"Application of near-real time monitoring systems for irrigated agriculture in MENA"

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Quarterly Progress Report July-September 2014

UAE, Jordan, Oman, Tunisia and Yemen

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DAI	USAID

Executive summary
This quarter was dedicated for equipments installation in all centers except INRGREF that is still in the process of procuring the equipments. The private sector represented by ICT spent considerable efforts in installing the equipments for Jordan and Yemen. At ICBA, the project team already installed the various technology platforms for annual crops, date palms and greenhouses and equipments in the farmer's fields. ICBA is actually sharing its meteorological data of two stations on its website and is working actually on creating a web platform for sharing all the centers data. Also ICBA is sharing data with MAWRED and FewsNet USAID funded projects. The work plan and budget for Yemen were finalized and yet submitted. The centers in Jordan, Oman and UAE starts data collection and organization into datasets for prompt sharing together with sharing IDs and passwords. As the project is extended until the end of 2015, the teams are actively catching the time lost previously in the project start up and the equipment procurement. All the centers participating to this project would like *to express their gratitude for both of these experts*: Peter Reis and Ken Ludwa.

خصص هذا الربع من السنة لتركيب المعدات في جميع المراكز باستثناء INRGREF التي لا تزال في عملية شراء المعدات. أنفق القطاع الخاص ممثلا في شركة لتكنولوجيا المعلومات والاتصالات جهودا كبيرة في تركيب المعدات في الأردن واليمن ، وفريق المشروع. في ICBA ثبت مختلف منصات التكنولوجيا من أجل المحاصيل السنوية، أشجار النخيل والبيوت المحمية والمعدات في حقول المزارعين .قامت ICBA بتقاسم بيانات الأرصاد الجوية في محطتين على موقعها على الانترنت وتعمل الان على خلق منصة على شبكة الإنترنت لتبادل جميع البيانات المراكز. يتم حاليا تبادل البيانات مع المشاريع الممولة من الوكالة الأمريكية للتنمية مورد MENA-LDASو FewsNet. تم وضع اللمسات الأخيرة على خطة العمل والميزانية لليمن. بدأت المراكز في الأردن وسلطنة عمان ودولة الإمارات العربية المتحدة بجمع البيانات وتنظيمها في مجموعات البيانات لالتقاسم الفوري مع معرفات تقاسم وكلمات السر. كما تم تمديد المشروع حتى نهاية عام 2015، والفرق تتلافى الوقت الضائع سابقا في بدء المشروع وشراء المعدات. جميع المراكز المشاركة في هذا المشروع تود أن تعرب عن امتنانهم لكل من هؤلاء الخبراء: بيتر ريس وكين لدوا على دعمهم والمراجعة النقدية للمشروع وتتمنى لهم كل التوفيق في المستقبل.

Farewell
Two dear colleagues left the project management: Ken Ludwa and Peter Reis. On behalf of all the partners' centers, we would like to express our gratitude for both of these experts for their support for this research during the whole process of the MENA NWC program: seed fund, proposal development and proposal design. We learned a lot about the FABRI methodology and the approach for networking in the MENA NWC. We would like in particular to thank you for all your critical review of the system approach we targeted to setup, based on the technology platforms and series of on-farm trials that are built through this project, in order to optimize irrigation water conservation and crop water productivity. We want to convey our gratitude for all your support to enable networking through the operational data sharing system setup here through communication technology.

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1. Activities on the ground started for this quarter

All the centers procured the equipments, except INRGREF (Tunisia) that is still in the process of tendering. Apart from the near-real-time monitoring equipment, INRGREF is also scheduled to receive laboratory equipment.
As the project work plan and budget just been finalized for WEC (Yemen), the project coordinators at ICBA are actually awaiting for DAI and USDAID approval of the grant agreement so to be able to receive the corresponding transfer for ensuring quick equipment procurement.
The generated weather data of ICBA is actually shared on its website. ICBA is awaiting for the loggers IDs and passwords for sharing from the partner centers to its local web portal until the MENA NWC allocates another web facility for this project.
The equipments were successfully installed and operated in NCARE (Jordan), SQU (Oman) and ICBA (UAE). Following are some illustrations of the installation as supervised by ICT International:

Figure 1: Women and man farmers, young researchers, graduate students, and extension staff installing equipments in Technology platforms (A), open farmers fields (B) and greenhouses.

The participation of young researchers and students to the equipments installation in the technology platforms and the series of on-farm trials, was very effective, and constitutes an good indicator on the project sustainability. The installation was carried out as planned in various crops: date palm, citrus and open field and greenhouse vegetables (See Milestone 2 Report).

