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MIDDLE EAST AND NORTH AFRICA WATER CENTER NETWORK (MENA WCN)

ASSESSMENT AND DESIGN: ANNEXES



SEPTEMBER 2010

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Middle East and North Africa Water Center Network (MENA WCN)

ASSESSMENT AND DESIGN: ANNEXES

September 2010

Submitted by:

U.S. Agency for International Development
U.S. Department of State
U.S. Bureau of Reclamation
U.S. Geological Survey
International Center for Integrated Water Resources Management
(ICIWaRM)/U.S. Army Corps of Engineers

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A SUMMARY OF JUNE 2010 REGIONAL CONSULTATIONS

A.1 EGYPT

1. USAID/Egypt

Richard Rousseau, Office Director, Agriculture, Environment, Antiquities, and Water

Moenes E. Youannis, Team Leader, Infrastructure

Wafaa Faltous, Team Leader, Water Resources Management

The meeting centered around interviews in Cairo and the objectives of the visit.

2. Ministry of Housing and Utilities

Mohamed El Alfy, Assistant Minister for International Cooperation and Chief Executive, Egypt Water Regulatory Agency

Water is important but sensitive and needs a wise approach. Some topics are sensitive, others not. Water quality is not sensitive; water pricing is. He suggests focusing on four themes:

- Water scarcity
- Water quality at the source
- Human resources
- Financing

Educating the public that water resources must be protected and respected should be the focus of the Center, as least to start with.

He suggested the Arab League as the hub since it has diplomatic status. How does the new network get respect? It needs an icon. Donors are present in the sector, but focused on project implementation. Policy is different – it is not easy or visible. Policy is the top priority. Regulation is second.

Creating an entity from scratch is a big challenge. Lifting it from the ground is a bigger challenge. He believes the institutions will determine what the Water Center Network does. It should not be a local entity. It should be regional.

Reform in Egypt started in the late 1980s and early 1990s bringing market and economic reform to the commercial sector. In the mid-1990s, there was infrastructure reform in telecommunications and power. Change came to water and sanitation in the late 1990s. USAID worked with the government for six years looking at examples for the government to make key reforms, moving ahead on corporatization and regulation. It creating the Holding Company for Water and Wastewater moving from a government to a corporate structure for the governorate level utilities and created the Egypt Water Regulatory Agency that he heads.

The key policy change was to invite in the private sector, technical assistance and donor money. The missing link is more updated policies based on current needs.

There are many international conferences and meetings where people give presentations and go home. He wants roundtables on specific issues to bridge the current disconnect between the government and financing institutions. Moenes Youannis of USAID interjected that it is no longer useful to preach policy reform. It's been done. Everyone has heard it multiple times. What is needed is to hold the hand of government and get it done.

Mohamed said that during the period he was at the Holding Company he created a scientific committee with a budget of LE500,000 or about \$100,000 to conduct research but when he left it dissolved and nothing was ever done.

3. Ministry of Water Resources and Irrigation

Mohamed Allam, Minister

Mohamed Nasser Ezzat, Advisor to the Minister

Hussam E.S. Fahmy, Vice President, National Water Research Center

Abdel Fattah Metawie, Chairman, Nile Water Sector

Ambassador Mohamed Rafik Khalil, Minister's Advisor, Nile Water Sector

Amro Makram El Tantawy, Head of the Technical Office, Ministry of International Cooperation

Mohamed El-Molla, Cabinet of the Minister of Foreign Affairs

Mariham Youssef, Attache, Ministry of Foreign Affairs

The Minister had assembled a large group, but the composition was interesting. One represented the NWRC. Some were from the Nile Water Sector, in case the conversation turned to transboundary issues. It never came up other than a very brief generic mention. Representatives of the Foreign Ministry and the International Cooperation Ministry were also presented. But there was no one from the Imbaba headquarters of the Ministry other than the Minister. The people that attended the meeting held during the December trip from the planning and irrigation departments did not attend.

He welcomed the Water Center Network in Egypt and strongly suggested that it be hosted in the National Water Research Center. The WCN needed to look at quality, quantity, constitutional, and institutional aspects. He mentioned many issues: seawater intrusion, desalination, wastewater treatment, groundwater depletion and pollution, water conservation, rainfed agriculture management, climate change, population growth, civil societies, stakeholder involvement, and shared water resources.

Dr. Hussam of NWRC asked why not start the center of excellence on water from scratch and bring in other institutions. We talked about how this was not a "bricks and mortar" approach and the need to get things moving quickly.

The Minister repeatedly suggested the creation of a foundation like Ford Foundation that was outside existing groups and could provide funding. He thought we ought to meet with the Ministry of Higher Education.

He said the three major issues facing the region were water loss, energy and population. [Population has come up many times in different conversations in different countries.] He suggested the creation of a regional board starting with three good institutions. He said that with a new institution, everyone will want to join. He thought it would be useful to think in terms of a results based matrix to see where institutions cluster. He thinks Egypt would donate. “Let’s not bother ourselves with bureaucratic decisions. Let’s define needs. But Egypt will not do it without a use for Egypt.” Put the function first. [This was echoed in many conversations, as well.]

4. National Water Research Center

Administration

Shaden Abdel-Gawad, President

Hussam E.S. Fahmy, Vice President

Dr Abdel-Gawad was not at the NWRC during the visit so we were given an overview by Dr. Hussam followed by a visit to the facilities and lunch. We were given quite a few publications and handouts that described the overall Center and its scientific publications.

The Center was started in 1975 to conduct applied research in all aspects of water, organized into sub-centers, labs and institutes as follows:

1. Water Management
2. Drainage
3. Water resources research
4. Nile River
5. Hydraulics
6. Channel Maintenance
7. Groundwater
8. Construction
9. Mechanical and Electrical
10. Survey
11. Coastal
12. Environment and Climate
13. Central Lab for Environment Quality Monitoring
14. Strategic Research Institute

The Center has 350 researchers and another 300 engineers and scientists, and a large support staff. The Center has essentially 2 career ladders, research through publications or the normal, more management career ladder. Because of low salaries and the current lack of outside research funding many highly trained researchers find jobs in the Gulf.

Dr. Hussam stressed that the Water Center Network must be independent and was hopeful that Egypt’s participation, and especially that of the NWRC, might help curb some of the brain drain. Independence of research is important so that researchers can work not just on current problems but can anticipate future needs.

Salaries at the Center are paid by the Government. All other costs have to come out of the total budget for the entire Center which is quite small considering the number of employees, something like 12 million Egyptian pounds. They have no money for subscriptions, software, technical equipment, etc.

They have a state-of-the-art training center with accommodation for a lot of long-term students – the students receive a diploma in water resources. The training is to build human resources capacity. Dr Hussam concluded stating that the NWRC would very much want to be involved in any way possible with the network, and added that an enabling environment for researchers to work together would be a great accomplishment.

Research Institute For Groundwater (RIGW)

Nahed El Sayed El Arabi, Director

Joseph Boshra Khalil, Groundwater consultant

Akram Mohamed Fekry, Groundwater Management and Protection

Gamal Abd El Nasser Kamel, Prof. of Soil and Water

It was an interesting and informative meeting with a very engaged and personable Dr. Sayad and her staff. The GW Center is 50 years old. They monitor water levels in 5,000 wells throughout the country on a monthly basis. Groundwater currently provides 8 billion cubic meters/year and is projected (needed) to reach 12 billion in the not so distant future. That means the country is relying heavily on the Institute and others to find good plentiful sources of water. The Center began monitoring 200 wells annually for water quality analysis as part of a Dutch program – periodic sampling of 50 parameters with a dedicated pump and sampling equipment. This is a very well established, scientific monitoring network.

The Center has been working on several methods of aquifer storage and recovery using treated water or surface water to augment depleted groundwater supplies. The research they are conducting seems technically sound but they could certainly use some assistance. A real problem the Groundwater Center has is lack of funds to buy simple things like computer software and readily available equipment which would greatly enhance their research.

They need help/assistance in assessing the potential of an expansive carbonate aquifer which overlies most of Northern Egypt. It is desperately needed for Egypt's future but is currently being exploited without little understanding or planning. The aquifer is a fault driven system and the Center does not have the expertise of technology to correctly assess the situation. They are also trying to conduct monitoring of potential seawater intrusion along the coast with an inadequate budget.

Dr. Sayad is one of the most genuine and caring administrator/researchers that the team has met. She is deeply concerned that the young staff will not have the opportunity to work with foreign experts and gain knowledge and experience like she and the other seniors had. She is concerned about the future of the water resources in her country. If the new network could assist the dedicated staff of the RIGW it would certainly be a great step.

Drainage Research Institute

Alaa A. Abdel-Motaleb, Professor, Director

Dr. Ahmed Mohamed Morsey, Head of MIS Unit

We were given three presentations by staff from the Drainage Institute, a well qualified and dedicated staff. They conduct research on various aspects of drainage including, treatments, filters, etc., but a huge part is water resources and water quality. They established a monitoring network with Canadian assistance and currently collect monthly water quality samples from 125 stations throughout the country which are each analyzed for 25 parameters, constituting a huge number of samples and expense. They use an up-to-date Microsoft Access database and make a yearly assessment of the monitoring network in an annual report. They could certainly benefit from some outside research assistance as Egyptian drainage is a leading contributors to pollution in the Mediterranean Sea.

Channel Maintenance Research Institute

Hosam Mohmoud Ibrahim, Researcher

The Channel Maintenance group conducts innovative research on some of the 50,000 kilometers of irrigation channels in the country. Issues include infestation by weeds and sand clogging. All chemical treatment for weeds was stopped in 1992 and the Institute has been at the forefront of new research and technology to rid the channels of weeds (actually a very crucial part of Egypt's economy) including mechanical and biological treatment. They have devised huge traps and weirs to remove weeds and conduct research on different types of weed eating fish. They use remote sensing to map and control weeds in Lake Nasser, and have devised innovative ways to determine which areas and channels are more susceptible to sand clogging from moving dunes.

Hydraulics Research Institute

Fathy El-Gamal, Director

We were given a tour of the huge mock up of the Nile River (1:45 scale) used for research to determine the effects of building a replacement barrage on the river. Sophisticated technology was being used but it probably does not relate much to the issues of the Water Center Network.

Central Laboratory For Environmental Quality Monitoring

Tarik A. Tawfic, Director

Rasha I. El-Gohary, Training Center Director

Mohamed M. Yehia, Deputy Director

We were given an extensive tour and explanation of the relatively new and impressive Central Laboratories, which possessed a large number of well-staffed and well-equipped labs for a variety of parameters.

The lab is the first phase of creating a center of excellence for the NWRC. It is both a training center and a lab for analytical techniques. It is the only internationally accredited lab in the Middle-East. A goal for the lab is to become the Mediterranean Center for Water Quality Studies. They currently conduct three to four month training programs and currently support a

lab in the Southern Sudan for Water Quality Technicians. Funding for this training is by Egyptian Aid to Nile Basin Countries from the Office of the Prime Minister.

The Lab has set national water quality standards for Egypt, which are generally inline with regional standards. They have connections for training at the Bari Water Quality Institute in Italy.

The main water quality issues are: sewage/ microbial contamination and trace element/industrial contamination. Their database structure is “off-the-shelf” and they do work for the private sector.

When we visited the labs it was very obvious that they had a qualified staff and up-to-date equipment, but almost all the labs (with the exception of the lab where the Sudanese students were training) were empty or inactive. We asked why this was the case and were told that in order to achieve accreditation they need to do a lot of quality assurance. Currently the quality assurance accounts for 45 percent of the cost for an analysis. The lab charges about 500 Egyptian pounds for a routine, but thorough analysis, whereas they said some outside low-quality private companies may charge as little as 20 pounds. They said it was very difficult to get outside business.

5. League of Arab States (LAS)

Djamel Eddine Djaballah, Minister Plenipotentiary, Environment, Housing, Water, and Sustainable Development Department

Shahira Wahabi, Chief, Sustainable Development and International Environmental Cooperation Division

There are three technical councils that Ambassador Djamel (from Algeria) oversees: environment (1985), housing (1983), and water (2009). He works with civil societies, ministries, and the UN. The Council of Arab Water Ministers was created because of the scattered work of the countries and as an umbrella to help research centers reflect the needs of the ministers. He mentioned desalination research as an example and said that the Council was coordinating with the three research centers in the Middle East working on desalination in Libya, Algeria and Saudi Arabia. He did not mention MEDRC in Oman. He spoke of the countries as major desalinization developers.

The unit he runs is a small secretariat to monitor progress and actions. It brings issues to the forefront for discussion at technical and political levels.

The Council sponsors a technical body which meets before any meeting of the Council, for perhaps a week to discuss issues related to, for example, IWRM, transboundary water issues, etc. This body raises technical issues and proposes decisions which are then taken to the “highest level of the summit” to make decisions by the Ministers.

The Council is a political body making the final decision. The three step process:

- Basic level – technical body meets for discussion when a decision is needed,
- Preparatory Committee – brings in both political side and external expertise,

- Ministers agree at the level of the Water Council,
- Issue could go to the Economic and Social Councils,
- It then reaches what he calls the summit. It is unclear, but this could be a meeting of country ambassador to the League of Arab States.

An example of this is IWRM. Going through the process, the Summit approved a regional program responding to specific projects using existing funds and resources in January 2009. It also approved an action plan.

They asked the team:

- What are the aims of the Water Center Network?
- Why does the United States want a Water Center Network in the region?
- What will be its relation to the Arab League?

6. Donors Meeting at the Embassy of the Kingdom of the Netherlands

Tarek Morad, Deputy Head, Economic and Development Cooperation (and informally Water Sector Coordinator), Dutch Embassy

Gerhard Krause, Head of Economic Section, European Union

Gaelle Lemaire, Project Manager, Human Rights and Good Governance, European Union

Hans-Werner Theisen, Program Director, Water and Wastewater Management Program, GTZ

Cecile Denormandie, Project Officer, French Development Agency (AFD)

Detlef Gielow, Program Manager, Water and Wastewater Sector, KfW Bank Group

Carl-Frederik Gronhagen, Deputy Head of EIB Regional Office for the Near East, European Investment Bank

Rania Elessawi, WASH Officer, UNICEF

Samia M. El Guindy, Egyptian-Dutch Advisory Panel Project on Water Management, Ministry of Water Resources and Irrigation, Panel Member, Director, APP Central Office, Advisory Panel Project on Water Management, National Water Research Center

Tarek Morad, chair of the Development Partners Subgroup on Water, called the special meeting of the donors to meet the design team. They had already received the background brief on the initiative and the scope of work for the June visit, and they all appeared to have read them. In all, seven donors were represented.

Questions they asked included:

- What is the funding for the Water Center Network?
- What is the outcome of the design team's mission?
- What institutions have we identified that can take on the functions of the network?
- What can be the visibility of other possible donors in the WCN; i.e., to what extent is this a purely U.S. effort?

There was concern about the selection of a single hub, and noticeable relief when the team explained that there was a change in thinking to a more flexible approach, that no entity would be named immediately and that it might be instead a network or an association.

AFD mentioned the Marseilles Center which does more than water and works regionally around the Mediterranean.

The EU talked at length about the Center of Excellence on Renewable Energy which was the idea originally of the Dutch, passed on to the Norwegians and taken up by the EU for funding. At the start up all Arab League countries (22) were invited to join but only 10 accepted. They somehow agreed to place it in Alexandria. The issue comes down to funding. The EU wants it sustainable and wants to get out as soon as possible, but it cannot for the near future. The Center seems to do what every center does for funding: membership fees, providing services for fees, and training. It is thinking of offering some system of accreditation. They were asked about bringing in private sector involvement but they do not see a clear role for them.

This donor meeting revealed the risks of not being clear about the design, particularly regarding other donor participation. The team was asked specifically about whether the United States welcomed the participation of other donors in a visible way. The EU spoke frankly and said that the EU would not be interested in contributing to the core funds of the Center if it remains a unilateral U.S. effort. He also said that the organization lines of the EU were different from the USG's. But that it might be possible for the EU to fund a piece of an activity that was consistent with their funding streams. It could possibly fund research or training for a particular institution that was a member of the Center. It cannot do direct financing.

The GTZ representative encouraged capacity-building, including training on how participating institutions can do fund raising, write proposals, and improve management approaches. The Center can get some technical activities moving, but the proper organization will take time.

The Dutch chair noted overlap among institutions. In Egypt there is the National Research Center, the National Water Research Center, and universities, all of them often doing the same things. He suggests developing a mechanism to identify leading entities in the sector in the region, working with them, and leaving the rest to play a secondary role. Those that are active get recognition and play a leading role. Others drop out. There is so much knowledge around, but it is scattered and needs to be brought together. The Center could help with that. Funding is an issue in some countries and not in others. The Center would need a mechanism to bring them all together. We have some mechanisms like the Nile Basin Initiative, but need a mechanism to bring in others, from Europe. There is the Union of the Mediterranean which has an initiative on water. You need to bring people around the table and develop a strategy for water for the region.

7. Ministry of Agriculture and Land Reclamation

Saad Nassar, Advisor to the Minister

Muhamed Abo El Wafa, Program Manager, Agribusiness PSD, USAID

Dr. Saad asked if we had visited the Agricultural Research Center in Giza. We had not. He specifically suggested the Soil and Water and Environmental Research Institute under ARC directed by Hamdy Khalifa. It could be a useful home for the Center of Excellence. He argued against a Center in each country.

He said that the food security issue is very hot, related to food commodities, safety and accessibility. How do we increase production and exports?

He talked about the major policy changes in the agriculture sector in Egypt. The sector is now private sector led, with the government providing technical assistance, planning, monitoring, and control. For example, the government still determines how much land can be used for some major crops, like rice, primarily to counter sea water intrusion on the Mediterranean coast.

The strategy is to optimize and rationalize water use. Rice and sugar cane claim half the water in the sector. The government wants to replace sugar cane in Middle and Upper Egypt with sugar beets. Beets use 4,000 cubic meters; cane 11,000 cubic meters – but the governorates in the south do not have the facilities to process the beets. We heard no action plan to convert the factories from cane to beets.

