scoping visit. These included representatives from organizations involved in higher education, community and vocational education, technical training and extension and advisory services and community engagement. The team also interviewed representatives from the government agencies involved in policy-making for AET and representatives of the private agricultural sector.

Organization	Interviewees
Higher Education Sector	
University of Jordan	Director and Assistant Director, Center for Water, Energy and Environment Former Dean, Faculty of Agriculture Vice Dean, Faculty of Agriculture Director, Jordan Valley Research Farm
Mutah University	President Vice President for International Relations and Quality Assurance Dean of Student Affairs
Jordan University of Science and Technology	Dean, Vice Dean and Assistant Deans, Faculty of Agriculture Department Chairmen, Plant Production, Animal Production, Natural Resources and Environment, and Nutrition and Food Technology
Al-Balqa' Applied University	Vice President for Technical Education Dean, Faculty of Agricultural Technology Vice Dean, Department of Applied Sciences
Community College and Vocational Education	
Al-Balqa' Applied University	Vice President for Technical Education
Vocational Training Center	Tourism Workforce Development and Training Specialist
Madaba VTC	Training Coordinator English Teacher Instructor Student focus group
Nuzha Vocational High School	Assistant School Principal Ministry of Education representatives
Technical Training and Extension	
National Center for Agricultural Research and Education	Assistant Director General for Financial and Management Affairs Social Science Researcher Director, Extension Director, Horticulture Researcher and Grafting Expert, Regional Center for Agricultural Research and Extension, Deir Alla Student focus group
Royal Scientific Society	Head, Water Studies Division Studies and Consultation Specialist

O & M Engicon/As Samra Biosolids Project	CEO Chief of Party and advisors
Association of Agricultural Engineers	Supervisor Operating Department Manager of Technical and Scientific Unit
Advisory Services and Community Engagement	
JOHUD	Natural Resources Director
Mercy Corps	Chief of Party Team Leader
GIZ	Senior Technical Advisor
JRF	Director of Program Development Socio-economic project manager
USAID ERSP	Deputy Chief of Party
International Youth Foundation	Country Director
Private Sector	
AgriJordan	Farm Manager and Agricultural Engineer
Arar Farms	Farm Manager
Zumot Winery	Owner
Wadi Exports	Owner
AgroCare	General Manager and Founder
Sukhtian Group	Head of Agricultural Division Managing Director
Small farmers in Jordan Valley	Farmers
Jordanian Exporters and Producers Association	Deputy Executive Director and Head of Promotion Department Chairman Board Member
Policy Environment	
Ministry of Agriculture	Secretary General Assistance for Plant Wealth General Secretary Assistant for Marketing Information Head of the Policy Division Head of Irrigation and Soil Department
Ministry of Water	Secretary General, Jordan Valley Authority Administrators, Water User's Associations
Ministry of Education, Vocational Education Directorate	Current Director and retired Director
Ministry of Labor	ETVET Council Secretariat Workforce Development Consultant

Scoping Assessment Interview Protocols

Education Institution Interview Questions:

Key questions:

1. Can you please briefly describe the purpose and structure of the agricultural education program at your institution?
2. In your opinion, what are the strengths of the agricultural education training program at your institution?
3. In your opinion, what are the weaknesses of the agricultural education training program at your institution?
4. What skills are you teaching students?
Probe: professional skills, communication skills, leadership/teamwork skills, technical, ethics, career
Probe: what's informing your decision to teach these skills?
5. What are the major obstacles to developing your AET program?
6. What kind of career preparation do your students get? Is there a career resources center?
7. Where are your students finding employment?
8. Where do you see the opportunities for growth in your program?

Additional questions for deans/directors:

9. Can you please briefly describe the strategy for recruiting new faculty/staff?

Snowball question: who else should we talk to if we want to learn more about AET?

Follow-up and probing questions:

10. Can you describe the process for recruiting students and evaluating applicants for the agricultural program at your school?
11. Are there sufficient resources to support the agricultural education program?
12. Probe: staff, funding, equipment, space
13. Can you please briefly describe the teaching approach of the agricultural education program at your school?
Probe for evidence of a variety of educational experiences including lectures, discussion, simulations, and distance education.
Probe for evidence of group/team projects, laboratory and field experiences?
Probe for approaches that foster critical and analytical thinking
14. Does the program provide internships or field experiences for the students?
15. Can you please describe how professional ethics are incorporated into the curriculum of the agricultural training program?
16. Do you have interactions with agricultural organizations or the commercial agricultural sector?
17. Do you conduct research?
Probe for evidence that research supports or enriches the existing curriculum
Probe for evidence of opportunities for students to participate in research activities
Probe for evidence that research supports the identified needs of the agricultural sector

18. Can you please describe how faculty performance is evaluated and rewarded/incentivized?
19. Do faculty members have access to professional development opportunities?