2. Final work plan for Yemen

The project team finalized the project work plan and budget for Yemen. Abdullah Babaqi, WEC director assigned a new team, as the location changed for security reasons, lead by Mohammed Alkhawlani (Crop Science Specialist, alkhawlani2010@yahoo.com). The team members in Yemen are Adel Alweshali (WEC deputy Director and Irrigation Specialist), Abdulrahmaan Salah (Irrigation specialist) and Wael Alderwish (Irrigation engineer).

The technology platform will be implemented in WEC Research Farm of the Faculty of Agriculture, Sana'a University (15.362 N 44.181 E) that will host a weather station measuring the atmospheric parameters of air temperature, humidity, solar radiation, wind speed and direction, and precipitation, with direct upload to the internet using the cellular telephone networks. Research activities will conducted to estimate the crop water requirement (ETc) using the already installed lysimeter grown in alfalfa. Five soil sensors (10 HS) will be installed at 5 soil depths: 0-20 cm, 20-40, 40-60, 60-80, and 80-100 cm. The crop water requirement (ETc) will be compared with (ETo) calculated by weather station data. Two dataloggers type (EM50G) are needed, one of them will be installed close to the lysimeter, the other one will be at the weather station. All equipments have direct upload to the internet.

The innovated irrigation scheduling using Near-Real Time systems will be compared with the traditional irrigation scheduling methods on fruit orchards in a series of farmer's fields. The series will start with four farms and will expend as the demonstration of new irrigation scheduling method is scaled-up. Irrigation scheduling will be based on results obtained in a replicated trial at AREA Jader Research Farm (15.48 N 44.81 E) where the water use efficiency and productivities of both conventional and new scheduling methods will be evaluated.

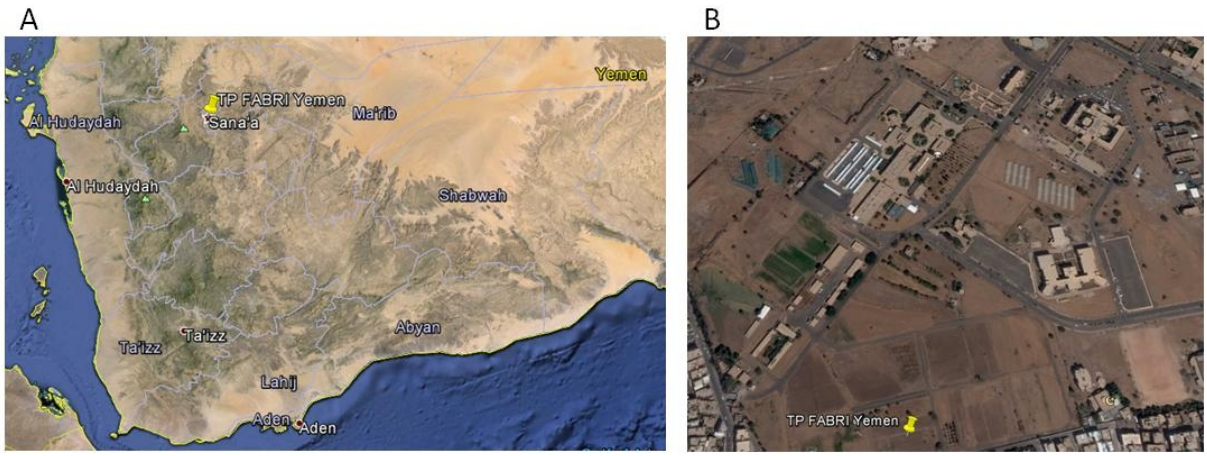

Figure 2: Location of the project intervention site (A) and the experiment facilities in WEC (B) including experimental plot and weighting lysimeter.

The farmers that are located nearby AREA will use the ongoing findings of the project in respect to scheduling the irrigation systems to improve their management skills and to study the effect of rescheduled irrigation system on the productivity of their crops. A reference to the rescheduled irrigation system will be the nearby weather station and the estimated ET_0 . A full record of the agricultural management practices will be conducted in these farms (irrigation frequency, fertigiation, soil characteristic curves, etc.). The estimated ET_0 will then be communicated with the farmers through sending SMS messages frequently. A water budget will be then set including the conserved water resources when monitoring technologies are utilized. A future step will be conducting farmer day to transfer the findings to local farmers.