Treated wastewater is not being used by the Ministry for edible crops.

Priority assistance to farmers is in high yield seeds, improved irrigation practices, fertilization, integrated pest management, and postharvest activities. The government is interested in investment not incentives for farmers. It has three governorates for pilot projects: Fayyoun, Minia, and Menufia.

8. Arab Network for Environment and Development (RAED)

Emad Adly, Director

Essam Nada, Executive Director

Mohamed Mahmoud El Sayed, General Coordinator Deputy

Waheed Abd El Mohsen, Financial and Administration Manager

Phillipa Abbot, Coordinator

Mohamed Hussein, Program Officer

Lamia Magdy, Program Officer

Ghada Ahmadein, Technical Assistant

RAED was formally established in 1990 as a regional mechanism for Arab civil society, but its origins go back to 1982 when a first regional meeting was held. In the early 1980s, there were no environmental NGOs in the region. RAED first started as a way to prepare for the Rio Conference in 1992, creating as a loose, informal, “virtual” network to present the Arab environmental challenges at Rio. In 1993, it held its first general assembly in Cairo. It now has more than 250 member NGOs from 17 countries of the 22 in the Arab League.

RAED has a Board of Directors made up of national coordinators who are elected in each country.

RAED is looking to Africa for a new direction. It is the North Africa coordinator for African Network for Water and Sanitation in Nairobi and works with The Mediterranean Information Office for Environment, Culture and Sustainable Development (MIO-ECSDE), a non-profit Federation of Mediterranean NGOs based in Athens.

RAED is a full member of the technical body of the Councils of Water and Environment in the Arab League. It works with international NGOs, the UN through UNEP and UNDP, and ISDR (International Strategy for Disaster Reduction). RAED is implementing a 1 million euro project on solid waste management in Egypt, Tunisia, Morocco, and Lebanon.

On Horizon 2020, it is working on the de-pollution of the Mediterranean, solid waste, wastewater, and solid and liquid industrial waste.

In general, little funding is coming into the Middle East and North Africa for NGOs -- 40 percent of their funds come from the EU. Egypt's NGOs suffer. He mentioned that in Jordan every NGO seeks the "royal key" which is patronage from a member of the Royal Court which gives and attracts funds.

Corporate social responsibility is not developed in Egypt. Two-thirds of all funds from the private sector go to groups sponsored by Mrs. Mubarak, like the children's cancer hospital. RAED has received very little money from companies: LE 10,000 from Vodofone, and from Mobinil three installments of LE 30,000, 20,000, and 10,000. He has never met a private sector entity that works at the regional level, only at the national level.

RAED does have a strong media connection in the Middle East and North Africa.

When he started, he did not have a model to follow. He looks to the International Union for the Conservation of Nature (IUCN) with its headquarters near Geneva but found even more useful the International Cultural Association (ICU) in a small office in Belgium. It has a strong partnership with only 15 full time staff.

RAED has a small secretariat housed in a flat in New Maadi not far from USAID. Some of the staff work exclusively on Egypt-focused projects, others are dedicated to RAED's regional activities. It is a "modest, small, strong team." You will find that some NGOs in the network have larger staff than the hub itself. The NGOs do not pay for RAED, and contribute nothing for personnel.

RAED works on the basis of joint projects with its members. Selection of which members take part on a project can be simple and non-contentious. NGOs fall off the possible list of participants if they have no expertise in the area. Some work well, others are weak. It does not seem to be a problem.

In general, success depends on the hub being neutral and letting decisions come from members. He advises us to embrace more people or groups and avoid politics, but then admits that it is impossible to be neutral. He brings people to RAED, builds a sense of ownership among members, and asks for their help and support in taking decisions. He works in a way to make members feel privileged to be part of the network. He suggests a first meeting in Washington to make them feel special.

Dealing with funds, you have to put good governance at the forefront, need to be transparent, and set up an advisory committee. You need to be realistic and not just good managers.

For every new project, he signs an MOU with the members about budget and responsibilities. There is no single MOU that covers all activities of every NGO. Legal relations are established project by project. He has no problem transferring funds internationally. Only Tunisia is an issue. It can take six months to get banks to release funds.

9. Initiatives in Education, Science, and Culture: Towards Enhanced US-Muslim Countries Collaborations, 16-18 June 2010, Bibliotheca Alexandrina

Recognizing the potential impact of President Obama's speech and the urgent need to encourage the creation of a new relationship between the United States and the Muslim world, the Bibliotheca Alexandrina in Egypt, a number of academic institutions and libraries in the United States and Egypt, as well as other cultural and educational institutions from other countries organized the international conference. The attendees included 300 scholars, writers, politicians, journalists, clergy, and youth. The conference was organized around plenary sessions and breakout discussions. The three principle areas for cooperation discussed were Culture, Education, and Science and Technology, in conjunction with four cross-cutting tracks: Youth, IT, Media, and Women.

Notably, science was the only track where there was palpable optimism for collaboration and a common language. In the other tracks, the debate about cooperation was more contentious and hinged on resolving U.S. foreign policy controversies in the Muslim world. However, even in the discussions about religion, speakers pointed out that collaboration in scientific research is a way to restart our relationship and have true two-way exchange.

Session: New Opportunities for Youth Engagement in Science

Prof. Mohamed Sherif El-Masry (Egypt) called for increased science partnerships – working teams of young scientists, visiting scholars and student exchanges (even at the undergraduate level), and training of journalists on S&T to better represent to the public. Ms. Omneya Darwish (Bibliotheca Alexandrina Center for Special Studies and Programs) outlined the many programs of the Center for Special Studies and Programs to increase S&T awareness, offer need-based training for researchers, and provide grants to researchers. She suggested research grants to link students in Muslim countries and US, exchange program (or database of exchange programs), visiting scholar program (create a network and facilitate seminars), online and real-time e-courses, and training in science journalism (link to 2011 conference in Cairo). Ahmed Hussein described Yahoo Project's innovation challenge (\$250,000) competition to help youth bring their ideas to the market – beyond the prize, the program offers the winners mentorship and technical support.

Members of the audience commented that the science capacity of teachers must be increased – this should be a focus of collaboration. Another person called for placing students in industry (so they can uncover needed scientific solutions and attempt to tackle them) paired with expanded entrepreneurship incubation programs. Another audience member said public education/engagement programs are needed to allow all to benefit from S&T – not just programs for highly trained elite. An audience member was highly critical of USAID in Lebanon for

funding conferences with minimal impact and called on USAID to partner more with local NGOs and small businesses to support entrepreneurial (social and economic) activities. Many pointed out the common challenge is in STEM education – effectively teaching children to like science, not creating diploma factories.

Other sessions:

In other sessions, notable projects related to youth were described. Mercy Corps' Global Citizen Corps Leadership Program works to build cultural understanding by linking students from Indonesia, Iraq, Pakistan, Jordan, Lebanon, UK, and the United States through teleconferencing to tackle global problems collectively (<http://www.globalcitizencorps.org/leadership>). IDSC Egypt's Public Opinion Poll Center is the first government poll center in Arab world (<http://www.pollcenter.idsc.gov.eg/>). The Global Knowledge Initiative is based on the premise that no country has enough S&T capacity to address the grand challenges and is working to map institutional capabilities, understand opportunities, and pair for collaborations (<http://globalknowledgeinitiative.org/index.html>). The 7th World Conference of Science Journalists in Cairo in June 2011 may be an opportunity to reach out to journalists to help science have a better public face (<http://www.wcsj2011.org/>). The Inspire Dreams 2010 Summer Public Service Program sends seven American college and graduate students to cultural centers in Bethlehem and Nablus to teach English, lead college preparatory courses, and help run Camp "I Have a Dream" in six different refugee camps (<http://www.inspiredreamstoday.org/>). One of the many outcomes of the conference was the announcement of a major new translation initiative that will involve collaboration between Yale University Press and the Bibliotheca Alexandrina (<http://www.yale.edu/divinity/notes/100705/alexandria.shtml>).

A.2 JORDAN

1. Ministry of Water and Irrigation (MWI)

Maysoon E. Zoubi, Secretary-General

MWI is attempting to develop a Ministry of Water Institute with GTZ assistance. It could be a non-profit company responsible for research, modeling, and developing of tools for people within and outside the government. It would be very important to include the private sector, since they best understand their needs. It would be a physical center. The focus would be on the most serious issues facing Jordan: water demand management, non-revenue water, reuse of treated wastewater for agriculture, water/energy, and desalination. The Secretary-General would like to link the Institute to the Water Center Network.

Eng. Maysoon also spoke about the Water Forum dealing with farmers in the highlands.

She talked about her efforts to bring people from the universities into the ministry part-time to join researchers with practitioners. But she asked if the universities can supply good people, since their salaries are not competitive.

At present, she said that MWI does not have research committees with the universities.

2. Swedish International Development Agency (SIDA)

Annika Johansson, Counselor, Regional Water Cooperation, Embassy of Sweden

Overall, Ms. Johansson felt the time was very good for a Water Center Network. One of the weaknesses of the water sector in the Middle East and North Africa is that regional institutions are weak. Therefore, with the exception of West Bank/Gaza, all of SIDA's work on water in the area is regional (not just regional conferences, but actual regional projects). They are helping fund the Red-Dead study, in collaboration with Friends of the Earth Middle East and North Africa.

SIDA's overall mission is poverty reduction, emphasizing human rights, climate change and gender. Ms. Johansson's new five-year strategy—likely to be approved in June or July—includes water (as well as good governance and regional trade). Her water program would have three components: transboundary water/conflict resolution, IWRM, and climate change, and will emphasize the Jordan and the Tigris-Euphrates river basins. The budget will be about \$5 million Euros per year.

Their transboundary water course has been running for four years and will likely continue. Regional IWRM is definitely an intersection, and climate change can certainly be worked in as well. Their “good governance” work could conceivably tie in.

She has been talking with ESCWA (UN Economic and Social Commission for Western Asia) and Global Water Partnership about supporting some of their work in the region. The former works with the Arab League.

Of the bilateral programs, she thinks the German work on IWRM is the most important. The French are involved in the Disi aquifer management, and we should talk with the Swiss, who may be open to collaboration. Norway and Denmark are not very active in the region. She likes the University of Jordan as a partner. They seem serious. She hasn't worked with the other universities, so she cannot compare among them.

3. Royal Scientific Society

HRH Princess Sumaya bint El-Hassan, President and Deputy Chair of the Board of Trustees

Tareq Al-Hadid, Executive Director, External Affairs and Assistant to the President

Mohammed Saidam, Director, Environment Monitoring and Research Central Unit (EMARCU)

Abeer R. Arafat, Cooperative Development Officer, External Affairs

Rafat Ahmad, Director, Industrial Chemistry Centre

John Guest, Partner, The Black and White Group

RSS is the largest national applied research institution in Jordan. It was founded in 1970 by King Hussein, as a not-for-profit NGO, containing 7 technical centers that house 38 nationally and internationally accredited laboratories. The society receives no government or royal court funding; but in the past, when Prince Hassan was Regent he provided a stream of government funding. RSS is now maintained largely on fees for services, amounting to about 70 percent of its income with the balance from consultancies.

RSS is part of a larger scheme and landscape: El Hassan Science City will eventually be home to RSS along with (a) Higher Council for Science and Technology, established in 1987 to set science and technology policies, strategies, plans and programs, increasing awareness of the significance of scientific research and development and directing its activities toward developmental priorities; and (b) Princess Sumaya University for Technology, established in 1991, a not-for-profit specialized university of information and communications technology. The 30 hectare campus is half empty but the plan is to grow a zone of S&T incubation where private and public sector entities can interact across sectors and disciplines, covering applied to basic approaches.

RSS tests all materials that enter the country or are locally produced, including food and building materials. They are all certified in RSS labs. It also has been contracted by the Ministry of the Environment to do real time water quality testing in Zarqa, King Talal dam, and King Abdullah canal. Much of this testing appears to duplicate the work of other entities, including the central lab of the Water Authority of Jordan.

It has recently spent \$1.5 million on lab upgrades. It conducts tests for energy efficiency of household appliances, and has a clean technologies center developed with USAID support – probably IDARA (Instituting Water Demand Management in Jordan – managed by DAI).

RSS has little coordination with Jordanian institutes of higher education, each having their own energy and environment centers.

RSS has a new strategy with a new business plan developed by The Black and White Group.

RSS would have no legal problems transferring funds to other institutions in Jordan or to institutions in other countries. It agrees with the concept of an international board of trustees for the network. It would like to host such a Water Center Network or center of excellence, even though the arrangements remain unclear.

Visit to the RSS laboratories:

The primary purpose of the visit was to see the laboratories of the RSS, which were indeed very impressive. The water quality laboratories were most relevant to the proposed Network, but it should be noted that these are a very small part of the overall operation. The lab functions in an analogous way to the National Institute of Standards and Technology (NIST) in the United States for many purposes. For water quality analysis RSS has very good facilities and capability.

We spoke extensively about the proposed Network both before and after the visit to the labs. RSS stressed the value of their Royal Charter from King Hussein, and its role as an NGO rather than a government institution, which allows them to serve as a neutral entity.

There are various entities and joint ventures hosted within the RSS. An example is the Cooperative Monitoring Center linked with Sandia National Laboratories. It is essentially independent, with RSS providing administrative functions. A Water Center Network could be accommodated, interacting with the existing staff and working with HRH Princess Sumaya and

her advisory committee, and thence to HRH Prince Hassan who chairs the Board of Trustees for the RSS. Naturally, and to be expected, at the staff level there are high expectations for increased levels of staff and operational funds.

4. Munther Haddadin, Former Minister of Water and Irrigation and Secretary-General of Jordan Valley Authority

When Dr. Haddadin heard of the visit, he prepared a paper on “A Water Center of Excellence in the Middle East”. The paper summarizes many regional water challenges: (1) imbalance in the population-water resources equation; (2) environmental degradation; (3) riparian unilateral uses; (4) sustainability of water services; (5) water governance; (6) management and legislation; (7) human resources development; (8) the natural synergy of water and energy; and (9) the continuum of research and development. In the paper, he points out that a Center of Excellence should cooperate with the private sector, public water institutions and NGOs. Cooperation with universities should implement training programs for human resources development. He also summarized the benefits of locating in Jordan: central geographic location, relaxed visa requirements, direct flights from countries in the region as well as from western capitals, good relations with all countries in the region, excellent security, moderate political views, complemented with opportunities for tourism and recreation.

The team met with Dr. Haddadin to discuss his paper and a wide array of topics. He has a BSCE degree from Alexandria University, an M.Sc and Ph.D in civil engineering from the University of Washington. He served as the Jordanian Minister of Water and Irrigation, Chairman and CEO of the Jordan Valley Authority, senior member of the Jordanian teams to the Middle East Peace Process, and a founding member of the Royal Scientific Society.

During the discussion of his paper, he pointed out that Jordan has received a lot of outside technical help. One challenge he highlighted was marketing to citizens the need and difficulty of managing scarcity. He also had a concern about the team’s definition of ‘region’. Jordan is one of the countries that can work with Israel, although it is more difficult now.

He preferred the University of Jordan as a location for the WCN because it can grant degrees and has prestige in the region. While the Jordan University of Science and Technology was more liberal and is higher ranked internationally, it is 80 miles from the airport and has fewer places for visitors to stay. The Royal Scientific Society (RSS) is good at providing service and can work effectively on a regional basis; but it is limited in research with few published scientific papers. In general, the universities do not work at the applied level, because the professors need to publish for promotions.

A couple of potential WCN structures in Jordan were discussed. The University of Jordan and the RSS could work together as the hub, or an umbrella could be created at the University of Jordan which would include the other Jordanian institutions.

5. USAID/Jordan and U.S. Embassy

Dana Mansour, Deputy Mission Director

Hugh Winn, Acting Director, Water Resources and Environment Office

George Harris, Senior Engineer

Ali Arbaji (MD, MPA), Program Management Specialist, Population and Family Health

Manu Bhalla, Regional Environment, Science, Technology, and Health Office, MENA

Caron DeMars, Regional Environment, Science, Technology, and Health Office, MENA

Yara M. AbuLaban, Environment Development Assistant, Regional Environment, Science, Technology, and Health Office, Middle East and North Africa

USAID staff had just come from a meeting with the Ambassador. He echoed concerns in the Mission that aside from some initiatives like water demand management, the government of Jordan's progress in the water sector is discouraging. The GOJ has yet to make major changes like closing wells and raising tariffs.

If this is a U.S. effort, the WCN will need U.S. staff and should bring in private sector participation, such as from IBM or GE, who are active in the water sector.

Most of USAID/Jordan funding is for infrastructure: 45 percent is in cash transfers for the government's non-military foreign debt, the rest is in the USAID program budget. Disbursement is tied to a Conditions Precedent but for the past five years those CPs were ignored. The CPs are in elections, trade policy, educational reform, and water reform (tariffs, groundwater use, and agriculture). Concerns focus on the fact that only two-thirds of costs are recovered from water and sanitation services and about one-sixth in agriculture.

They recommended reaching out to Prince Faisal who heads a water committee and to carefully weigh the pros and cons of working through RSS because of USAID's experience of mixed results in working with RSS.

6. National Center for Agricultural Research and Extension (NCARE)

Faisal Awawdeh, Director General

Said El-Zuraiqi, Manager of Water, Soil and Environment Directorate

Esmat Al-Karadsheh, National Coordinator, Improvement of Irrigation Water Management in Lebanon and Jordan (LWRA) – EU

Nabeel M. Bani-Hani, Researcher in Irrigation and Soil Chemistry

Kefah Youssef, Researcher in Irrigation and Soil Management

Adel Shoubaki, Researcher in Water and Environment

Mohamed Mudabber, Researcher in Conservation and Water Harvesting

Luna Al-Hadidi, Research Coordinator of USAID MERC Project

Mohamed A. Jitan, IMIS Project Coordinator

Naem Mazahrih, Director Deir Alla Regional Center and Irrigation Researcher

Abeer Albalawneh, Grey Water Projects Coordinator

Sireen Naoum, Irrigation Water Management

The team met with Dr. Faisal Awawdeh and 11 researchers and specialists. NCARE has been the major agricultural research institution since its founding in the 1950s. Previously known as the National Center for Agricultural Research and Technology Transfer (NCARTT), it became a semi-autonomous institution in 1993.