Student/Alumni Interview Questions:

Key discussion questions:

1. Could you please briefly describe your experience in the agricultural education program at your school/training center?
2. What aspects/components of your school's/training center's education programs do you like most?
3. What aspects/components of your school's/training centers' education program do you like least?
4. What skills are you learning that will be most valuable in your career?
5. Can you describe how you were selected for this program and/or application process for the agricultural program?

Snowball question: Who else should we talk to if we want to learn more about AET?

Follow-up and probing questions:

6. Can you please describe the academic advising process?
Probe for accessibility, quality of information
7. Do you have opportunities for internships or field experiences in you agricultural education program at your school/training center?
8. Do you have opportunities to participate in research projects?
Probe for faculty encouragement, specific requirements, level of interest
9. What is the source of funding for your education at your school/training center?
10. Do you receive career advising as part of your program? Can you please describe this career advising process?
11. Do you think a career in agriculture is a good career in Jordan?
Probe for their specific career intentions or aspirations
Probe for: job availability, occupational prestige, possible career opportunities

Government Agency Interview Questions:

Education and Labor Ministries

- Can you please describe the agricultural education and training system in Jordan?
- Can you please describe the accreditation processes for AET institutions in Jordan?
- What is the process for curriculum development and approval?
- What is the situation in relation to gender equity in AET in Jordan?
- How are AET education and/or training institutions financed?
- Who has the authority to recruit, hire and dismiss deans, department chairs and faculty and/or directors at AET institutions
- Can you describe the relationship between AET institutions and the private sector?
- What are the current educational effort reforms for AET?
- How do the ministries communicate with each other?
- In your opinion, what are the strengths of the agricultural education training program in Jordan?
- In your opinion, what are the weaknesses of the agricultural education training program in Jordan?
- What are the major obstacles for AET in Jordan?

Agriculture and Water and/or Environment

- What are the areas of greatest need in terms of skill sets for employees in the agricultural sector
Probes: government and private sector employees
- In your opinion, what are the strengths of the agricultural education training program in Jordan?
- In your opinion, what are the weaknesses of the agricultural education training program in Jordan?
- What are the major obstacles for AET in Jordan?
- Does your ministry provide training programs in agriculture?
- How does your ministry communicate with the education and labor ministries about AET needs in Jordan?
- Tell us about the agricultural employees union?

Snowball question: who else should we talk to if we want to learn more about AET?

Non-Governmental Organization Interview Questions:

Research Institutions and Extension Agencies (NCARE, RSS, JVA etc.)

- What set of skills do you need in your new employees?
- Where do you recruit employees?
- In your opinion, what are the strengths of the agricultural education training program in Jordan?
- In your opinion, what are the weaknesses of the agricultural education training program in Jordan?
- What are the major obstacles for AET in Jordan?
- How do you provide professional development for current employees?
Probe: In the past year – what courses did your employees take?
- What is the accountability/follow-up?
- What, if any, training and education do you provide in the agriculture sector?
- What opportunities do you see in the agricultural sector in Jordan?
- Does your agency/organization have a strategic plan?

NGOs (JOHUD, JRF, Mercy Corps, etc.)

- What set of skills do you need in your new employees?
- Where do you recruit employees?
- In your opinion, what are the strengths of the agricultural education training program in Jordan?
- In your opinion, what are the weaknesses of the agricultural education training program in Jordan?
- What are the major obstacles for AET in Jordan?
- How do you provide professional development for current employees?
- What, if any, training and education do you provide in the agriculture sector?
- What opportunities do you see in the agricultural sector in Jordan?

Snowball question: who else should we talk to if we want to learn more about AET?

Private Sector Interview Questions:

Private Sector

- What set of skills do you need in your new employees?
- Where do you recruit employees?
Probe: high-skill, low-skill, permanent vs. seasonal/harvest

- In your opinion, what are the strengths of the agricultural education training program in Jordan?
- In your opinion, what are the weaknesses of the agricultural education training program in Jordan?
- What are the major obstacles for AET in Jordan?
- How do you provide professional development for current employees?
Probe: Where do you send your employees for training?
- Where do you get your agricultural advice and training?
Probe: do you get advice from NCARE?
Probe: do you get advice from private sector companies? E.g. irrigation suppliers, seed suppliers, other input suppliers?

Snowball question: who else should we talk to if we want to learn more about AET?