The results of the innovative irrigation scheduling will be used to compare them with traditional irrigation systems in the farmers' fields locating close to the Research farms. The results will be disseminated to the farmers through demonstration, workshops, and organized field tours.

The conventional and technology-based irrigation practices in grapes and apple farmer's fields will be compared for agronomic performance and crop quality. The yield components and environmental conditions will be assessed in each on-farm trial (see WP3 Project document) in order to identify the yield-limiting factors. Key nutrient content of fruit samples as well as quality parameters will be analyzed according to standard methods.

The Policy-maker stakeholder is Mr. Tawfic Alshargabi, Ministry of water and environment: Deputy Minister of the ministry of water and environment. Two farmers associations participated to the project: Al Mahjel and Kharabat Mahiab Farmers Associations.

3. Activities planned for next quarter

The project milestones were re scheduled taking into account both the delay in starting, implementation and also benefiting of the project no cost extension until the end of 2015. In front is a tentative plan that was submitted to DAI for approval. The main activities of the coming quarter are related to:

1. Biophysical and socio-economic characterization of the strategic intervention sites of the project
2. Datasets organization, sharing and the operational the web portal.
3. Training, dissemination, technical bulletins and newsletters.

ICBA, SQU and NCARE started the process of dataset organization for prompt sharing. Following is an example of weather and soil moisture data:

FABRI_1	Port 1	Port 1	Port 2	Port 3	Port 3	Port 3	Port 4	Port 5	Port 5	Port 5
288 records	VP-3 Humid	VP-3 Humid	PYR Solar R	DS-2 Sonic	DS-2 Sonic	DS-2 Sonic	ECRN-100 P	5TE Moistur	5TE Moistur	5TE Moisture
Measurement Time	RH	°C Temp	Solar W/m²	m/s Wind	m/s Gusts	° Direction	mm Precip	m³/m³ VWC	°C Temp	mS/cm EC B
11/4/2014 7:00 AM	0.842	16.9	23.8	0.80	2.0	175	0.0	0.168	24.6	0.38
11/4/2014 7:30 AM	0.849	17.8	119.0	0.76	2.1	179	0.0	0.167	24.5	0.38
11/4/2014 8:00 AM	0.834	19.6	227.1	1.31	2.9	179	0.0	0.167	24.5	0.38
11/4/2014 8:30 AM	0.806	20.9	333.3	1.33	2.9	213	0.0	0.166	24.4	0.39
11/4/2014 9:00 AM	0.766	22.3	435.8	1.71	3.8	218	0.0	0.166	24.3	0.38
11/4/2014 9:30 AM	0.712	24.2	529.2	1.94	3.6	227	0.0	0.166	24.3	0.38
11/4/2014 10:00 AM	0.686	25.6	611.6	2.01	3.7	230	0.0	0.166	24.3	0.38
11/4/2014 10:30 AM	0.645	27.0	681.2	2.27	4.6	239	0.0	0.166	24.3	0.38
11/4/2014 11:00 AM	0.602	28.2	736.1	2.35	4.6	238	0.0	0.170	24.4	0.39
11/4/2014 11:30 AM	0.534	29.8	776.4	2.22	5.2	241	0.0	0.174	24.5	0.41
11/4/2014 12:00 PM	0.479	30.9	798.3	2.03	4.4	225	0.0	0.179	24.7	0.43
11/4/2014 12:30 PM	0.422	32.2	800.2	2.06	4.8	221	0.0	0.194	24.9	0.50
11/4/2014 1:00 PM	0.360	33.4	783.7	1.95	4.1	231	0.0	0.205	25.1	0.63
11/4/2014 1:30 PM	0.250	34.1	748.9	2.01	4.4	243	0.0	0.207	25.3	0.65
11/4/2014 2:00 PM	0.228	34.7	701.3	2.03	4.5	241	0.0	0.207	25.6	0.64
11/4/2014 2:30 PM	0.211	35.2	640.9	1.74	4.2	215	0.0	0.207	25.8	0.64
11/4/2014 3:00 PM	0.196	35.6	562.1	1.70	3.6	226	0.0	0.207	26.0	0.63
11/4/2014 3:30 PM	0.179	35.9	472.4	1.29	2.8	257	0.0	0.206	26.3	0.62
11/4/2014 4:00 PM	0.174	36.1	375.4	1.00	2.5	269	0.0	0.206	26.5	0.61
11/4/2014 4:30 PM	0.170	35.8	269.2	1.19	3.1	242	0.0	0.206	26.7	0.61
11/4/2014 5:00 PM	0.172	35.4	164.8	0.89	2.3	221	0.0	0.205	26.8	0.60
11/4/2014 5:30 PM	0.205	34.0	67.7	0.29	0.7	304	0.0	0.204	26.9	0.59
11/4/2014 6:00 PM	0.243	30.5	7.3	0.30	0.6	141	0.0	0.204	27.0	0.59
11/4/2014 6:30 PM	0.360	29.2	0.0	0.89	2.5	37	0.0	0.204	27.1	0.58
11/4/2014 7:00 PM	0.416	28.3	0.0	0.66	1.8	84	0.0	0.203	27.1	0.58
11/4/2014 7:30 PM	0.483	27.1	0.0	0.80	2.6	100	0.0	0.202	27.1	0.57
11/4/2014 8:00 PM	0.518	26.2	0.0	1.09	2.4	105	0.0	0.202	27.0	0.57
11/4/2014 8:30 PM	0.537	25.2	0.0	1.09	2.1	106	0.0	0.201	26.9	0.56
11/4/2014 9:00 PM	0.566	24.3	0.0	1.17	1.9	110	0.0	0.201	26.9	0.56
11/4/2014 9:30 PM	0.597	23.8	0.0	1.39	2.2	114	0.0	0.200	26.7	0.56
11/4/2014 10:00 PM	0.608	23.6	0.0	1.36	2.5	117	0.0	0.199	26.6	0.55
11/4/2014 10:30 PM	0.602	23.1	0.0	1.22	1.8	111	0.0	0.199	26.5	0.55
11/4/2014 11:00 PM	0.595	22.4	0.0	0.93	1.9	124	0.0	0.198	26.4	0.55
11/4/2014 11:30 PM	0.587	22.3	0.0	1.16	2.1	133	0.0	0.197	26.3	0.55
11/5/2014 12:00 AM	0.587	22.1	0.0	1.15	2.0	131	0.0	0.197	26.2	0.54
11/5/2014 12:30 AM	0.586	21.7	0.0	1.20	2.2	140	0.0	0.196	26.1	0.54
11/5/2014 1:00 AM	0.574	21.5	0.0	1.21	2.3	139	0.0	0.195	26.0	0.54
11/5/2014 1:30 AM	0.554	21.4	0.0	1.16	2.3	140	0.0	0.195	25.9	0.54
11/5/2014 2:00 AM	0.535	21.5	0.0	1.21	2.7	143	0.0	0.194	25.7	0.54
11/5/2014 2:30 AM	0.536	21.1	0.0	1.27	2.3	137	0.0	0.194	25.6	0.53
11/5/2014 3:00 AM	0.542	20.8	0.0	1.24	2.3	140	0.0	0.193	25.5	0.53