In 2007, NCARTT became NCARE, an institution which combines both research and extension functions, which is an excellent departure from the usual system of separating research and extension functions. NCARE receives its core funding from the Government of Jordan, but also receives significant funding from outside donors, including the World Bank, the EU, UNDP, FAO, USAID, USDA, GTZ, IDRC, ICARDA, the Arab Center for the Studies of Arid Zones and Dry Lands (ASCAD), JICA, GEF, etc.. The annual budget is approximately \$5 million.

In addition to the central office which was constructed under a USAID project (and remains in excellent condition), NCARE has seven regional centers located in Dair Alla, Ramtha, Mafraq, Mshaggar, Rabba, Tafilleh, and Shobbak. In addition, NCARE operate 13 research stations and extension field units, representing different agro-ecological zones throughout Jordan.

NCARE goals are to:

- Adopt the latest research findings from local and other sources to improve agricultural production.
- Conservation and preservation, and sustainable use of natural resources.
- Achieve food security.
- Maintain an ecological balance through a sustainable use of natural resources without jeopardizing the environment.

NCARE has eight research departments and four extension departments. Personnel include 60 with Ph.D.'s, 90 holding M.Sc.s, and 300 with B.Sc.s

Dr. Awawdeh indicates that the quality of agricultural research undertaken in Jordan is superior to most countries in the region.

Research Departments include:

- Biodiversity and Medicinal Plants
- Field Crops
- Horticulture
- Integrated Livestock and Rangeland
- Olive Trees
- Plant Protection
- Socio-Economic Studies
- Water, Soil, and Environment

Extension Departments include:

- Information and Agricultural Management
- Training
- Awareness and Mass Media
- Extension Programs

According to Dr. Awawdeh and staff, the major issues related to water include:

- the increased level of salinity in highland soils;
- lack of a system for water pricing; and
- the lack of sufficient treatment of waste water.

Dr. Awawdeh indicated that NCARE would be most willing to host the new Middle East Center for Water.

On-going NCARE water programs include: programs in the northern Jordan Valley to reduce salinity in water for citrus crops; water scarcity and quality projects in the Jordan Valley; and research on irrigation schedules to reduce use of water by 30 percent.

In addition, research and extension are working together on irrigation management programs to calculate rates of evapo-transpiration.

Dr. Esmat Al-Karadsheh is undertaking research/extension with 11 water user to improve associations to extend proper operation and maintenance of irrigation schemes.

Other water programs include:

- Water filtering in the King Abdullah canal,
- Water harvesting in the Badia, and
- Use of gray water for home gardening (a public-private partnership with Coca Cola).

Concerning the issue of the purported lack of connection between agricultural research and the needs of agricultural and water policy makers, Dr. Awawdeh and staff indicate that the research/extension undertaken by NCARE has been of use to policy makers. Indeed, there is a joint NCARE and ministerial committee (which also includes the University of Jordan, JUST, etc.) to jointly develop topics of interest.

According to Dr. Awawdeh and staff, research results which have had a significant impact on government agricultural and water policy include:

- the expanded use of covered fields, a technology developed and transferred by NCARE, has resulted in the savings of 40-50 percent of water required for production in areas of Jordan; and
- proposed fertigation units developed by NCARE can significantly reduce water requirements.

In addition, a water pricing study is underway which will determine the real cost of water for agriculture.

Agriculture remains a key economic activity, providing 27-30 percent of total GDP and providing 27-30 percent of total employment in Jordan, taking into consideration all related activities up and down the value chain, according to Dr. Awawdeh.

7. German Technical Cooperation (GTZ)

Guy Honore, Programme Coordinator, German-Jordanian Water Programme

The German Ministry for Economic Cooperation and Development is doing a study of institutional capacity in the region in preparation of a regional water program. This should be finished around the end of the month. GTZ doesn't fund much infrastructure as this is usually handled by KFW – the banking group. GTZ advises the Secretary-General of the Water Ministry, where GTZ staff are co-located. They are very involved in energy efficiency, since the Water Authority is the greatest single user of energy. They have a climate change initiative; work with the Jordan Valley Authority on establishing water user associations; and work with Jordan's Food and Drug organization on standards for wastewater use. Under the gray water project with schools, GTZ promotes using water several times—one round of recycling for toilets, and another for irrigation. In Aziza (Aqaba) they work on spatial planning and water resources management. For example, thanks to GTZ, new buildings in Aqaba have dual water systems. They also support the Water Wise Women project—seven community development centers where they train women.

They have contributed to Jordanian water legislation and strategy, including a long-term master plan. This includes past, current and future WEAP modeling – an integrated water resource management tool – that is relevant for about 90 percent of the population of Jordan. They imagine the WEAP tool as a living model that can provide decision-support to the Ministry, perhaps implemented by the University of Jordan, with whom they are involved.

The existing dual master degree program with the University of Cologne will be continued, and it is possible that the German government would be interested in partnering with the US.

Mr. Honore doesn't know NCARE very well; he doesn't work with them.

As for our Center, he said RSS is a reasonable place to situate a center on water, but he supports having multiple organizations involved, with a call for competitive bids every five years to keep people from “falling into a slumber.” Amman is a good choice. It's neutral and more livable than Cairo. As for topics, he suggests a) desalination (the King has recently expressed his interest); treated wastewater; and water governance, especially more participatory approaches (He supports ACWUA (Arab Countries Water Utilities Association), but feels they aren't doing a good job of sharing information).

The champion for our Water Center Network should ideally be Prince Faisal—brother of the king and regent when the king is out of the country. Faisal (and Maysoon Zoubi) took a keen interest in a recent highland water forum involving groundwater management and agriculture in the highlands. This was a stakeholder forum; the idea was to establish a water fund for the highlands, moving away from individual interventions. There would be an incentive system for farmers to change their water management practices, and the king would be asking the donors to contribute to this.

The Ministry of Agriculture is not very involved in water.

As for other international donors that might be interested in a Water Center Network, he suggested checking with the EU, SIDA, Italy, Japan, Spain, and UNDP. The UNDP and SIDA programs are regional. The EU is planning a grant to the Ministry of Labor for vocational training related to water. The French are thinking about a “Union for the Mediterranean”. The World Bank is not currently very active in the water sector in the Middle East and North Africa. The FAO is collaborating on the UNDP/UNESCO study of climate change and adaptation, but don’t have an office here.

8. Elias Salameh, Professor of Hydrogeology and Hydrochemistry, University of Jordan

Dr. Elias founded the water research and study center at the University of Jordan around 1982. His center was supposed to have developed into a regional center, but didn’t. The center conducts research on wastewater treatment and reuse, groundwater overexploitation, curative thermal waters, artificial recharge, water quality of the Jordan River, etc.

As for “short-term successes,” he suggested training, which is very much needed. Good topics would be water resources, water quality, including field work, plus environment, economics and finance. Give out some sort of diploma. Courses could be offered with duration of a week to a year.

He disagreed with the claim that universities are not doing useful research, and asked rhetorically if the government was interested in research, and if anyone at the Ministry publishes. He said they do collaborate, e.g., on injecting King Abdullah canal water into the aquifer and pumping out later to help purify it

As for the proposed WCN, he noted that “Centers of excellence are made, not born.” He advised to keep close control in the establishment phase and to have an independent Board of Trustees.

9. Water and Environment Research and Studies Center (WERSC), University of Jordan

Emad Karambleh, Director
Dheaya Alrousan, Researcher
Hind Jasem, Researcher
Maha Halalsheh, Researcher
Anwa Hamaiden, Researcher
Ghada Kassab, Research Assistant

WERSC was founded in 1982 and has six program areas:

- Scientific research – bridging gaps between decision-makers and technical advisors in government. It has a staff of full-time researchers.
- Training programs – offering courses of one to three weeks duration on water and wastewater for people from Jordan, Yemen and Iraq drawing in faculty from engineering, chemistry, and agriculture.
- Education – graduate programs such as a MSc program in IWRM with the Applied University of Cologne.
- Public awareness – awareness campaigns for students and developing teaching materials.

- Community service – chemical analysis, biological analysis, analysis of treated wastewater and grey water in hotels, hospitals and restaurants as paid services.
- Laboratory testing – will apply for accreditation for the laboratory, signing MOUs with universities in the Arab world like Morocco (IAV-Hassan II) and West Bank/Gaza (Bir Zeit and En-Najah)

10. University of Jordan

Khalid Al Karak, President

Dia-Eddin Arafah, Vice President for Scientific Faculties and Institutes

Amer Salman, Chairman, Department of Agricultural Economics and Agribusiness

Manar Fayyad, Professor, Chemistry Department

The university was established in 1962 and now has 19 faculties and 37,000 students and 1,500 faculty. Currently, 250 students are enrolled in United States and European universities in masters and Ph.D. programs. It has roughly 150,000 graduates.

Ten percent of the budget in 2010 is set aside for medical research, but three priorities for applied research are in water, energy and environment. They spoke of the Open Mind Academy which focuses on global issues of high priority to Jordan.

On 30 May the UJ launched the Center of Excellence on Water, Environment, and Energy with a conference. The conclusions: there is a need for a Center, capacity building and applied and basic research. It could be expanded to be a regional Center in the future. The Cabinet in April approved a motion by the Minister of Higher Education to move forward.

The President said that this effort is of great interest to UJ: “Come and let’s talk” about was to bring together government, universities, the private sector and donors. He said UJ will provide financial support to the WCN and is preparing to break ground for a building where the WCN could be housed. The university budget has a line item for research that can be used to make a Jordanian contribution. The university is pushing ahead with joint ventures. He said the new network should be independent and free of university by-laws and regulations. He needs approval from different councils but it can be done easily.

Note: While the university president said that changing the by-laws was easy to do, it is a more complicated process than he suggested. It can be done, but it takes time. The following groups must approve any bylaw change in this order: Dean’s Council → University Council (president, vice presidents, students, faculty) → Board of Trustees → Ministry of Higher Education’s Higher Education Council → Regulatory Office in the office of the Prime Minister → Cabinet → Royal Court. It can be done, but it takes time.

The Center will need a business plan and an action plan. UJ has formed an internal steering committee which includes Dr. Manar. It will bring together different existing entities including the Center for Strategic Studies. It is not clear how and if WERSC will fit into this.

It is no problem for UJ to open participation to other institutions. It will take the responsibility for bringing together these institutions and keeping them involved but it is unclear whether

funding in this Jordanian Center of Excellence on Water, Environment, and Energy can be used for other institutions in the region.

11. Jordan University of Science and Technology (JUST)

Wajih M. Oweis, President

Omar al-Jarrah, Vice President and Professor of Computer Engineering

Hani Abu Qdais, Director, Queen Rania Al-Abdullah Center for Environmental Sciences and Technology and Associate Professor of Water and Environmental Engineering

Saied Jaradat, Director, Princess Haya Biotechnology Center

JUST was established in 1986 on 11 square kilometers outside Irbid. The campus of Yarmouk University was going to moved there, but in the end Yarmouk stayed in place offering arts and humanities and some technical fields. JUST is purely technical with 20,000 students from 50 nationalities. It has 30,000 graduates. It has 11 faculties in 55 departments, including faculties in communications and information technology, agriculture, medicine, dentistry, veterinary medicine (the only one in Jordan), pharmacy, nursing, and science and arts. It offers MSc and PhDs in 97 specializations. It has 700 faculty with PhDs. It gives the utmost priority to basic and applied research. It has a Center for Science and Technology focused on the private sector in industrial zone factories offering workshops.

The entire campus has WiFi connections to the internet and a new library is under construction. An intelligent campus initiative is underway to manage water resources better on campus. The campus using treated wastewater and rainwater for its non-drinking needs and is self-sufficient in landscaping. It also has pilot projects in rainwater harvesting and tertiary treatment for irrigation diluting effluent with harvested rainwater.

The President spent more than an hour with the team. He was dean of the College of Science at Yarmouk for eight years and has served for seven years as president of JUST.

All courses are taught in English. About 70 percent of the faculty graduated from the US. He plans to send 172 students abroad for graduate degrees in the US, Canada, UK and Australia. They must pay back two years of time for every year abroad. A quarter of the students on campus are foreign with 5000 students coming from 61 countries. Saudia Arabia sends the most students (600), followed by Malaysia (460); while there are 60 Arab-Americans enrolled from the US. Three faculties in engineering and the medical department are accredited from the outside; 51 percent of the medical graduates go to the United States each year; 95 percent pass the medical exam the first time.

This year no money went to UJ, JUST, Hashemite and Balqa but much went to upgrade Yarmouk. The university's annual budget is \$110 million.

The Water Center Network should fill a space between the government and universities but it should be housed at a university. The network should move ahead – don't wait until things are perfect because that moment may never arrive. It is not easy to change university by-laws. He advised to start slowly, picking a pertinent topic and seeing how it can be developed over the course of a year and then make corrections and expand as appropriate.

JUST would be happy to work with the WCN. They do not have much connection to North Africa but it is interested in expanding its linkages; as for the Gulf States, they are more capricious – for example, six years ago Qatar stopped sending students for some reason – but they already have significant enrollment of students as mentioned above.

Salaries are set by the government so graduates returning from abroad earn \$1,500/month and these people often move to get better jobs. The university adds \$1000 a month to keep the best staff; nevertheless, many graduates take jobs at King Abdullah University for Science and Technology in Saudi Arabia.

In a discussion of technical issues, he recommended water management, water rights, water demand management, wastewater reuse, and groundwater. The WCN should work on social and education components.

JUST has agreements with many U.S. institutions but few are active. There are activities with North Carolina State, Iowa and University of Illinois, Chicago.

Students particularly like U.S. professors but few come. One or two Fulbrights visit from time to time.

The Queen Rania Center for Environmental Sciences and Technology was created in 1996 and does training, organizes workshops and promotes awareness. It does not do any research, but typically earns revenue through consultancies for donor-funded projects. Its greatest strength is wastewater reuse. It lacks lab equipment for experiments.

The last word from Vice President Al-Jarrah: “JUST is interested in the Water Center Network whether it is in Jordan or any other place.”

12. Majlis El Hassan (Office of HRH Prince Hassan)

HRH Prince Hassan bin Talal, Chair of the Board of Trustees of the Royal Scientific Society

HRH Princess Sumaya bint El-Hassan

John Guest, Partner, The Black and White Group

Helen Pyman, Partner, The Black and White Group

The Black and White Group did an audit of RSS six to seven months ago, finding it lacked a business plan and possessed an old-style personnel structure; hence, it has reorganized its human resources, finance, and external affairs. Half of the executive team is now new and salaries have been increased to attract and retain qualified technical staff. It is moving into a regional focus.

HRH Prince Hassan enters: He possesses a wide ranging perspective on Jordanian and regional stability, human carrying capacity, etc. A few direct quotes reflecting his honesty:

- We are being led by projects. Projects should fit together into concepts.
- Academic centers are notoriously vague and often are provocative.
- Corporate social responsibility in this region is almost non-existent.
- The poor should not pay for our short-sightedness.

- We have failed in governance and broken the trust of our constituency.
- We need to build a groundswell to overturn corruption.
- The poor have nothing but hope.

13. Ministry of Water and Irrigation

HE Eng. Mohammad Jamil Al-Najjar, Minister, Ministry of Water and Irrigation

HE Jafar Hassan, Minister, Ministry of Planning and International Cooperation

Najjar: The MoW has its own water quality labs, but uses the RSS labs as a neutral party if there are any disputes. The Ministry of the Environment doesn't have its own lab and uses RSS extensively.

There is reasonably good cooperation with the universities; however, he did note that the leadership of UJ's Center changes frequently and with this so does their direction.

Jordan has many water challenges, such as shared basins and climate change. So it is a good place to host a Water Center Network on managing scarce resources. Morocco, Syria, Egypt and other countries will soon be facing the same problems. Wastewater treatment and reuse is a real strength of Jordan. A public education and outreach program is also a good use of resources, and they have existing programs funded by USAID.

Hassan: The water sector in Jordan has been a huge focus of foreign aid. He also noted his work with the Earth Institute of Columbia University, in collaboration with the Ministry of Agriculture.

The regional center of excellence approach is especially important for applying science to better manage water at local and regional scales. With existing programs, the Disi aquifer and Red-Dead Sea projects there will be difficult choices and decisions to be made. A scientific approach should be used to explain why it makes sense to prioritize one choice or decision versus another. He understood that the network wouldn't just collect data. He thinks more pilot projects might be good to show what can be implemented on the ground. Overall, he said he could use solutions that make the hard choices easier!

As for where the WCN is located, this doesn't matter as much as what you want to do. In general, they favored the creation of NGOs, which could then engage with both universities and Ministries. They would like to see universities involved with them more, but Najjar said the professors tend to be more interested in writing publications than solving problems. Hassan noted that sometimes the government has used foreign entities when they could have used the universities; he thinks perhaps the Ministries could have built more local capacity at the universities, but said he often doesn't have the money to do this.

14. Arab Countries Water Utilities Association (ACWUA)

Khaldon Khashman, Secretary General

Mustafa S. Nasereddin, Director of Programs and Technical Services

Dana W. Daqqaq, Communications Officer

Oezguer Sezer, CIM Expert

In his more than a year as secretary general, he has built a regional association with 71 utilities that are paying members. Of the 22 countries that are Arab League members, six have not joined yet: Libya, Iraq, Qatar, Sudan, Somalia, and Djibouti. Tunisia just joined after long but successful negotiations. He is planning a second general assembly in Amman in December with the Arab League declaring it as the first Arab Water Week. He is on the road to financial viability but it has been a slow and labor intensive process. It is possible to get people to work regionally, but they need to benefit.

ACUWA would like to participate in the Water Center Network in outreach efforts. The network should emphasize applied work, bringing in the private sector.