Table E1 - Policy Environment

Internal	
Strengths	Weaknesses
Ministry of Labor, ETVET initiative on labor markets and skills required JVA process to empower and train water user associations	General lack of sustainability because of reliance on donor support Lack of political support for agriculture Policies don't encourage farmers to conserve water use Water reuse policies favor domestic users Difficulty to use bio-solids for agriculture Civil service database (350,000) – full of people without requisite skills, no screening, just queues annually Labor – lack of skilled agricultural labor, perception of high cost of labor Farmers access to and control of markets, domestic and international No intersectoral collaboration Agricultural Ministry is not strong 70% of agricultural graduates are female, but current demand is 70% for male graduates; this is a policy-based challenge Certification and inspection processes are under-resourced Agricultural transportation issues not addressed adequately Lack of export support for producers
External	
Opportunities	Challenges
New ETVET effort to revamp 22 sectors including agriculture	Lack of political support for agriculture Poor perception of agriculture among general public Regional instability limits access to international markets

Table E2 - Higher Education

Internal	
Strengths	Weaknesses
<p>Nutrition and food processing programs are popular</p> <p>High female enrollment levels</p> <p>Higher demand for natural resources as a topic of study is emerging</p>	<p>Weaker students (based on Tawjihi) go into agriculture</p> <p>Too many graduates in some disciplines (e.g., agricultural economics)</p> <p>Graduates lack practical skills</p> <p>Limited number of internships</p> <p>Outdated curriculum (need for social sciences, business and management and entrepreneurial skills)</p> <p>Outdated teaching methodologies</p> <p>Outdated equipment and facilities (especially for practical training)</p>
External	
Opportunities	Challenges
<p>Internships with private sector</p> <p>AAE six month post graduate training is an excellent model for practical training</p> <p>Broaden the understanding of the jobs along the agricultural value chain</p> <p>Career advising</p> <p>Curriculum and faculty development to update courses and introduce new technologies and concepts</p>	<p>High percentage of female graduates who are not offered or cannot take jobs (away from home)</p> <p>Need to match student training to employers' needs</p> <p>Poor perception of agriculture as a career</p> <p>Most graduates do not want to work in rural areas</p> <p>Heavy reliance on donor funding, efforts not sustained by government or institutions</p>

Table E3 - Community College and Vocational Education

Internal	
Strengths	Weaknesses
<p>General</p> <p>Royal support to improve education in Jordan</p> <p>USAID has several programs partnering with both public schools and vocational colleges to improve career placement services and provide specific training (e.g., tourism)</p> <p>VTC</p> <p>Vocational Training Corp (VTC) has 44 centers, 1,500 staff and over 10,000 students</p> <p>Creating effective and engaging learning environment</p> <p>Curriculum includes life skills course and English</p> <p>Developing a career development service</p> <p>Students have good employment prospects, especially female students</p> <p>Offers short-term training courses</p> <p>Works closely with the private sector – has MOUs with private sector – demand-driven (at least for some fields)</p> <p>Staff are motivated to improve skills and professional development is incentivized</p> <p>VTC has a quality assurance system to maintain standards of training</p> <p>Conduct “open houses” to improve perception of vocational education and careers</p> <p>Public Schools</p> <p>2 year agricultural vocational training program available in secondary vocational schools</p> <p>Provides hands on, practical training</p>	<p>General</p> <p>Lack of practical training</p> <p>Curriculum is not aligned with market needs</p> <p>Poor quality of teachers/trainers</p> <p>Few and small vocational schools</p> <p>Student-teacher ratio is too high</p> <p>Teachers are paid poorly and, as a result, many have low motivation</p> <p>VTC</p> <p>VTC receives weakest students who perform poorly or don’t take the Tawjihi</p> <p>Lack of career guidance, especially for vocational careers in public schools</p> <p>Not approved to provide fee-for-service training to private sector, though working to get permission</p> <p>Currently VTC doesn’t have programs in agriculture (though have programs in water – plumbing, utilities etc.)</p> <p>Some fields lack official accreditation or certification</p> <p>Public Schools</p> <p>Students from vocational secondary school programs are not adequately prepared to attend college – they don’t take chemistry and biology</p> <p>Students are streamed to vocational education if they have lower grades</p> <p>Life skills courses are not valued and often the students don’t receive the 14 hours instruction per week</p> <p>There is confusion about the accreditation standards for vocational education</p> <p>Lack of funding for vocational education and poor facilities</p>
External	
Opportunities	Challenges
<p>VTC beginning to attract more highly qualified students as reputation is growing and graduates are finding jobs</p> <p>Agreement with Al Balqa University for students to progress to community college and university</p> <p>Development of fee-for-service training programs for private sector companies</p> <p>EU funding to develop 3 model centers of excellence in Renewable energy</p> <p>Water and environment</p> <p>Pharmaceutical</p> <p>Existing certificate programs (e.g., tourism) could provide model for vocational agriculture training</p> <p>Opportunities for training in eco-tourism, agro-tourism, adventure tourism etc.</p> <p>Public Schools</p> <p>ETVET initiatives for labor market development</p> <p>National employment strategy – which hasn’t been effectively implemented, but exists on paper</p>	<p>General</p> <p>High turnover of Ministers and other policy makers</p> <p>General political instability</p> <p>Pressure to accommodate refugee populations</p> <p>Lack of funding</p> <p>Externally funded programs struggle to secure Ministerial support and often end when donor funding stops, i.e., no sustainability plans</p> <p>Poor perception of agriculture as a career</p> <p>Proprietary nature of large farms</p> <p>Competition from better trained and/or less expensive labor from other countries</p> <p>Lack of implementation of reforms</p> <p>VTC</p> <p>Poor perception of vocational careers, especially for females and in rural areas</p> <p>Few well-trained trainers in Jordan</p> <p>Mandate to hire trainers/teachers through the civil service list; most candidates do not have appropriate skills</p> <p>Need labor market information system for Jordan (Ministry of Labor is supposed to be working on this)</p> <p>Inherent preference to work for government rather than private sector</p> <p>Public Schools</p> <p>Heavy reliance on external funding (World Bank, Canada, USAID, etc.) which are not sustained by government</p>