Months	Weeks	Holidays	FABRI-USAID
January	wk1	1-3 NY	Field tour/installation
January	wk2		
January	wk3		Milestone 3 Field sites
January	wk4		
February	wk1		
February	wk2		
February	wk3		
February	wk4		Field tour
March	wk1		Meeting Oman
March	wk2		Milestone 4 websites training
March	wk3		Quaternaly report
March	wk4		
April	wk1		
April	wk2		
April	wk3		
April	wk4		
May	wk1		MENA NWC congress
May	wk2		Training
May	wk3		Milestone 5 datasets bulletins
May	wk4		Meeting Tunisia
June	wk1		
June	wk2		
June	wk3		
June	wk4		Quaternaly report
July	wk1		
July	wk2		
July	wk3	19 Eid	
July	wk4		
August	wk1		
August	wk2		
August	wk3		
August	wk4		
September	wk1		
September	wk2		
September	wk3		
September	wk4	22-24 Eid	Quaternaly report
October	wk1		Milestone 7 publications
October	wk2	13 Hijri	Training
October	wk3		
October	wk4		
November	wk1		Meeting UAE
November	wk2		
November	wk3		
November	wk4		
December	wk1	2-3 Nat	Milestone 8 dessimination
December	wk2		
December	wk3		
December	wk4		Quaternaly report/Final Report

The project coordination committee needs actually from INRGREF details about the status of progress with precise indications about:

- The status of equipment procurement: the 2 weather station, the pressure extractor and soil sensory system
- The status of implementation of the plots for the weather stations and the single season potato experiment
- Quick description of the experiments plans and protocols with some details on justification of key measurements (eg. infiltration rate measurements)
- The planning for training and involvement of young researchers and students

Quick actions to catch delay in the project implementation will ensure synchronization of project deliverables and communication.

We do not add the centers individual reports in appendix as all their quarterly reports were already communicated with DAI.