15. UNESCO

Lama Al Masallha, Programme Officer, Natural Science Sector

UNESCO has a very active water program in Jordan, through its International Hydrological Programme (IHP). UNESCO does much of its in-country work through national committees. In Jordan, the National Committee is headed by the Minister of Water and Irrigation (presently Mohammad Al-Najjar). The committee holds monthly meetings (up from bi-monthly meetings in the past; for reference, the U.S. National Committee for IHP meets twice per year). University-based attendees include people from UJ, Hashemite, Yarmouk, Muta'h and JUST. The Meteorological Department also participates regularly. Munjed Al-Sharif of JUST was so active they co-opted him into being the Joint Coordinator for their Adaptation to Climate Change program (see below). The committee runs a modest applied research grants program.

The committee's main functions are capacity-building, promoting research, providing technical advice, education and awareness, and partnership with other IHP committees in the region. Their program is modest in funding but very active. They run workshops for the Ministry of Water on IWRM and groundwater protection. They are about to run a transboundary water course on the Yarmouk with participants from Syria and Jordan (they report that data sharing with the Syrians is an issue). Mohammed Saidam of RSS leads their water harvesting program. They are putting together a case study on Jordan for the World Water Assessment Program. They collaborate with the UNU on a nine-month online training program in IWRM in Bahrain. They help support Friends of the Earth-Middle East which brings together Jordanian, Palestinian and Israeli environmental scientists, and have done eco-hydrological training.

The UN has a Joint Program in "Adaptation to Climate Change to Sustain Jordan's MDG Achievements", well funded by the Spanish government. UNESCO's component focuses on institutional and community capacity building in IWRM, water research and education, and awareness. Through this, UNESCO will be funding IWRM training, community based research projects, water education curricula. They also plan to work on shared management of transboundary waters, and of most relevance to the current effort, "design and establish one environmental and water resource center for advocacy education and capacity building".

They have limited interactions with other Category 2 centers in the region (analogous to the US's ICIWaRM), such as those in Egypt and Libya.

A.3 KUWAIT

1. Kuwait Institute for Scientific Research (KISR)

Naji M. Al-Mutairi, Director General

Hayfaa Almudhaf, Senior Advisor

Muhammad F. Al-Rashed, Director, Water Resources Division

Abdul Mohsen Al Haroon, Director, Public Relations and Publications Division

Khaled Hadi, Manager

Abulbasher M. Shahalam, Senior Research Scientist, Water Technologies Department

Essam E. F. El-Sayed, Senior Research Scientist, Water Technologies Department

Mahmoud Abdel-Jawad, Principal Research Scientist, Water Technologies Department

Amr Fadlemawla, Associate Research Scientist, WRD/Hydrology Department

Adnan Akber, Research Scientist, Water Resources Division/Hydrology Department

Vincent Kotwicki, Research Scientist, Water Resources Division/Hydrology Department

Adel Jaragh Al-Haddad, Associate Research Scientist, Water Resources Division,

Ali Al-Odwani, Associate Research Scientist, Water Resources Division Office

Tariq Rashid, Research Associate, Hydro-Physical Analysis Laboratory

Husain Fahad, Information Section Head

Ranna Al-Bassam, Public Relations Office

Anthony P. Graffeo, President, Graffeo and Associates LLC

Richard J. Chidester, Senior Energy Industry Consultant

KISR, now 42 years old, works in many areas. It has just completed a rigorous exercise to develop a 20 year strategy for 2010-2030 called a roadmap for 2030 for KISR's transformation. This is KISR's seventh strategic plan, starting from 1980.

In 1967, the Arabian Oil Company (a Japanese company) launched the underpinnings of the institute focused on petroleum issues. In 1973 it became a government agency. In 1981 it became an independent government agency under Decree 28. The mission and mandate of KISR is to conduct applied research related to national industry, energy, natural resources, and food resources. It has a Board of Trustees composed of 13 members from Ministries, the Bank of Kuwait, the Kuwait Foundation for the Advancement of Sciences, the KISR Director General, and a member of the scientific community. It has an independent operating annual budget of \$193 million with 80 percent coming from government and 20 percent from companies and institutions for research, technical services, and consultation services.

The new strategic plan will mean a major change for KISR's organization. It now has five divisions:

- Petroleum Research Center
- Water Resources Division
- Food Resources and Marine Science Division
- Environment and Urban Development Division
- Techno-Economics Division

KISR has an extensive headquarters with fine facilities and five research stations in the country.

The KISR Transformation Project, a.k.a. the seventh strategic plan, has almost completed its first phase – vision, mission, strategy and organizational planning. The second phase is on schedule and will be completed by the end of this year: reviewing current systems and processes, building systems and processes, implementing planning, and developing a marketing plan.

It has clear but ambitious goals for the next 20 years. For the center of excellence, KISR sees an opportunity to gain a national and regional reputation and increased public awareness, by actively collaborating with partners and demonstrating their significant research strengths. In 10 years, they want to achieve world class capabilities, and be recognized as a regional Center of Excellence. In 20 years, KISR wants to be an international Center of Excellence with an international reputation.

It will do this in part by reorganizing into four of excellence in (1) water, (2) petroleum, (3) energy and building and (4) environment and life sciences. In the future, it may also create centers of excellence in infrastructure and economics. Rather than organize by traditional departments and divisions, it will organize each center under program supervisors to be as flexible as possible, allowing it to draw in members from other centers, if needed.

In terms of the water program, KISR is breaking ground now for a \$50 million Water Research Center. It has a staff of 130 with 40 PhDs and an annual budget of \$25 million.

The programs of their water center will include:

- Natural resource management,
- Integrated water resources management,
- Innovative desalination technologies and systems,
- Optimizing existing desalinization technologies, and
- Developing and optimizing wastewater treatment.

Clearly, KISR would like to be a key partner of the network. In a presentation it explicitly wrote, “KISR will incorporate the design team’s concept into its [own] new Water Center of Excellence facility and it offers the following:

- Experienced program managers with leadership skills to attract regional partners;
- Establishment of a Kuwaiti Science, Technology, and Innovation Council;
- Championing an inclusive plan to allow each of the region’s Water Center Network partners to contribute in their areas of expertise; and
- Establishment of an international training center for water research.

KISR is ready to host a regional meeting of champions of the WCN. It would use the meeting room of the Kuwait Fund, whose Headquarter’s building is an absolutely beautiful architectural treasure.

2. Kuwait Fund for Arab Economic Development

Fawzi Y. Al-Hunaif, Director of Operations

Ayad E. Y. Al-Gharabally, Asst. Regional Manager for East South Asia and Pacific Countries

A.F. Asfari, Engineering Advisor

The meeting was very positive on many levels, and they seemed genuinely pleased that we met with them – but they had to head off to Caracas for an OPEC meeting. They stated that water is the top priority for the Kuwait Fund especially as it relates to agriculture. They are part of the larger Arab Fund and solicit proposals for funding primarily from the developing world with 104 current proposals. They have a five-year plan, and they contribute \$600 million annually. They want 75 percent to go to water projects, but in 2010 only one of 25 funded projects is for water, and they are disappointed at that.

Fawzi stated numerous times that water is crucial to the region and the next war will be a water war. They wanted to know our opinion of KISR, especially as it compares to other institutes.

They cannot directly fund a Kuwaiti institute but would be very supportive of funding projects associated with the Water Center Network. The Arab Fund already funds the Arab Water Academy in the UAE, and they would need proposals submitted to the Arab Fund to enable their contribution. They are very supportive of the Water Center Network concept and would give whatever political support needed. They meet every six months with six funding organizations in the GCC.

They suggested dividing MENA into four areas based on different water needs and issues. They also said that whoever the person/persons is in charge they should make sure that they have a good understanding of the politics involved.

When asked what they thought the principal issue the network should target, they said water management, as 91 percent of water in MENA is used for agriculture. They also were very interested in public sector involvement as many industries could be interested in research products or outputs.

When asked about politicians' use of research results, they said that many political types still need to be fully educated about water issues and that many do not like to hear about research as they think it is long-term and may take 15-20 years to get results.

They said the GCC should be recognized as the world leader in desalination.

3. Kuwait Foundation for the Advancement of Science (KFAS)

Ali A. Al-Shamlan, Director General

Mahmood Y. Abdulraheem, Director of Research Directorate

Dr. Fathima, Director of Water Resources

KFAS is the principal funding agency for most of the work at KISR. They stressed that the principal issue for the WCN should be water resource management or integrated water management, and also stressed that it was important to avoid political issues that would derail progress. They said the focus should be on international research. They said it might be best to use the health issue as a guideline, as health does not seem to have political pitfalls. Having international institutes such as Harvard, MIT, or Johns Hopkins involved would give credence to

the effort. Again they stressed the non-political nature of a network and suggested that it should be established first in the Gulf as the Gulf States can work together and have the resources.

4. Embassy of the United States of America, Kuwait

Oliver B. John, Counselor for Economic Affairs

Keisha Toms, Economic Affairs Officer

Embassy officials noted the level of indigenous scientists working here in Kuwait and the quality of research KISR is contributing to desalination and wastewater issues among other things. Embassy officers acknowledged the logistics and coordination challenges that hosting such a Water Center Network in Kuwait would require, but noted that the strong interest of KISR to host and the skills they have should make it a strong candidate for consideration. They are available to help the group achieve its goals. In addition to the scientific aspects of making KISR a member of such a network, KISR would have the administrative and financial backing of Kuwait's two principal funding organizations: KFAS, the Kuwait Foundation for the Advancement of Science and KFUND, the Kuwait Fund for Arab Economic Development. KFAS funds domestic research and could support the network through KISR, while KFUND supports international projects and could support a center through collaboration with other "sister fund" organizations.

KISR presently has a Water Resources Division that has been in existence for more than five decades. The design team had a chance to tour the laboratories and speak with the scientists during a three hour meeting at the KISR headquarters. KISR has already broken ground on a new Water Resources facility that is scheduled for completion in 2011. KISR even offered to make design modifications on its facility to accommodate the hub concept, if the Design Team stuck with the hub and spoke concept.

A.4 MOROCCO

1. USAID/Rabat

Ramona El Hamzaoui, Assistant/Acting Director

Mustapha El Hamzaoui, Director, Department of Economic Growth

Jaouad Bahaji, Adjoint Director, Department of Economic Growth

Morocco has identified water as a key constraint to economic growth. Policy-related problems are the real challenges in water – taxation and pricing, overlapping institutional jurisdictions, and policy gaps. The technical areas that Morocco can develop are extension work to small farmers and climate change impacts on water resources. Morocco could benefit from exchange with Jordan, Egypt, etc.

The embassy is carrying out a new program, the Moroccan Economic Competitiveness (MEC) Program (\$34 million) to reduce barriers to trade and investment. It will be realized through the acceleration of reforms, strengthening institutional capacity and greater private sector involvement. It will focus on (1) the establishment of legal and regulatory reforms to improve the business climate in Morocco, (2) upgrading and optimization of water resources in order to increase productivity, competitiveness, and employment in the agricultural sector, and (3)

support the development of a competitive, modern work force. Two regions in Morocco are targeted for the conduct of this program: Oriental and Doukkala Abda which represent great potential in economic development and employment. These regions were selected for their vulnerability to shortage in water carriers for their agricultural sectors and the diversity of their water resources and irrigation technology.

The Mission was unclear as to how the water center of excellence effort linked to the recent visits of the Science Envoy.

Mission staff recommended that the WCN design effort should link to the Science Envoy program. The design team should reach out to Science Envoys and create a clear message that is aligned with the Envoys. Additionally, Morocco should be included and efforts should build on the MEC program. The Mission Director emphasized that the network should have components that include outreach to youth (not just higher echelons of scientific excellence) and components that support public diplomacy. Finally, WCN should support deepening an understanding in the region of the effects of climate change on water.

2. U.S. Embassy

Michael DeTar, Economic Counselor

There is interest in creating a National Institute of Water in Morocco. DeTar suggests USAID could help. Climate change models show the most serious looming problems in the Maghreb; what can we do to adapt to the change that we know is coming?

Casablanca and Tangier are a major business and logistical hubs for Western Africa. However, Morocco is a very Francophone environment and most scientists cannot do business or technical work outside of French. Morocco is more aligned with Western and Sub-Saharan Africa. East-West connections are inhibited by the closed border with Algeria.

Morocco-US trade is extremely significant and a Free Trade Agreement has been recently signed. Morocco's relationship to the EU is also important, with whom they also have free trade but the EU relationship is "saturated." Morocco wants to expand and diversify, and the United States is an obvious partner. The King recognizes a long friendship with the United States and wants to maintain it. There is some disappointment on Morocco's part about the level of U.S. investment. Trade in phosphate drives Morocco's overall trade and phosphate prices have a large impact on the trade numbers.

Water quality and quantity are both important in Morocco.

Morocco seems to have more openness to private-sector-driven approaches to water than other post-colonial Arab countries. Several key economic ministers in Morocco have private sector experience. DeTar thinks this is good because they better understand what the private sector can offer.

There is a disconnect between MCC investment and responsible water use. For example, 90 percent of MCC-supported fruit tree planting is in water-stressed areas in Morocco. Because of

the value of Moroccan exports to the EU, and the EU's reluctance to accept genetically modified organisms (GMOs), Morocco is in turn resistant to implementing GMOs in agriculture. The World Bank is working with the Ministry of Agriculture on a program to engage private entities to manage and sell water to end users. Prices are still subsidized. Users pay for surface water but generally not groundwater.

Morocco has an interest in engaging with the United States on water and climate change issues. We need to consider Morocco and the Maghreb as a distinct region, different from the Middle East.

DeTar thinks if the network is centered in Jordan or Qatar, then that is too far away to be relevant. DeTar thinks the network needs French-speaking people (contractor) to engage Morocco. Note: we heard elsewhere that the network would do better in Arabic, especially considering that Arabic would be more effective in rural environments.

3. Ministry of Water and Environment/General Directorate of Hydraulics, Sous-secrétariat d'Etat de l'Eau de l'Environnement (SEEE)

Majid Benbiba, Director General, General Directorate of Hydraulics

Naima Houmy, Hydrogeologist, Administrative Affairs and Techniques

By 2030 water shortages in Morocco will be severe – the country must transform irrigation to drip technology. The Green Morocco Plan (PMV) includes major investments in:

- Drip irrigation,
- Dams (~ 130 new large dams (up from 60) and 100 new small dams planned),
- North-South water transfer to Marrakech,
- Desalination (Casablanca and others),
- Desalination of brackish groundwater,
- Wastewater treatment and reuse for irrigation, and
- Rainwater catchment (currently doing studies).

The main axes in the strategy include:

- Protection of aquatic resources – sustainable management and artificial recharge of groundwater;
- Climate change adaptation – control floods and plan for desertification;
- Institutional organization – realization of the 1995 Water Law, examining the Water Code, and adapting the EU Water Directives for Morocco; and
- Research and education – Modernization of administration, research, water management, and education (working with universities and the National Office for Potable Water (ONEP)).

There is a need for liaising and harmonizing research – while there are recommendations that every university have a center of water research, it is difficult to find utility in existing research results – there is high competency but the research is not organized to the service of development – there is a lack of rules/guidelines.

They are planning to fund research in each basin – three themes are in process: rainwater harvesting, reuse of wastewater, and artificial recharge. Each basin will have a budget for R&D with local universities (2 million Moroccan Dirhams per basin per year = \$224,000 per basin). They will sign a convention for each theme with university partners. Under each theme they will start with a state of the art benchmarking effort to understand what can be adapted.

There is a lack of capable engineers in domains other than large infrastructure (dams). There is a need for the private sector to invest in R&D in this sector.

There are two large regional cooperation networks: Stratégie Méditerranéenne de l'Eau (recent accord signed in April in Barcelona to outline principles and regional programs – details still to be decided) and Strategie Arabe de l'Eau (by the Arab Ministers of Water Council and the Arab League) to be worked out July 1-2, 2010 in Cairo, Egypt.

Système Euro-Méditerranéen d'Information sur les savoir-faire dans le Domaine de l'Eau (SEMIDE, <http://www.semide.net/fr>) is a website to share water information – the Center could contribute by recommending what to exchange and how to exchange it.

Based on our discussion with the Ministry, the Water Center Network could facilitate the sharing of regional experiences. There is a strong interest in the question of how to put research in water at the service of practical development. It would be helpful for the WCN to address any of the investment areas of the MPV (Green Morocco Plan). The Ministry of Water and Environment is ready to fund R&D. If R&D investments prove useful they can increase funding. They may be interested in supporting their own participation in the network if it can add value to their R&D investments. The network should be linked to national programs through the Ministry as an arbitrator. The network should focus on capacity building and building links between administration, universities, and enterprises.

4. Ministry of Agriculture

M'hamed Belghiti, Engineer in Chief, Chief of the Division of Hydro-Agricultural Resources

Emphasized PMV (Green Morocco Plan) plan to use agriculture as a driver of economic growth. Agriculture currently uses more than 80 percent of the country's water. The PMV approach is inclusive of all parts of agriculture and will include an effort to aggregate small producers' access to technology and finance.

The national water savings program outlines that cities have priority over water if there is pressure, so agriculture takes the deficit. Current water deficits are 50-60 percent of water needs throughout the country (except in the north where water is not as scarce).

Irrigated areas (only 13 percent of cultivated land) produce 50 percent of the agriculture value added and regarding exports, 75 percent are from irrigated areas (vegetables and citrus). Morocco is pushing towards irrigating 50 percent of the cultivated land, so it is critical to invest in efficient irrigation (changing from flood to drip). This requires a change in the whole cropping systems and institutional setups. There is a strong focus on farmers as stakeholders and in thinking about building innovative links from farmers to the market throughout the value chain.

Morocco is entering an aggressive program to make water tariffs cover costs (including system maintenance) through incremental increases in tariffs.

The role of private enterprise should be included in the WCN's activities. For example, Guerdanne is the first private irrigation perimeter in MENA, where farmers are involved in formal consultation and regulation, but a "professional service provider" owns and operates the irrigation perimeter.

The network can help with exchange of experience. There is a need for exchange among institutions on field-demonstrated efficient use of water. The WCN should not work on creating new technologies – capacity building and exchange, bridging gaps between institutions and stakeholders are needed. The network should involve multiple disciplines, as this is the nature of the water sector: technical, economic, social, and environmental experts.