Table E4 - Technical Training and Extension

Internal	
Strengths	Weaknesses
<p>Research organizations with an agricultural mandate</p> <p>On-going research activities</p> <p>Educated and experienced personnel</p> <p>Employees have opportunities to attend workshops and training</p> <p>Employee training also occurs on the job</p>	<p>Activities are limited for a variety of reasons (funding, authority, political)</p> <p>Not demand driven, i.e., by farmers</p> <p>Inadequate funding from government or royal foundation</p> <p>Private sector does not fund government research</p> <p>Reliance on donor funding</p> <p>All research information on NCARE website is in English; agents and farmers need Arabic materials</p> <p>Research farms and extension units are not often included in research activities</p> <p>Lack of connection/communication between extension/training organizations and farmers</p> <p>Demonstrations on the research farms are not accessible to most farmers</p> <p>In JV only have 8-9 extension agents</p> <p>Hiring freeze in government</p> <p>Retention is a problem</p> <p>Graduates don't have requisite skills or practical training sufficient for the jobs</p> <p>Selection process for employee training is not transparent</p> <p>Many employees are on leave, working elsewhere and slots remain empty</p>
External	
Opportunities	Challenges
<p>Farmers get information from a wide array of sources, e.g., NGOs, private sector</p> <p>Farmers use mobile phones to work with suppliers</p> <p>More collaboration between research labs, farms and extension</p> <p>More collaboration with universities</p> <p>Many inefficiencies in farm management suggest that many opportunities exist for on-farm training in water use efficient agriculture</p> <p>Private sector input suppliers provide training for employees who have more up-to-date information</p> <p>Large farmers/producers access technical information internationally</p> <p>Re-structuring and re-conceptualization for an agricultural extension program that includes working with CBOs</p>	<p>No effective national strategy for agricultural extension</p> <p>Lack of community trust in government extension although this also extends to private sector extension</p> <p>Poor perception of agriculture means limited funding and possibly poorer human resources</p> <p>Farmers, especially larger farmers, engage private sector (agricultural suppliers) for extension information</p>