The network can draw on the National Norms Center for testing irrigation technologies. Morocco has a long experience in holistic approaches to water for agriculture (thousands of years), including the 1990 law on irrigation management participation. Morocco can bring its strong experience of facilitation to the effort.

Morocco needs assistance in efficient and resistant crops, technical tools for negotiating complex problems, and exchanges.

5. Agronomic and Veterinary Institute Hassan II (IAV)

Si Bennasseur Alaoui, Field Crop Specialist and Professor, Department of Agronomy and Plant Genetics

El Houssine Bartali, Professor of Infrastructure and Water, Department of Water, Environment, and Infrastructure

Said Ouattar, Docteur Es. Sciences, Water Resources and Environment

IAV has 1,200 students between Rabat and Agadir campuses. It is the biggest engineering school in Morocco, and one of few institutions in Morocco to award Ph.D.s. IAV coordinates the National Drought Mitigation Center, developed with the help of USDA and the University of Nebraska. Institute officials want to develop a stronger link to Nebraska. IAV also coordinates with the International Irrigation Center, an extension of Utah State University, providing irrigation technology development and training for Morocco and Western/Francophone Africa. IAV hosts students from other African countries: 10 percent of students are from Western Africa. Morocco's Ministry of International Development pays their tuition and expenses.

IAV does crop research and produces varieties for distribution via extension. The Agronomy and Plant Genetics Department receives little or no funding from the United States

Both technical and socioeconomic factors must be addressed in making Moroccan irrigation more water-efficient and productive. The ORMVAs (local irrigation authorities) do not currently charge the real cost of producing water. Most revenue goes to salaries instead of infrastructure and operating expenses. Privatization would amend this situation. The area around Agadir is starting a public-private venture. Although water prices rose by a factor of

four, the end users generally agreed to the pricing because they understood it would lead to a sustainable use of the resource.

Water quality/pollution and flooding are also important issues in Morocco.

There is a disconnect between technology and policy. Good technology exists, but is not always required by the ORMVAs or implemented by the end users.

The Gulf States have an agreement with Morocco to develop irrigation technology.

Morocco is a natural nexus for Western/Francophone Africa, as well as European interest in this region. Being part of the network would allow IAV access to needed irrigation technical and policy expertise from outside Morocco. Likewise, IAV enthusiastically laid out a convincing case for participating as a key institution in the network, possibly as a sub-regional locus for connecting to Western and Francophone Africa.

The network should be based on cost-sharing between donors and end users – e.g. participants in the network’s training activities. We heard a recommendation that USAID start with seed money, gather momentum, and then tap other potential donors, such as France, GTZ and the EU. Start small with a clear focus. It is important for there to be an end product; to serve real needs for end-users.

6. National Institute of Agronomic Research (INRA)

Mohamed Badraoui, Director

INRA, IAV, School of Meknes, and School of Forestry signed an agreement in 2009 to collaborate on issues pertinent to the Green Morocco Plan.

In Morocco, surface water is a much bigger issue than in other MENA countries.

There is a big gap between what Morocco produces based on its water consumption compared to what it could produce. The Green Morocco Plan recognizes this. Some farmers get high value per water used. These are considered examples that the Plan seeks to disseminate.

Organizing farmers is key, since individual farmers cannot by themselves undertake the reforms to increase production.

Strong points at INRA:

- Long-term germplasm collection and research aimed at producing crop varieties adapted to water-stressed conditions.
- Development of a conservation agriculture program (soil and water) responsible for a 30 percent increase in productivity and 70 percent decrease in energy used under no-till.
- Genetic characterization and breeding of fruit trees (olives, dates).

There are ongoing activities between INRA and ICARDA.

The WCN could add value by facilitating better data sharing. Morocco currently buys most of its data. The network should feature technology transfer and better use of research results. Consider that the network's implementation should occur at the basin scale. The WCN should initially focus on a specific topic, and do it well and visibly. The network should include Sub-Saharan Africa.

7. National Office of Potable Water (ONEP) International Institute of Water and Sanitation (IEA)

Mokhtar Jaait, Head of R&D Department, International Institute of Water and Sanitation

Samira Amrani, Chief of the Training Program Division

Mohamed Laaouan, Pedagogical Development

Ahmed El Khallouiki, Directeur

Created in 1978, ONEP IEA provides training, R&D knowledge sharing, and technical assistance. The vision for ONEP is south-south cooperation, and to be a resource to the MENA/Sub-Saharan Africa (SSA) regions. IEA conducts training of technicians, managers, and engineers, as well as provides technical assistance to utilities (in Morocco, MENA and SSA). IEA also operates 2 mobile training units to train in the field where operators cannot leave their post. IEA is linked to UNESCO-IHE (Institute for Water Education) and IRC (International Water and Sanitation Center) in Delft; Global Water Partnership; and UN Habitat. IEA is the only official Collaborating Center of the WHO in the area of Drinking Water and Sanitation. They also are a founding member of ACWUA and chair the capacity building working group. IEA organizes major events for the Arab region (including with UNEP) and has facilities for training and conferences (conference center, hotel, multimedia classrooms, laboratory, hands-on workshops, and wastewater treatment pilot plant).

Morocco needs assistance in the technical areas of desalination, wastewater reuse, and crop varieties.

The WCN could help present concepts of change management in operations to encourage technology adoption.

The ONEP representatives recommend:

1. Mapping exercise of existing institutions to identify the niche for this network that adds value. Follow the Paris and Accra Declarations on the need for country-led assistance programs.
2. Create a vision/proposal and concrete actions, share it with partners, and get agreement.
3. Then summarize findings and have a donors' conference to propose an idea and get buy-in.

Activities must be done in a network of national and international research centers; do not duplicate work. R&D should include feed-back to training, and knowledge management and sharing. The effort needs human capacity to manage the network.

8. Irrigation Authority Doukkala – Offices Régionaux de Mise en Valeur Agricole (ORMVAD)

Nassiri Hamid, Office Regional de Mis en Valeur Agricole des Doukkala (ORMVAD)

Latifa Gana, Engineer

Ahmed El Khallouiki, Directeur, Institut Technique Agricole Khmiss M'touh

The Doukkala ORMVA is one of nine local irrigation authorities in Morocco. The average annual water deficit in the Doukkala ORMVAD over the last 10 years is 55 percent. In the basin in which ORMVAD sits, 95 percent of the available water has been mobilized. The basin is virtually tapped out. Approximately 125,000 ha were planned for irrigation, with 96,000 ha currently irrigated. Since the basin is fully utilized, there is a moratorium on new irrigated area until a strategy is developed. Municipal water suppliers get their full allotment of water as the first priority; the 3 ORMVAs divide the remainder (the ORMVAs bear the deficit).

The WCN could add value by harmonizing institutions and helping to avoid redundant efforts; also sharing technology among countries instead of generating more research).

The network would have a lot of value in technology transfer – sharing technologies among countries, implementing institutions, and end users, rather than just research. New irrigation technology, remote sensing, and water use monitoring tools would be valuable to the ORMVA, but also a platform for information exchange among basins and countries. There is a big gap in grower understanding (and thus implementation) of improved irrigation technology. They need to see it with their own eyes. Development of high value crops (per cubic meter of water) would be valuable. The challenge is how to engage the many small growers so that there is broad application of new technology. For example, switching to drip irrigation takes considerable technical knowledge, which is hard to implement on a farmer-by-farmer basis.

The current pricing structure is outdated and does not reflect the real situation. Prices need to be increased but farmers can't afford to pay increased prices unless they also can increase productivity. Privatization would allow the market to reflect real prices. Current price is about 27 cents per cubic meter (set in 2009; prices normally revised every 5 years).

Hamid asked if the Water Center Network will be something the ORMVAs can use. Phrased differently, is it push or pull? Can the ORMVA “pull”? Gana asked how end users engage the network. In response, they feel the network should still have a strong central unifying entity. On one hand, it seems that the network is working a couple levels above the end users – and that participating institutions in the home country would be the network's interface with end users. However, what about instances where the end users are disenfranchised?

Does the WCN align with other USAID programs or the USAID 5-year country plan?

The network needs to have a strong central unifying entity.

9. World Bank Group

Hassan Lamrani, Senior Irrigation Specialist, Middle East and North Africa Region

The World Bank Group's (WBG) Country Partnership Strategy for Morocco FY10-13 includes: Economic growth, social services, and sustainable development in a changing climate. WBG's objective is to support the government's reform program. Water scarcity is a central priority for the development of the country and "requires transformative change in water allocation and management practices, as well as in institutional roles and capabilities." Transforming the energy sector is the next objective.

Specific projects of the WBG include water supply and sanitation (two rural drinking water projects just approved); water sector policy reform including drinking water, irrigation, and sanitation; mapping and modeling of evapo-transpiration using remote sensing (with Riverside Technology Inc. or University of California (UC)-Riverside, NASA, and CRTS (National Center for Remote Sensing)); a study on impact of climate change on water resources (for the Ministry of Water with UC-Irvine and UC-Riverside); and participation in the creation of the Arab Water Academy (University of Ifran was a candidate host).

Morocco has strong international cooperation in research and extremely valuable human resources but there is a disconnect between academia and policy – research doesn't inform the grand programs of the government. Institutional challenges around wastewater reuse, water efficiency and productivity, and climate change and water management (including modeling) should be important areas for the WCN.

At IAV there has been a recent change of Directors and now international connections are much more encouraged.

The Design Team should meet with Ministers in Morocco to get political level feedback.

The WCN should be linked to Centre de Marseille Mediterranean Integration (MCMI) project, which includes WB and European Bank. MCMI has four priority themes, one of which is sustainable development (including water).

10. African Development Bank (BAD) – Morocco Country Office

Amani Abou-Zeid, Resident Representative and Director

Mohamed El Ouahabi, Water and Sanitation Specialist

Leila Jaafor Kilani, Social Development Specialist

BAD is one of the top two or three largest investors in Morocco. About 30 percent of BAD investment is in water and there are four big projects in implementation. BAD makes program funds available contingent on incremental institutional reforms whose strategy was developed in concurrence with the Government.

BAD has two pillars: governance and social programs, aimed largely at the transport, energy, and water sectors. BAD assists the government of Morocco with water law, water economic mechanisms, and environmental protection. BAD financed a study on water structure development in 2008.

BAD is currently oriented to S&T organizational development and capacity building. BAD sees these gaps in Morocco: institutional arrangements for policy; aquifer management; and overreliance on unsustainable schemes such as dams (e.g. silting).

The National Program for Irrigation (part of the Green Morocco Plan) is funded by BAD. The goal is to reduce system losses from 40 percent to 0 percent.

BAD currently has a pilot program for Water Resources in the Maghreb – knowledge sharing via a network of institutions with a specific interest in climate change and water. BAD had a program in 2004-2008 to integrate institutions for water resources management.

11. European Union

Hassane Belguenani, Chief Water and Sanitation Programs, Governance and Infrastructure Section

EU regional cooperation programs are coordinated in Brussels. There is interest at the EU level in water – priorities include sanitation, industrial pollution, and irrigation efficiency (there is a pilot project in middle sized irrigation perimeters for water savings). The EU is often contacted by civil society to do workshops (e.g. organized by World Wildlife Federation and the University of Forestry at Sale). EU is involved in funding ONEP's International Institute of Water and Sanitation (including a 30 million euro sanitation project). In academia there are water networks (including the University of Marrakech and University of Water at Oujda).

The water sector in Morocco is mature but it is difficult to operationalize projects due to ministries being unable to work together. Morocco is relatively good at water policy, including around water reuse and universal drinking water coverage, and could assist other countries in these areas.

In Morocco, currently 70 percent of the country has improved sanitation, and 14 percent of collected wastewater is treated. The goal for the next decade is to increase these to 80 percent coverage and 60 percent treated. Institutional relationships will make or break the achievement of these goals.

Morocco faces several challenges in research: budget constraints dictate research that does not reflect national priorities, researchers do not talk to each other, and there is great difficulty attracting young researchers.

The Water Center Network should help Morocco work on institutional reforms and could look at how to create research policy and retain researchers. The WCN could be a “climate change water research and policy center” – measuring the impact of climate change and recommend policies.

12. Islamic Educational, Scientific, and Cultural Organization (ISESCO)

Ahmed Said Ould Bah, Director of the Cabinet (Chief of Staff)

Faiq Billal, Director (Science)

Mohamed Chtatou, Programme Specialist in Relations and Cooperation with International Organizations

Mohammad Saaïd Dayer, Programme Specialist, Science Directorate

Wafaa El Alami, Head of ISESCO Center for Promotion of Scientific Research (ICPSR)

ISESCO funds prizes and grants for scientists to promote research in the Islamic world. They have a journal, website, other publications, and national and regional offices. Like our concept of the WCN, they emphasize the network of individual institutions. ISESCO has developed a network of institutions in the MENA region.

ISESCO coordinates with UNESCO International Hydrological Programme (IHP). ISESCO holds an environmental forum with ministers every 2 years. This year's meeting, in Tunisia, will focus on water.

They agree that Morocco would be a natural bridge between the ME and NA/Francophone region. They feel Morocco would be warmer and more welcoming than elsewhere.

ISESCO currently has interest in water pollution and clean water. ISESCO wants to increase collaboration with the US. Particularly with the Water Center Network, they feel they have a common objective and are ready to collaborate. They said we should move fast. ISESCO is ready to participate in the WCN. ISESCO develops action plans for the coming year and allocates resources in advance. They are interested in seeing a proposal and/or agreement (to sign) for 2011.

13. French Development Agency (AFD)

Olivier Pannetier, Head of the Mission

AFD's mandate is to work with management institutions on operations, such as ONEP and municipal systems in large cities on irrigation, potable water, and sanitation. AFD has programmed more than 400 million euro in programs in since 1990. AFD has not yet worked with private sector providers. AFD is co-financing (with IFD, Germany, European Investment Bank, and the European Commission) 65 networks and treatment plants, to a total of 160 million euro.

AFD is working on small- and medium-sized basins with ORMVAs managing irrigation perimeters.

AFD does not finance dams (part of the Moroccan Water Strategy) due to the environmental problems; they also consider dams to be unsustainable, as reservoirs silt in and lose capacity over time. Also, it is hard to fund municipal drinking water systems since financing is not guaranteed by the state. As a result donors like AFD and EU Group on Water Donors are competing to fund ONEP since it is more politically tenable. AFD is co-financing a study on the Sous-Agadir water resources. GTZ is working on technical assistance at the basin scale.

Interesting areas for growth include industrial wastewater (such as pilot treatment plants in Fes and Agadir for leather, fish, and olive oil wastes) and wastewater treatment plant sludge

treatment (research is going on at IAV to do pilot projects on using sludge for agriculture and cement production).

Institutional issues in Morocco are the key – the study done by the Ministry of Water and Environment is technical and does not address institutional issues (especially in wastewater reuse). Aquifer management is another area the network should address.

Regional programs for AFD are coordinated in Paris (Disbreuil is the contact person).

14. USAID Morocco Economic Competitiveness Program (MEC)

Andrew Watson, Program Director/Chief of Party, DAI

DAI is the prime implementing contractor for the MEC program, a \$35M, 5-year program. MEC is currently the only USAID economic growth program in Morocco. Around 65 percent of the funds are for water and agriculture; remainder is for business environment and workforce development. Andrew notes that it is telling that this economic growth program is focused on water and agriculture.

Most farmers are growing sugar beets and fodder grass – not high-value crops for the amount of water used. However, some growers are selling higher-value crops. For example, several crops in Morocco ripen a few weeks before the same crops in Europe, adding substantial value to the Moroccan products. To these farmers, the price of water is small relative to the profit margin, and a several-fold increase in water prices is not going to hurt their profit.

On-site irrigation systems (e.g. drip systems) cost about \$7,000/hectare and about 60 percent of these costs are subsidized. 60 percent of the real cost of water is infrastructure (dams, conveyance systems). Morocco does not make water users pay for these costs. The remaining 40 percent is for operation and maintenance. Users more or less pay to cover these costs.

Reservoirs are silting up and losing capacity. New infrastructure is needed.

Morocco's major strategy is large conveyance from the highlands to cultivated areas. Farmers see the government as top-down. They opt out of government irrigation schemes and instead sink boreholes, which are loosely regulated. Soil salinization and aquifer depletion will become problems in the future.

DAI is helping the ORMVAs and the ABH (basin authorities, or providers) share data.

Two treated-wastewater-reuse projects are coming online. DAI is coordinating one of these projects in Meknes. Tertiary treatment is being provided, making the water legally usable for irrigation. The system will irrigate 2,000 hectares.

Andrew thinks Morocco's awareness and action on water problems are far behind those of Jordan, recognizing also that Jordan's problems are considerably worse. The Souss-Massa region is more sophisticated in terms of market (and thus technology).

Long-term (e.g. 2030) water shortage predictions do not include climate change, so the problems are likely to be worse.

Andrew suggested that the WCN could bring Jordanian consultants who would be effective when working at the grassroots (rural) level. He believes Jordan has good lessons to share, and that these trainers would be more effective and credible working in Arabic. The WCN should be more than something like SERVIR, which only shares data. The network should promote collaborative analysis, interpretation, and development of solutions to the problems. The MEC and/or DAI are worth consulting and possible integration into ongoing development and implementation of the Water Center Network.

15. National Center for Remote Sensing (CRTS)

Driss El Hadani, Director General

CRTS does not make policy. It serves policy makers with information and tools. They see the challenge as continuing to develop new tools to meet the challenges of water scarcity. CRTS has project underway to use remote sensing data to optimize irrigation, in ORMVA Gharb (just north of Rabat).

Other CRTS efforts underway include: NASA/World Bank water remote sensing project in the MENA region; a tsunami warning project; a drought early-warning project with OSS (Observatoire Sahara et Sahel); and a Mediterranean oil spill project with Egypt.

CRTS has its own capacity building program (training and technology transfer programs). CRTS has a good, functional relationship with ONEP.

The director feels that the Ministry should (but does not) have an entity to promote R&D.

Many implementing institutions (local-level authorities) are “150 percent” overburdened with core activity operation and have no capacity for development. The Water Center Network could help fill this gap, but the challenge of participation would still exist.

In addition to MENA, the CRTS director sees the Water Center Network as a link to U.S. expertise. The director believes CRTS would participate in the WCN, particularly in R&D. CRTS would probably not be a core institution, as its role is more to develop the tools, information, and methodology used by policy makers.

The WCN’s administration should be strong and active, facilitating connections between participating institutions, building consensus – this is a gap in any single country, and in the whole MENA region. In terms of the mechanics, how will the network of centers will make each project or program happen?

Important themes in Morocco: water economy, water savings, wastewater re-use. Desertification and CC are also important subjects and should be included in the work of the network. Consider designing the network to facilitate smaller networks within participating countries, which in turn could link to larger inter-country network.

A.5 QATAR

1. U.S. Embassy

Ambassador Joseph LeBaron

Eric Wahlstrom, Economic Officer

Qatar is running on 99.99 percent desalinated water, thermally powered by the oil and gas industry. There is only a day or two worth of supply so water security is a huge issue.

The Ambassador hosted the team at his residence at the beginning and end of our mission. He was eager to hear about the water center of excellence concept and had a keen interest in its possible role in Qatar. He thought the hub and spoke model was not a good fit for Qatar and encouraged us to find another model.

He tasked Eric Wahlstrom, who has a hydrology background, to accompany the team during all of their visits and we were grateful for his insights and knowledge as he contributed much to the preparation of the visit, thinking about the issues and discussions. Each team member provided background on the visits to other countries and their own areas of expertise. The Ambassador had been following the Food Security discussions related to President Obama's Feed the Future (FTF) Initiative and wanted to know more about the interaction between the FTF and the Water center of excellence.

Eric keeps a spreadsheet to track the number and nature of U.S. requests for funding from Qatar. He concluded that the USG should be more discriminating and avoid treating Qatar like an ATM for donations to various causes. The main point hammered out over and over again by the Ambassador was that Qatar would like to establish a partnership with the United States but that we must not ask for their involvement in a center of excellence without a real value proposition for Qatar – meaning a true partnership with the United States. In the case of the Water Center Network, the key is in formulating a strong collaborative U.S.-Qatar bilateral program. The Ambassador has regular contact with the key people to make things happen if we can deliver on the prerequisites.

The group agreed that there are good bilateral reasons for the United States to work directly with Qatar, possible through an S&T Agreement, because the Qataris were investing heavily in cutting edge research that would benefit the United States, such as membrane technology, solar power desalinization, small-scale brackish water desalinization, strategic aquifer storage, and some issues of recycling.

It may be possible to engage the Qataris in a parallel track of development, concentrating on their stated desire to create a knowledge-based society and to be an agent of regional development by 2030. The United States has much to offer through twinning with the Gulf Arabs to demonstrate development with developing Arab nations and the Qataris could interpret and adapt to their own style of cooperation. The Qatar National Vision 2030 foresees such a role:

The Qatar National Vision 2030 on international cooperation (abbreviated):

- An increased regional role economically, politically and culturally (especially in the Gulf).
- Intensification of cultural exchange with the Arab peoples in particular and with other nations in general.
- Sponsorship and support of dialogue among civilizations, promoting co-existence among different religions and cultures.
- Contribution towards international peace and security through political initiatives and developmental and humanitarian assistance.

The Qatar National Vision 2030 on a balance between growth and protecting the environment:

- Encouragement of regional cooperation to put in place preventive measures to mitigate the negative environmental effects of pollution arising from development activities.
- A proactive and significant regional role in assessing the impact of climate change and mitigating its negative impacts, especially on countries of the Gulf.
- Support for international efforts to mitigate the effects of climate change.

The Ambassador floated a plan to cooperate with Qatar on a Food Security exhibit at the UN General Assembly in New York City, which would then move to the World Bank in Washington, DC. The response from the State Department was not encouraging. He was disappointed that the USG does not seem to grasp the tremendous potential for cooperation with Qatar to create a new paradigm of “the New Middle East arising out of the Old Middle East.” On cooperation with Israel, the Qatari side was “looking for an excuse to be open” but the conditions at this time have handicapped their pro-activity.

2. Qatar National Food Security Program (QNFSP)

Sheikh Hamad Ben Ali Al-Thani, Vice Chairman

Mahendra Shah, Director of Programmes

Mohamed J. Al-Maslamani, Technical Director

Laurie Kitch, Senior Agriculture Advisor

Godwin Balasingam, Senior Regulatory Affairs Advisor

Mahendra Shah gave an overview of QNFSP’s integrated framework on food security then each staff member contributed additional points. The plan focuses on self-sufficiency to the extent possible through proper inventory of land resources, optimization of adapted stable crops, fruits and vegetables and cropping systems that feed the population or be processed and exported. Indigenous production must be complemented with cooperation internationally to produce food that can be imported to Qatar. The strategy is supported with a land use master plan, analyses of future food reserves, value chain analyses for various food production systems like such as hydroponics and winter cropping sequences, an agro-processing park with subsidies for foreign direct investors, and balancing of crop, livestock and aquatic food resources.

Nutrition is also taken into consideration owing to the composition of the population into indigenous Qataris (300,000), expatriates (300,000) and migrant workers (1,000,000) each with their own food consumption habits, excesses (obesity, diabetes) or deficiencies (under-nutrition). Education plays a similarly important role as there is a need for a new generation of water and

land managers that can run the enterprises that will manage and implement the food security strategy.

Mohamed Al-Maslamani previously worked in the oil and gas sector and he cited the example of Qatar being short of natural gas in 1988 and now being a world wide player in the delivery of liquefied natural gas – with innovative financing and turn key construction of off shore delivery terminals to many countries. Similarly, they have a vision for food security. His particular task is concerned with solar powered desalination to feed the food security plan.

Sheikh Hamad Ben Ali Al-Thani spoke about the importance of the United States as a source of expertise. Qatar wants to be a player on the world stage and he cited their investments in sports, education (Education City) and diplomacy (Dafur Peace Talks; \$300 m contribution to the rebuilding of Lebanon) as examples. The QNFSP is just now finishing its first phase of planning and is moving into implementation about the same time as the Water Center Network is about to be born and there may be potential for collaboration. The QNFSP brings expertise from around the world and assembles the people under one umbrella. He said Doha is an open city and Qatar Airways connects globally. The timing is also good because the Ministry of Cooperation is just now starting to develop their thinking about international programs.

QNFSP is governed by a Supreme Council, often used in Qatar when a subject has overlaps between regular line ministries. Entities under Supreme Council are streamlined and can act fast while ministries are considered bureaucratic and slow.

3. Texas A&M University

James Holste, Associate Dean for Research and Graduate Studies

Patrick Linke, Technical Director, Qatar Sustainable Water and Energy Utilization Initiative

Ahmed Abdel-Wahab, Technical Director, Qatar Sustainable Water and Energy Utilization Initiative

Education City in Doha covers 14 square kilometers and houses educational facilities from school age to research level and branch campuses of some of the world's leading universities. Six U.S. universities have branch campuses at Education City. They are Virginia Commonwealth University, Weill Cornell Medical College, Texas A&M University, Carnegie Mellon University, Georgetown University School of Foreign Service and Northwestern University.

TAMU in Qatar offers undergraduate degrees in chemical, electrical, mechanical and petroleum engineering. In 2011, TAMUQ will offer a masters degree program. Research emphasis areas include environmental issues, advanced water treatment technologies, chemical process safety, petroleum reservoir studies, mathematical modeling, machinery and controls, telecommunications, transportation and roads, electric power generation, distribution and machinery, chemistry, and physics. There have been 161 graduates since December 2007. The student body has now reached nearly 400, comprising 40 percent Qatari, 40 percent local residents from other countries and 20 percent students from more than 20 foreign countries – with females representing 40 percent of the total enrolled. Already there are about 40-50 females currently in the work force. The Qatar University is segregated by sex, with the women studying

in computer systems and chemical engineering while the men focus on electrical, civil and mechanical engineering. TAMUQ on the other hand is coeducational so it took three or four years to figure out how to deal with the social issues.

There are 70 active research projects, 80 percent of which are funded by the Qatar National Research Fund (QNRF) and 20 percent funded from corporate sponsors. QNRF aims to advance knowledge and education by providing support to researchers. It administers funding for original, competitively selected research and fosters collaborations within academia, and through public/private partnership. Although QNRF actively seeks internationally recognized researchers, it is dedicated to funding research that meets the needs of Qatar. QNRF is a member of Qatar Foundation, established by His Highness Sheikh Hamad Bin Khalifa Al-Thani, Amir of Qatar, and chaired by Her Highness Sheikha Mozah Bint Nasser Al Missned.

The National Priorities Research Program (NPRP) is intended to support the overarching goal of Qatar National Research Fund (QNRF), which is to foster a research culture in Qatar. Specifically, the grants offered through the NPRP will build human capital in Qatar and raise Qatar's profile within the international research community. NPRP is the flagship funding program of QNRF. It is announced annually to fund successful proposals ranging from U.S. \$ 20,000 up to U.S. \$350,000 per year, for research project periods of one, two or three years.

Patrick Linke and Mohamed Adul-Wahab reported on water issues, which are institutionally spread across several ministries and the General Electricity and Water Organization, responsible for water supply. Agriculture is under the Department of Agriculture in the Ministry of Environment, as is the Department of Water for regulation and groundwater management.

Patrick is working on a water and energy initiative with QNFSP while Ahmed works on treated wastewater and recharge. Much of their work is funded by QNRF with 65 percent for Qatari entities and allowances of up to 35 percent for external partners. TAMU has reached out the National Science Foundation to supplement the funding for projects under QNRF.

Ahmed outlined the 6 projects on water, all of which would have regional relevance:

1. Inland desalinization with zero liquid brine discharge: groundwater can have a salinity of 30-100 g/L but availability is high so extraction of the salt would provide a good source of water. They are working at the Qatar Science and Technology Park (QSTP) on a two stage reverse osmosis process that yields 97 percent pure water and 3 percent salt.
2. Environmental assessment of cooling water discharge: TAMU thinks the Ministry of Environment standards are set too low. This grant is working on a model and toxicity analysis.
3. Hazardous industrial wastewater: TAMU is studying harmful organic compounds in the groundwater.
4. Salt production from evaporated brine
5. Soil and water analysis
6. Simulation tools

TAMU has had to explain the role of research as Qatar was habituated to consultants serving

under joint ventures where most of the research was conducted in the home laboratories of the expatriate consulting companies. After seven years working with TAMU the Qataris are starting to differentiate contracts from partnerships, although they are still sensitive to the possibility that money is being abstracted from the nation through most of the existing methods of cooperation.

International collaboration among Gulf States is weak and there is a need to break down barriers among countries to reduce the duplication of effort. TAMU spoke for themselves and the Qatar Foundation by stating they would be interested in the NAS New Frontiers program to encourage discourse among countries. TAMU recommends collaboration with GNFSP as working with Qatar Foundation (QF) is more challenging because it is so large.

4. Qatar Science and Technology Park (QSTP)

Dr. Eulian Roberts, Managing Director

QSTP supports works in the following areas: energy, in collaboration with the petroleum industry; renewable energy from solar power and poly-silicon chips; health sciences and information technology. QSTP is a home for technology-based companies from around the world and an incubator for start-up enterprises. Providing premises and services, QSTP's support programs help organizations develop and commercialize their technologies. At the forefront of industry-university collaboration, QSTP is located in QF's Education City. Its objective is to attract companies and entrepreneurs from around the world, to develop and commercialize their technology in Qatar. QSTP's rental charges are competitive with ordinary commercial property in Doha, despite the research-grade specification of its buildings and infrastructure. Current tenants include ExxonMobil, GE, ConocoPhillips, Microsoft, Shell and Total; bringing research and business together, while spurring the development of Qatar's knowledge economy. Investing \$600 million in its first phase of buildings, QSTP provides world-class offices and laboratories specifically designed for technology-based companies. Companies can lease premises or commission their own buildings for design and build by QSTP.

5. ConocoPhillips Global Water Sustainability Center (GWSC)

Samer Adham, Managing Director

Maltesh, Deputy Director

Research studies underway include:

- Innovative treatment technologies for produced water in the oil and gas industry (for every barrel of oil another two to five barrels of brackish water are produced). There is a huge industrial need to treat and handle the produced water responsibly.
- Desalinization and water reuse.
- Sustainable development and promotion of conservation. Qatar is a very high consumer of water, using 675 L/person/day (vs. 575 L/person/day in the United States). The population has double in the past three years so it is imperative to educate the public on conservation measures. There is a very nice visitor's center in the GWSC facilities.

The GWSC is an attempt by ConocoPhillips to identify areas of potential application. It is a relatively small investment with 10 staff to be employed by the end of the year but it takes advantage of the incubator environment to learn new ideas and interact with other cutting edge companies.

6. Qatar University (QU)

Dr. Hassan Rachid Al-Derham, Vice President for Research, Office of Research

Dr. Moumen Omar Hasneh, Director of Research

Dr. Mazen O. Hasneh, Dean, College of Engineering

Dr. Mohsin A. Al-Ansi, Director, Environmental Studies Center

Dr. Farid Benyahia, Professor and Head of Chemical Engineering Department

QU has 7,500 students, seven faculties, and six research centers including several of relevance to the proposed Center of Excellence on Water: Central Laboratory Unit; Social and Economic Survey Research Unit and the Environmental Studies Center. Research is a new part of QU's strategy and they are developing advanced degrees within several faculties. They are working on non-thermal desalinization, membrane technology, groundwater pollution, aquifer storage, treated and recycled wastewater for use on landscapes and in agriculture and biological treatment of wastewater.

The QU student body is gender segregated in undergraduate classes. Graduate programs are co-educational. Number of women enrolled is high – up to 75 percent of some departments. The President of the University, Vice President of Academic Programs, two Deans and a good number of Department Heads are female. The Qatarization of the oil industry is resulting in the employment of many women.

As described above, QU has six research projects with TAMU and 38 total research projects

7. Qatar General Electricity and Water Corporation (Qarhama)

Mohammed Hassan Al-Malki, Head, Water Network Development Section

Eng. Fahad Yousef Tolefat, Manager, Water Operations and Maintenance Department

Eng. Ali Saif Ali Al-Malki, Director, Water Network Affairs

Qarhama is a public utility responsible for delivery of water to the nation and is doing so through desalinization in the face of a rapidly growing population, a one-day water buffer and need to increase public awareness and appreciation for conservation. Part of their guidance to customers is to install roof-top reservoirs with at least one day of storage. They hope to extend their strategic reserve to 7 days and to further study aquifer storage, preservation of remaining groundwater resources for human as opposed to agricultural and landscape use, and renovation of the infrastructure to reduce non-revenue water (leakages) from the system. Seven facilities in Qatar produce energy and water with the next two plants coming on line in August 2010 and April 2011.

The team wondered whether there would be opportunities for interaction with Qarhama staff for practical exchanges of personnel for apprenticeships and training. They were open to this idea and also expressed interest in getting help to make users aware that water was not an unlimited

resource and to restrict use of potable water for washing cars, irrigating crops, watering lawns and industrial purposes.

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C CONSULTATIONS IN THE MIDDLE EAST AND NORTH AFRICA: GAPS, ISSUES AND PROGRAMS

The design of the Middle East and North Africa Water Center Network draws heavily from the many conversations the Team had with several hundred stakeholders, most of them resident in the Middle East. The following table summarizes that highlights of those interviews and indicates the priorities of stakeholders when asked to identify technical gaps and technical issues, and recommend program areas to address them.