Table E5 - Advisory Services and Community Engagement

Internal	
Strengths	Weaknesses
<p>Royal support for several NGOs (JOHUD, JRF)</p> <p>Strong relationships at local level, with community development centers and local training teams</p> <p>Inclusive approach (including women, youth as well as community leaders and other stakeholders)</p> <p>Community-driven</p> <p>NGOs have a good understanding of the local context</p> <p>Provide training in various agricultural sectors in communities throughout Jordan and some even at regional level</p> <p>Employ TOT model</p> <p>NGOs sometimes partner on projects</p> <p>Creating opportunities for employment of graduates with NGOs – they look for people with skills in natural resources, finance, marketing etc.</p> <p>Experience with revolving loans</p>	<p>Limited relationship with government institutions, university researchers, extension agencies</p> <p>Heavy reliance on donor funding</p> <p>Lack sustainability - projects often end when donor funding is withdrawn</p> <p>Revolving loans have heavy administrative burden and the repayment rates have declined for some CBOs</p>
External	
Opportunities	Challenges
<p>Regional training courses</p> <p>Overlapping interests for NGOs and foreign donors</p> <p>Newly developed by-law on water utilities certification programs</p> <p>Revolving funds could be expanded</p> <p>Knowledge gaps all along the agricultural value chain where training is needed</p>	<p>Need more extension services – private sector extension by companies other than input suppliers</p> <p>Need integrated projects that identify gaps in agricultural sector and develop appropriate collaborations</p> <p>CBOs don't really function as coops, considered a "foreign" concept in Jordan</p> <p>Regional political instability</p> <p>Market control by wholesalers/market authorities</p> <p>Land speculation in some areas is driving up prices</p> <p>Not all CBOs are equally functional</p> <p>Ministry of Agriculture has many internal problems and is difficult to work with</p> <p>Lack of communication between Ministries</p> <p>Need policy/legislative changes at the national and local levels</p> <p>Need to build trust with local communities and WUAs</p> <p>Need to understand local context</p> <p>Lots of donor projects have made promises that they have not kept</p> <p>Difficult to build sustainability into these programs</p> <p>No governmental strategy for extension</p> <p>Lack of collaboration between extension and research agencies and with the NGOs</p>

Table E6 - Private Sector

Internal	
Strengths	Weaknesses
<p>Many farms and companies will provide on-the-job training for employees</p> <p>There is demand for female employees in some sectors (e.g., greenhouse workers, packing)</p> <p>Some larger farms have relationships with universities and AAE (internships), but most farmers do not</p> <p>Good relationships between agricultural suppliers and private extension agencies and some farmers (especially larger) for training, though not all farmers trust these sources of information</p> <p>Huge agricultural capacity in Jordan Valley</p> <p>JEPA provides export assistance</p>	<p>Low salaries for agricultural workers</p> <p>Demand for professional or highly-skilled workers is low</p> <p>Some specialized producers complain that they can't find employees with the right skills</p> <p>Many field workers are immigrants</p> <p>Lack of trust and no relationship with NCARE or government agencies</p> <p>Lack of coordination between farmers, extension programs and research entities</p> <p>Small farms lack technological advances and are using inefficient practices, with poor land and water management</p> <p>Poor water networks with water shortages (some farms get less than 50% of the water they request) and inefficient/ineffective water delivery systems</p> <p>Farmers inability to access WSA information</p> <p>Agriculture sector is not organized and doesn't have an effective lobby</p>
External	
Opportunities	Challenges
<p>Many unidentified or unrecognized jobs all along every agricultural value chain, e.g., inspection, transportation, water/soil testing, food quality testing, expertise in export rules and regulations</p> <p>Need more information in marketing, integrated pest management and fertilizer management</p> <p>Export markets – needs coordination and information to enter and access</p> <p>Jobs for women in packing, greenhouse production</p> <p>Technology experts/training may be needed (e.g., date harvesters, drip irrigation, water pumps, pruning, computer use, etc.)</p> <p>New crop options may provide opportunities to increase production while reducing water use – this could involve universities (research and teaching in curriculum), extension agencies (providing information about alternative crops), agricultural suppliers etc.</p> <p>Develop market strategies, especially for new crops and export markets</p> <p>Creating more internships with AAE</p> <p>Tax-free investment opportunities</p> <p>JVA/WUAs are beginning to offer training courses for farmers on irrigation/water use, but also including communication skills, team building, English etc.</p> <p>JVA is looking for funding to renovate a training center in the Jordan Valley</p>	<p>Agricultural value chains are very narrowly defined in Jordan</p> <p>Young people do not want to work in agriculture – low salaries, hard work, don't want to live in rural area, poor perception of agriculture as a career</p> <p>Large producers need more low-skilled employees, rather than professional-level employees</p> <p>Graduates lack real-world, practical experience and knowledge about global markets</p> <p>Certain jobs are not considered appropriate for women</p> <p>Lack of knowledge to market products</p> <p>Larger farms and companies import technical expertise</p> <p>Regional political instability (e.g., markets in Syria are closed to exports)</p> <p>Testing facilities (soil, water, food) are inadequate and expensive</p> <p>Exporting via air is expensive</p> <p>Lack of government support for exporting products</p> <p>Access to financing is difficult especially for small farmers</p> <p>Poor market prices and market inundation of certain crops at times (e.g., tomatoes)</p> <p>High prices for inputs (e.g., taxes on imported inputs)</p>