C.1 Egypt

Institution	Gaps	Priority Issues	Programs
Ministry of Water Resources and Irrigation		<ul style="list-style-type: none"> seawater intrusion desalination wastewater treatment groundwater depletion and pollution water conservation rainfed agriculture management climate change population growth civil societies stakeholder involvement shared water resources 	
Ministry of Housing and Utilities	<ul style="list-style-type: none"> large gap between policy makers and line agencies and with researchers research not seen to be useful or practical little interaction between government and researchers 	<ul style="list-style-type: none"> water scarcity water quality at the source human resources financing 	<ul style="list-style-type: none"> support key policy changes roundtables on specific issues to bridge the current disconnect between the government and financing institutions
Ministry of Agriculture and Land Reclamation		<ul style="list-style-type: none"> seawater intrusion desalination wastewater treatment groundwater depletion and pollution water conservation rainfed agriculture management climate change population growth civil societies stakeholder involvement shared water resources 	
National Water Research Center	<ul style="list-style-type: none"> low salaries for researchers good researchers leave Egypt for other countries independence of research is important so that researchers can 	<ul style="list-style-type: none"> drainage as a leading producer of pollution groundwater management 	<ul style="list-style-type: none"> assessing the potential of an expansive carbonate aquifer which overlies most of Northern Egypt

	<ul style="list-style-type: none"> work not just on current problems but can anticipate future needs ▪ young staff will not have the opportunity to work with foreign experts and gain knowledge and experience 		
Environmental Quality International			<ul style="list-style-type: none"> ▪ focus on knowledge management
International Donors	<ul style="list-style-type: none"> ▪ much knowledge around, but it is scattered and needs to be brought together ▪ funding is an issue in some countries and not in others 	<ul style="list-style-type: none"> ▪ 	<ul style="list-style-type: none"> ▪ capacity-building, including training on how participating institutions can do fund raising, write proposals, and improve management approaches
League of Arab States		<ul style="list-style-type: none"> ▪ desalination 	
Arab Network for Environment and Development	<ul style="list-style-type: none"> ▪ corporate social responsibility is not developed in region 		<ul style="list-style-type: none"> ▪ public outreach ▪ capacity building ▪ policy formulation
Arab Water Council	<ul style="list-style-type: none"> ▪ research on water is not well funded or well used 	<ul style="list-style-type: none"> ▪ water conservation ▪ wastewater reuse ▪ energy and water ▪ desalination ▪ water finances ▪ tourism 	<ul style="list-style-type: none"> ▪ strengthen existing institutions ▪ strengthen management, not technical capacities

C.2 Israel

Institution	Priority		
	Gaps	Issues	Programs
Israel Water Authority			<ul style="list-style-type: none"> ▪ exchange knowledge to improve water use efficiency ▪ focus on convening intensive, high level conferences and professional meetings ▪ could also organize short courses of two month duration for students

C.3 Jordan

Institution	Priority		
	Gaps	Issues	Programs
Ministry of Water and Irrigation	<ul style="list-style-type: none"> ▪ weak link between research and policy ▪ weak link between research and application 	<ul style="list-style-type: none"> ▪ water demand ▪ management ▪ non-revenue water ▪ reuse of treated wastewater for agriculture ▪ water/energy ▪ desalination ▪ shared basins ▪ climate change ▪ managing scarce ▪ wastewater treatment and reuse 	<ul style="list-style-type: none"> ▪ training ▪ mentorship for academics in ministry locations
Ministry of Planning	<ul style="list-style-type: none"> ▪ technical direction and leadership of university research centers shifts frequently 	<ul style="list-style-type: none"> ▪ 	<ul style="list-style-type: none"> ▪ public education and outreach program ▪ applying science to better manage water at local

			and regional scales
Swedish International Development Agency	<ul style="list-style-type: none"> ▪ weak regional institutions 	<ul style="list-style-type: none"> ▪ water/conflict resolution ▪ integrated water resources ▪ management climate change 	
Royal Scientific Society	<ul style="list-style-type: none"> ▪ lack of coordination among institutions of higher education 	<ul style="list-style-type: none"> ▪ transboundary water issues 	<ul style="list-style-type: none"> ▪ strengthened laboratory analyses ▪ private sector partnerships
Munther Haddadin	<ul style="list-style-type: none"> ▪ little cooperation among the private sector, public water institutions and NGOs ▪ need to market scarcity – misunderstandings by public 	<ul style="list-style-type: none"> ▪ imbalance in the population-water resources equation ▪ environmental degradation ▪ riparian unilateral uses ▪ sustainability of water services ▪ water governance ▪ management and legislation ▪ human resources development ▪ natural synergy of water and energy ▪ continuum of research and development 	<ul style="list-style-type: none"> ▪ degree programs
USAID/Jordan	<ul style="list-style-type: none"> ▪ lack of institutional financial sustainability ▪ capacity-building ▪ policy formulation ▪ brain drain 	<ul style="list-style-type: none"> ▪ water demand management ▪ cost recovery policies 	<ul style="list-style-type: none"> ▪ water valuation studies
National Center for Agricultural Research and Extension		<ul style="list-style-type: none"> ▪ increased level of salinity in highland soils; ▪ lack of a system for water pricing ▪ lack of sufficient treatment of wastewater 	
German Technical Cooperation (GTZ)	<ul style="list-style-type: none"> ▪ weak institutions ▪ lack of coordination between research institutions and line agencies 	<ul style="list-style-type: none"> ▪ climate change ▪ establishing water user associations ▪ standards for wastewater use ▪ spatial planning and water resources management ▪ desalination ▪ water governance 	competitive programs that shift management responsibility on regular basis
University of Jordan	<ul style="list-style-type: none"> ▪ losing best researchers because of low salaries at universities 	<ul style="list-style-type: none"> ▪ water quality ▪ water conservation 	<ul style="list-style-type: none"> ▪ ties to us institutions ▪ chemical and biological analysis of water. ▪ training for stakeholders. Research
Jordan University of Science and Technology	<ul style="list-style-type: none"> ▪ poor links between universities and ministries and line agencies 	<ul style="list-style-type: none"> ▪ water management ▪ water rights ▪ water demand management wastewater reuse groundwater ▪ social and education components 	<ul style="list-style-type: none"> ▪ training ▪ strengthened ties with U.S. institutions

C.4 Kuwait

Institution	Priority		
	Gaps	Issues	Programs
Kuwait Institute for Scientific Research		<ul style="list-style-type: none"> desalination wastewater reuse water conservation 	
Kuwait Fund		<ul style="list-style-type: none"> water management 	<ul style="list-style-type: none"> private sector involvement
Kuwait Foundation for the Advancement of Science		<ul style="list-style-type: none"> water resource management integrated water management 	

C.5 Morocco

Institution	Priority		
	Gaps	Issues	Programs
USAID/Morocco	<ul style="list-style-type: none"> need for technical exchanges with neighboring countries policy gaps overlapping institutional jurisdictions 	<ul style="list-style-type: none"> taxation and pricing extension work to small farmers climate change impacts on water resources 	<ul style="list-style-type: none"> outreach to youth (not just higher echelons of scientific excellence) support for public diplomacy effects of climate change on water
U.S. Embassy		<ul style="list-style-type: none"> climate change water quality water quality 	
Ministry of Water and Environment / General Directorate of Hydraulics	<ul style="list-style-type: none"> liaising and harmonizing research difficult to find utility in existing research results high competency but the research is not organized to the service of development lack of rules/guidelines lack of capable engineers in domains other than large infrastructure (dams) 	<ul style="list-style-type: none"> protection of aquatic resources – sustainable management and artificial recharge of groundwater climate change adaptation – control floods and plan for desertification institutional organization research and education – modernization of administration, research, water management, and education 	<ul style="list-style-type: none"> capacity building building links among administration, universities, and enterprises
Ministry of Agriculture		<ul style="list-style-type: none"> role of private enterprise Irrigation management and water use efficiency 	<ul style="list-style-type: none"> sharing regional experiences testing irrigation technologies efficient and resistant crops technical tools for negotiating complex problems, and exchanges
Agronomic and Veterinary Institute Hassan II	<ul style="list-style-type: none"> good technology exists, but is not always required by the ORMVAs (local irrigation authorities) or implemented by the end users disconnect between technology and policy 	<ul style="list-style-type: none"> both technical and socioeconomic factors to make irrigation more water-efficient and productive privatization water pricing water quality floodings 	<ul style="list-style-type: none"> training

National Institute of Agronomic Research			<ul style="list-style-type: none"> ▪ facilitate better data sharing ▪ feature technology transfer and better use of research results ▪ implementation should occur at the basin scale ▪ should include Sub-Saharan Africa.
National Office of Potable Water's International Institute of Water and Sanitation		<ul style="list-style-type: none"> ▪ desalination ▪ wastewater reuse ▪ crop varieties 	<ul style="list-style-type: none"> ▪ present concepts of change management in operations to encourage technology adoption ▪ research activities must be done in a network of national and international research centers ▪ do not duplicate work ▪ R&D should include feedback to training, and knowledge management and sharing
Irrigation Authority/Doukkala	<ul style="list-style-type: none"> ▪ big gap in grower understanding and thus implementation of improved irrigation technology 		<ul style="list-style-type: none"> ▪ technology transfer – sharing technologies among countries, implementing institutions, and end users, rather than just research ▪ new irrigation technology, remote sensing, and water use monitoring tools ▪ platform for information exchange among basins and countries ▪ development of high value crops per cubic meter of water
World Bank Group	<ul style="list-style-type: none"> ▪ disconnect between academia and policy – research doesn't inform the grand programs of the government 	<ul style="list-style-type: none"> ▪ wastewater reuse ▪ water efficiency and productivity ▪ climate change and water management (including modeling) 	
African Development Bank		<ul style="list-style-type: none"> ▪ institutional arrangements for policy ▪ aquifer management over reliance on unsustainable schemes such as dams 	
European Union	<ul style="list-style-type: none"> ▪ difficult to operationalize projects because ministries do not work together ▪ budget constraints dictate research that does not reflect national priorities ▪ researchers do not talk to each other ▪ great difficulty attracting young researchers 		<ul style="list-style-type: none"> ▪ institutional reforms ▪ research policy

Islamic Educational, Scientific and Cultural Organization		<ul style="list-style-type: none"> ▪ water quality and pollution 	
French Development Agency	<ul style="list-style-type: none"> ▪ institutional issues are not addressed, emphasis on the technical side 	<ul style="list-style-type: none"> ▪ industrial wastewater ▪ wastewater treatment plant sludge treatment ▪ institutional issues, especially related to wastewater reuse ▪ aquifer management 	
USAID Morocco Economic Competitiveness Program			<ul style="list-style-type: none"> ▪ regional sharing of information ▪ promote collaborative analysis, interpretation, and development of solutions to the problems
National Center for Remote Sensing	<ul style="list-style-type: none"> ▪ implementing institutions overburdened with core activity operation and have no capacity for development ▪ challenge of participation would still exist 	<ul style="list-style-type: none"> ▪ water economics ▪ water savings ▪ wastewater reuse ▪ desertification 	<ul style="list-style-type: none"> ▪ facilitate connections between participating institutions, building consensus – this is a gap in Morocco and entire MENA region ▪ facilitate smaller networks within participating countries that could link to larger inter-country network

C.6 Qatar

Institution	Priority		
	Gaps	Issues	Programs
US Embassy	<ul style="list-style-type: none"> ▪ productive and wise use of funding 	<ul style="list-style-type: none"> ▪ water security is the big issue 	<ul style="list-style-type: none"> ▪ membrane technology ▪ solar power desalinization ▪ small-scale brackish water desalinization ▪ strategic aquifer storage ▪ recycling
Qatar University			<ul style="list-style-type: none"> ▪ non-thermal desalinization ▪ membrane technology ▪ groundwater pollution ▪ aquifer storage ▪ treated and recycled wastewater for use on landscapes and in agriculture ▪ biological treatment of wastewater
Qatar Science and Technology Park		<ul style="list-style-type: none"> ▪ renewable energy ▪ health services ▪ information technology 	
ConocoPhillips		<ul style="list-style-type: none"> ▪ huge industrial need to treat and handle the produced water responsibly ▪ desalinization and water reuse sustainable development and promotion of conservation 	<ul style="list-style-type: none"> ▪ innovative treatment technologies for produced water in the oil and gas industry

Texas A&M	<ul style="list-style-type: none"> ▪ international cooperation among Gulf States is weak ▪ duplication of efforts 	<ul style="list-style-type: none"> ▪ 	<ul style="list-style-type: none"> ▪ inland desalinization environmental ▪ assessment of cooling water discharge ▪ hazardous industrial wastewater: TAMU is studying harmful organic compounds in the groundwater. ▪ salt production from evaporated brine ▪ sail and water analysis ▪ simulation tools
Qatar National Food Security Program	<ul style="list-style-type: none"> ▪ link between water resources and food security 	<ul style="list-style-type: none"> ▪ food security ▪ value chain analysis 	
Qatar General Electricity and Water Corporation			<ul style="list-style-type: none"> ▪ practical exchanges of personnel for apprenticeships and training ▪ make users aware that water was not an unlimited resource

C.7 United Arab Emirates

Institution	Priority		
	Gaps	Issues	Programs
Arab Water Academy		<ul style="list-style-type: none"> ▪ water governance ▪ water diplomacy ▪ remote sensing for water management ▪ utility reform ▪ non-conventional water resources ▪ groundwater management 	
Environmental Agency of Abu Dhabi	<ul style="list-style-type: none"> ▪ need for applied research to guide decision-making and identify policy options ▪ research in the region is not advanced and there are missing links between research, policy, and good business outcomes. ▪ universities are not filling the gap, they do not understand where the private sector and government are moving. 	<ul style="list-style-type: none"> ▪ ecological footprint of UAE is highest in the world ▪ water conservation ▪ desalination ▪ wastewater reuse ▪ heavy government subsidies and lack of metering 	<ul style="list-style-type: none"> ▪ climate change ▪ environmental data management ▪ environmental information
International Center for Biosaline Research	<ul style="list-style-type: none"> ▪ water scarcity 	<ul style="list-style-type: none"> ▪ water use productivity and efficiency 	<ul style="list-style-type: none"> ▪ stronger technical ties with U.S. research centers
U.S. Embassy			<ul style="list-style-type: none"> ▪ knowledge management ▪ training ▪ private sector engagement

C.8 West Bank/Gaza

Institution	Priority		
	Gaps	Issues	Programs
USAID/WB/G			<ul style="list-style-type: none"> ▪ focus on policy issues ▪ application rather than research
Palestinian Water Authority		<ul style="list-style-type: none"> ▪ wastewater treatment and reuse 	<ul style="list-style-type: none"> ▪ capacity within the PWA to strategize where to place wastewater treatment (balancing Israeli demands and needs of West Bank/Gaza) ▪ use of centralized vs. decentralized systems

D CONSULTATIONS IN THE UNITED STATES: Q&A FROM MEETINGS

D.1 Background

The interagency Design Team for the Middle East Water Center Network (“the Network”) held two U.S. government (May 6-7, 2010) and one external consultation (May 13, 2010) to discuss the vision for the Center. Please see “Scope of Work for consultations 4-30-10.doc” for the current vision.

Given the emphasis of the WCN on applied water research, the Design Team sought engagement with water professionals in the private and public sectors, as well as in academia. The Team invited the leadership of professional organizations with significant water resources mandates, such as the Water Research Foundation (WaterRF), National Groundwater Association (NGWA), American Water Works Association (AWWA), American Society of Civil Engineers (ASCE), Environmental & Water Resources Institute (EWRI), and the Universities Council on Water Research (UCOWR). These organizations represent professionals from public and private utilities, international consulting firms, and major universities playing a leadership role in linkages with the Middle East and North Africa around water. They covered sub-disciplines including groundwater, surface water, water quality, water availability, drinking water and sanitation, remote sensing and hydrogeological modeling, water management, water policy, and education and training.

The Design Team (made up of individuals from USAID, USACE, DOS, USBR, and Commerce) reached out to USG colleagues and were encouraged by the consultation participation of colleagues from the Team’s agencies as well as USBR, NASA, NOAA, MCC, and USEPA.

At each two-hour consultation held at the Wilson Center (and by teleconference), John Wilson started with a 20-minute presentation summarizing the vision for the Center, followed by a discussion based on the following key questions:

- What core functions should the network carry out?
- How can the process be more inclusive for broad stakeholder buy-in?
- What are key lessons learned about regional platforms in the Middle East and North Africa?
- Which entities in the Middle East and North Africa ought to be invited to join and why?

D.2 Key Suggestions from Consultation Participants

- Add someone from the Middle East and North Africa to the Design Team to join consultations and be central to decision-making to get buy-in.

- Ensure support at the highest political level (including regional platforms), such as the Arab League's new Council of Water Ministers.
- Outline a plan for financial self-sustainability, including fee-for-service functions.
- It is important to rapidly demonstrate relevance. "Low hanging fruit" for low-cost initial projects where the United States has a comparative advantage may include training on water management software or building on NASA and NOAA's remote sensing and cyber infrastructure programs.

D.3 Messages Given Regarding the Design Process

- To achieve our goal we will have to have high-level champion for the idea.
- Take advantage of the benefits of the competition but not have a formal competition.
- Regarding funding, support will come if it is successful – we have money for the assessment, no further guarantee.

The water Centers will be networked with an ability to transfer knowledge across the region and support economic growth. To achieve this goal, the network must shape and lead dialogue with decision-makers. The model is "hub and spokes" where the hub is a facilitator for the network, but not meant to absorb all (or even a majority) of the resources.

The hub must be located in a host that would not exclude Israel from the process and from future activities. To this vein, the Middle East Desalination Research Center (MEDRC), located in Muscat, Oman, will be included in the network, which includes partnership of Israel, Jordan, and West Bank/Gaza. In 2009 MEDRC convened a Steering Committee to create a MEDRC – Palestinian Water Authority (PWA) center of excellence on desalination and water reuse in Gaza and the West Bank. The University of Jordan has just announced (May 2010) that it is creating center for water and energy (initiated by the Ministry of Higher Education), which may be a good partner. If there is not a suitable hub for the Center in Jordan we will look elsewhere in the region.

D.4 Comments from Discussions

Role. The Water Center Network should be designed so that it strengthens existing institutions in the region and supports existing practitioners by raising their profile and giving them greater entrée into politics. The hub is a networker that brings together Middle Eastern, North African, and U.S. institutions to enrich and link existing activities.

Partners in the region would gain the following from the Center:

- Connections to premier U.S. research centers, enhanced knowledge of which partners are valuable to work with, access to U.S. research;
- Better understanding of applied research to solve problems, improved capacity to connect research and policy; and
- Transform an existing center into a regional resource.
- Partners in the United States would gain:

- Innovations developed in the Middle East and North Africa that are of use to counterparts in arid regions of the United States for dryland and crop management;
- Linkages to universities and centers with tremendous opportunities, especially in terms of applied research; and
- Partners in the Middle East and North Africa for educational exchange and collaboration.

A challenge in the United States is to train U.S. engineers for a global future. The WCN could play a role to allow U.S. students to learn both technical and cultural understanding to maintain U.S. leadership in science and engineering. This exchange can happen virtually (Ex: NSF-funded open-source WaterHub platform to put together academic, NGO, end-users, policy-makers, and industry to share information, data, and tools. Students are linked with students in the Middle East and North Africa and NGOs and they share designs virtually weekly.)

Goal. One participant emphasized that as water does not exist in separation from food security and energy, the WCN must include these concepts to be successful in addressing policy.

Function. To the extent that it is possible, bring trainings to the US. (For example, IAEA trained inspectors all come to Los Alamos for few weeks, which is foundational for U.S. leadership in this sector.) One participant requested revising the goal of the WCN to emphasize science and engineering tools upfront and felt it would be a mistake to emphasize policy because adapted capacity in science and engineering is lacking in the region. Another participant emphasized that the network should conduct some basic research activity (which he suggested is implied in the COE term), to build innovative local solutions that can be exchanged between the United States and the Middle East and North Africa. The Well network (US National Groundwater Association) may a good networking platform to build on, which allows a free exchange of insights and access to other people's work.

Structure. To make sure the hub does not consume all of the resources of the center, a model to look to could be the competitive grant structure of the Challenge Program on Water and Food (of the Consultative Group on International Agriculture Research (CGIAR)). Additionally, the center could involve a rotating hub leadership through various partner Centers. If the Center were in Jordan, a consortium of Jordanian universities together might be more synergistic as a combined hub. A separate technical advisory group would be the appropriate group to oversee the technical operation of the center.

Technical Focus. One participant pointed out that any technical challenge in the region has a possible counterpart match in the US. However, specific challenges in the region are country-specific, but the top challenges are: wastewater reuse, national water management strategy, and groundwater quality monitoring.

- Reuse of treated wastewater is a priority for the United States and for the Middle East and North Africa. In the Middle East and North Africa, the infrastructure in this area is variable, even within advanced countries, with upfront investment in properly designed infrastructure, as well as long-term investment in the agencies to maintain the infrastructure, being the main barriers. On the research and policy side, some countries have fledgling programs though this

is a strength of the US, both in the private sector water managers as well as research institutions.

- National level examination of strategic water management and planning is an ongoing challenge in the Middle East and North Africa, where high quality fresh water is allocated to irrigated agriculture, cities are water-stressed, and groundwater is over-tapped.
- Monitoring groundwater quality is generally insufficient, and an opportunity for good fundamental applied research.

US Academic Linkages. What U.S. universities can gain from the Water Center Network is the ability to connect with people on the ground in a long-term connection. U.S. academics need a small amount of money to make this connection.

One participant suggested an annual conference for visibility, perhaps every two years to share the latest technical updates. The U.S. President's Emergency Plan for AIDS Relief (PEPFAR) Program created an initially USG-only conference, and subsequently expanded to include international partners, which has been seen as an extremely positive component of the program.

US Government Linkages. The Water Center Network could complement the Millennium Challenge Corporation's (MCC) activities, which are designed to be reactive to country demands. In the region, MCC Jordan's compact is 100 percent water-related and the MCC Morocco compact also has a substantial irrigated agriculture project (water resource management). If there was such a proposal in play, that kind of research would clearly fit into these activities. MCC sees a lot of proposals with a traditional mindset, which, if the Center helped to change over time, it would help generate more interesting proposals.

Emerging sensing and cyberinfrastructure technologies: This WCN could focus on the tool of remote sensing and build on the NASA Resources Program, which funds end-to-end projects that engage the end users to solve their problems using NASA's "decision support tools." Examples of existing projects that could be built upon or expanded include the Nile Basin Initiative, Himalayan water resources, and Famine Early Warning Systems Network (FEWSNET). In the US, examples of programs that may be nice models for the Water Center Network include the National Integrated Drought Information System (NIDIS), which monitors drought at the county level, and a NOAA project at the University of Nebraska Lincoln which brings in all kinds of data (economic, satellite, etc.) and pulls it all together.

One area of NASA's partnerships in the MENA region which already partners with USAID is NASA's North Africa Land Data Assimilation System (MENA-LDAS), which is a supercomputing facility currently being built at the International Center for Biosaline Agriculture (ICBA) in Dubai, United Arab Emirates. The MENA-LDAS facility will allow remote sensing specialists to model regional water availability, using NASA's technology that uses remotely sensed data to monitor the water cycle (groundwater, surface water, and evapotranspiration) and map agricultural land use. This is used for water and land management decision-making, including understanding needs implied by signaled climate trends (long-term) or weather forecasts (short-term). The tool allows researchers to demonstrate to policy-makers how over 50 years how conditions change over time (on the local scale, using archived data), and how that relates to water cycle and land use changes.

NOAA has complimentary programs to NASA, such as Geonetcast. The National Sea Grant College Program is a model research grants program. NOAA supports a low-cost weather data collection apparatus (\$10,000 per system) with satellite capability. [Need more information]

Financial Sustainability. An example of a self-sustaining center that USAID started is the Bangkok Emergency Disaster Response Center, which marketed services and became self-sustaining, and USAID withdrew. On the other hand, there is a Center in Latin America that USAID created that it is still paying for. Unless the Water Center Network receives an endowment, it will need to market services, and needs a business model to outline how the WCN can do this. For example, there was a USAID project in Jordan focused on utility services and certification. Something similar wherein the whole region would draw on and pay to do their training might take off. Training could be such a service – for example in the Middle East Partnership Initiative (MEPI) program, participants from the Gulf countries have interest and participate in the training for a fee, while partners from countries with smaller economies participate for free. The Center will need to create a financial structure that combining fees and subsidies. It would be ideal to go out with an open tender to be part of this Water Center Network, along with a requirement for marketable skills to join. Does the private sector have a role to play in this and how would they want to participate?

The U.S. National Groundwater Association has a three-pronged approach for financial sustainability: membership, publishing, and events (conferences, short courses, trade expositions). Membership is attractive because the association has a strong U.S. advocacy role. The U.S. Water Research Foundation is sustained from utility memberships which buy-in to centrally-funded research. The benefit of this model is that the users demand its existence and relevance to application.

Regional Approach. It will be an interesting proposition to try to ensure that the Region as a whole feels that they have an interest in the Water Center Network. Creating satellite offices or chairs may be important, along with training to bring partners together. MEDRC is interested in linking and expanding operations to North Africa, which is important to look at.

Relevance. The Nile Basin Initiative (NBI) is a successful example of a distributed network with hubs in different regions, training centers, and sectoral initiatives. The academic involvement is beginning to happen. NBI is successful because it is addressing a critical need for the region. For the Water COE it will be very important to define a very concrete or a few concrete initiatives like this. The Yarmouk River, Disi Aquifer, and the Tigris and Euphrates Rivers are really one water system – if the countries are going to create a sustainable framework they need to consider the whole picture, which may be a leverage point for defining a concrete initiative of relevance. One issue that the Middle East and North Africa as a whole can work on is climate change's effect on water availability, a transboundary issue which does not imply an upstream/downstream context.

Immediacy. One participant highlighted the need for the Water Center Network to get off to a quick, successful start, employing comparative advantages of the United States that are low-cost. “Low-hanging fruit” include training on existing free software and applications for groundwater

(USGS) and surface water/water management (USACE), as well as isotopic analysis of groundwater (for recharge rates, age, source of contaminants). The latter involves some investment in a partner laboratory, but technology is standard. Another participant echoed that the sooner the pay-off the better, and pointed out that the opportunity is in moving information (low cost) rather than people (high cost). Some of the “spokes” in the region have very good information communications technology – just need to establish those linkages and begin the applied research dialogue. Interested networks from the U.S. side could be quickly established, as there are many with extensive experience in the region (both faculty and former students).

Outreach. Consider unveiling this is the World Water Forum and the activities of the World Water Council, which is an excellent venue for large international feedback on the effort.

Legal Institutional Requirements. The design will need to involve an expert in international institutional legal arrangements to ensure harmonization of priorities and sharing of information, including data.

Political Buy-in. Politically, who must buy in to make a difference in investments in applied research on water in the region? The key to water in the region is agriculture. Ministries of Water and Irrigation generally are archaic and top-down, and not open to data, applied research for decision-making. Cracking that nut will be necessary to have an impact on water use in several of these countries in the largest water-using sector.

D.5 Questions Asked by Participants and Responses

Q: Expressed priorities. What areas do the stakeholders want to focus on?

A: We need to shift that conversation to the partners in the Middle East and North Africa to hear more, look at the strengths of existing institutions.

Q: Baseline capacity. Some countries in the region are very advanced in water management and other areas are at a very different capacity level. How can you address the wide range of capacities?

A: While there are differences in capacity within the region, partners at all levels do exist. We need to draw a distinction between the status of water management practices in the region and technical expertise that can serve as partners with the network. For one, the Palestinian territories have severe water shortages and serious groundwater management problems, coupled with supply and quality issues. But the West Bank and Gaza both have excellent resources in institutions and individuals. Some examples: An Najah University in Nablus has first rate faculty tied to the Water Research Center. The Palestinian Hydrology Group, based between Ramallah and Jerusalem on the West Bank, is a longstanding NGO that promotes local water governance from its skilled technical basis and has an international reputation for providing excellent services. The Jerusalem Water Undertaking is a highly efficient water utility servicing towns in the West Bank, including Ramallah, and has a well trained staff that has advised other utilities in the region. The initiative should seek to draw in this expertise from across the region.

Q: Focus. How will the assessment narrow down the focus?

A: The institutional assessment will narrow the technical focus of the Water Center Network, at least initially. We do not expect that the hub will be able to work in all of the possible technical areas that the committee has identified, nor it is desirable. But the hub that is selected should be able to make a credible case for working in two or perhaps three of those areas. Those areas will be the early focus of the WCN. Of course, those areas should also reflect major, priority concerns within the region among stakeholders. The selection of satellite entities will also narrow the network, as with the partnership with the Middle East Desalination Research Center which clearly indicates anticipated work on desalination and likely wastewater reuse.

Q: Scale. What scale is the WCN initially?

A: The network should be a reasonably functioning entity with an existing staff and budget and ongoing programs. It is likely during the initial years that the WCN will be a moderate sized entity, with no more than a dozen staff, and probably less, since funding may be limited and will need to be provided to partner institutions in the region that serve as associates or satellites in the construction of activities. The scale will be determined by available funding, both provided by external sources, including the USG, and ongoing funding of the existing entity. An early product of the overall effort is a detailed Transition Plan that presents how the existing entity will become a hub, followed by a five-year business plan. Those two planning documents will determine the scale of the hub.

Q: COE Linkages. How will the Water Center Network link to other proposed Centers of excellence (COE) as part of Global Engagement?

A: There is a notional need for linkage. But it is not something that we are explicitly building in at this point?

Q: “Optics.” The State Department likes the general philosophy and focus on policy, but questions the optics. What is a Center of Excellence and how do you recognize one if you walked into one? Often they are research Centers with state-of-the-art equipment containing recognized scientific leaders. There is some concern that the Center will be perceived in that way. One way to build a COE is to go to the U.S. National Science Foundation (NSF) and ask for millions of dollars, and build it around a kernel already nationally and internationally recognized for excellence. One of our concerns is that if we called the leaders in water policy, and said we’re going to put a COE in Jordan, the response would be “why there?” It will be problematic to get the WCN started without the individual person or nucleus institution to be the leader. It’s critical to start with an individual or institution that already has credibility and visibility in the field to make someone say, “Wow that’s exciting. We want to support that.”

A: It is true that a champion is necessary to be successful. In addition, we need to design a Board of Trustees to engage in the operations of this effort. The WCN must earn the reputation of “excellence,” but we have to design the network to be successful from the start.

Q: Assessment process. What is the process for picking the hub? It looks like the United States is pushing the process and is going to go out and bestow this in some place in Jordan and make everyone sign on. Would it make more sense to have broad consultation with a lot of agencies (beyond Jordan alone), look at the options broadly, and give everyone a chance to make a presentation?

A: The Design Committee recognizes that no country in the region has an entity with the perfect profile for a hub. However, through its knowledge of the Middle East and North Africa and its water-related institutions, the Design Committee made an initial short-listing of institutions and countries. The assessment in Jordan does not mean that it is a foregone conclusion that the hub will be placed there. The Design Committee decided that conditions and entities in Jordan warranted a first detailed review there. Other possible locations are Qatar, the UAE, and Egypt. Still, recent developments in Jordan, including a cabinet level decision to establish a Center of Excellence on Water, Environment and Energy on the campus of the University of Jordan, is an indication of a high-level national commitment to the concept spurred by local priorities. This is a welcome and promising development, but not yet a definitive one for the establishment of a Center supported by the USG.

Q: Would it be considered a Category II UNESCO center?

A: No.

D.6 Suggested Partners

Individuals and groups to add to the list of possible partners and locations to visit in the upcoming Middle East and North Africa consultation include:

Regional and International

- Arab Countries Water Utilities Association (ACWUA)
- Arab League Council of Water Ministers
- Stockholm International Water Institute (SIWI) and Swedish International Development
- World Water Council and World Water Forum

Syria

- International Center for Agricultural Research in Dry Areas (ICARDA, Aleppo, Syria)

Morocco

- OSS (groundwater monitoring in Morocco and Tunisia)
- Morocco Remote Sensing Center
- Agency (SIDA)
- Upcoming training: Water Management for the MENA Region; November 2010 in Jordan

Qatar

- Qatar Foundation is creating an environment and energy institute – they will be launching soon; funding is approved.
- Global Water Sustainability Center (GWSC)
- GWSC is effectively a joint venture between Conoco-Phillips and General Electric to develop commercial sustainable alternatives. It has not yet formally launched, although its origins go back to at least 2007. It has a suite of offices and a one room lab in Qatar Science and Technology Park (QSTP).
- Qatar National Food Security Program (QNFSP)
- Qatar Sustainable Water and Energy Utilization Initiative (QWE), a research group housed out of Texas A&M and the Environmental Studies Center at Qatar University

- Under the patronage of the Ministry of Energy.
- It has offices, 10 researchers (engineers and scientists--not students), 2-6 student assistants at any given time and substantial infrastructure: water analytics facilities, RO pilot plant, supercomputing, 3D visualization and specialized software for discharge simulation, energy integration and modeling platforms. QWE has 10 major research projects ongoing including zero-discharge sea desalination, inland desalination with zero discharge alternative wastewater treatments and uses, etc.

Kuwait

- Kuwait Institute for Scientific Research – extensive water program

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F PRESIDENT BARACK OBAMA'S SPEECH IN CAIRO: A NEW BEGINNING

June 24, 2009
Cairo University
Cairo, Egypt

Thank you very much. Good afternoon. I am honored to be in the timeless city of Cairo, and to be hosted by two remarkable institutions. For over a thousand years, Al-Azhar has stood as a beacon of Islamic learning; and for over a century, Cairo University has been a source of Egypt's advancement. And together, you represent the harmony between tradition and progress. I'm grateful for your hospitality, and the hospitality of the people of Egypt. And I'm also proud to carry with me the goodwill of the American people, and a greeting of peace from Muslim communities in my country: Assalaamu alaykum.

We meet at a time of great tension between the United States and Muslims around the world -- tension rooted in historical forces that go beyond any current policy debate. The relationship between Islam and the West includes centuries of coexistence and cooperation, but also conflict and religious wars. More recently, tension has been fed by colonialism that denied rights and opportunities to many Muslims, and a Cold War in which Muslim-majority countries were too often treated as proxies without regard to their own aspirations. Moreover, the sweeping change brought by modernity and globalization led many Muslims to view the West as hostile to the traditions of Islam.

Violent extremists have exploited these tensions in a small but potent minority of Muslims. The attacks of September 11, 2001 and the continued efforts of these extremists to engage in violence against civilians has led some in my country to view Islam as inevitably hostile not only to America and Western countries, but also to human rights. All this has bred more fear and more mistrust.

So long as our relationship is defined by our differences, we will empower those who sow hatred rather than peace, those who promote conflict rather than the cooperation that can help all of our people achieve justice and prosperity. And this cycle of suspicion and discord must end.

I've come here to Cairo to seek a new beginning between the United States and Muslims around the world, one based on mutual interest and mutual respect, and one based upon the truth that America and Islam are not exclusive and need not be in competition. Instead, they overlap, and share common principles -- principles of justice and progress; tolerance and the dignity of all human beings.

I do so recognizing that change cannot happen overnight. I know there's been a lot of publicity about this speech, but no single speech can eradicate years of mistrust, nor can I answer in the time that I have this afternoon all the complex questions that brought us to this point. But I am convinced that in order to move forward, we must say openly to each other the things we hold in our hearts and that too often are said only behind closed doors. There must be a sustained effort to listen to each other; to learn from each other; to respect one another; and to seek common ground. As the Holy Koran tells us, "Be conscious of God and speak always the truth." That is what I will try to do today -- to speak the truth as best I can, humbled by the task before us, and firm in my belief that the interests we share as human beings are far more powerful than the forces that drive us apart.

Now part of this conviction is rooted in my own experience. I'm a Christian, but my father came from a Kenyan family that includes generations of Muslims. As a boy, I spent several years in Indonesia and heard the call of the azaan at the break of dawn and at the fall of dusk. As a young man, I worked in Chicago communities where many found dignity and peace in their Muslim faith.

As a student of history, I also know civilization's debt to Islam. It was Islam -- at places like Al-Azhar -- that carried the light of learning through so many centuries, paving the way for Europe's Renaissance and Enlightenment. It was innovation in Muslim communities it was innovation in Muslim communities that developed the order of algebra; our magnetic compass and tools of navigation; our mastery of pens and printing; our understanding of how disease spreads and how it can be healed. Islamic culture has given us majestic arches and soaring spires; timeless poetry and cherished music; elegant calligraphy and places of peaceful contemplation. And throughout history, Islam has demonstrated through words and deeds the possibilities of religious tolerance and racial equality.

I also know that Islam has always been a part of America's story. The first nation to recognize my country was Morocco. In signing the Treaty of Tripoli in 1796, our second President, John Adams, wrote, "The United States has in itself no character of enmity against the laws, religion or tranquility of Muslims." And since our founding, American Muslims have enriched the United States. They have fought in our wars, they have served in our government, they have stood for civil rights, they have started businesses, they have taught at our universities, they've excelled in our sports arenas, they've won Nobel Prizes, built our tallest building, and lit the Olympic Torch. And when the first Muslim American was recently elected to Congress, he took the oath to defend our Constitution using the same Holy Koran that one of our Founding Fathers -- Thomas Jefferson -- kept in his personal library.

So I have known Islam on three continents before coming to the region where it was first revealed. That experience guides my conviction that partnership between America and Islam must be based on what Islam is, not what it isn't. And I consider it part of my responsibility as President of the United States to fight against negative stereotypes of Islam wherever they appear.

But that same principle must apply to Muslim perceptions of America. Just as Muslims do not fit a crude stereotype, America is not the crude stereotype of a self-interested empire. The United

States has been one of the greatest sources of progress that the world has ever known. We were born out of revolution against an empire. We were founded upon the ideal that all are created equal, and we have shed blood and struggled for centuries to give meaning to those words -- within our borders, and around the world. We are shaped by every culture, drawn from every end of the Earth, and dedicated to a simple concept: *E pluribus unum* -- "Out of many, one."

Now, much has been made of the fact that an African American with the name Barack Hussein Obama could be elected President. But my personal story is not so unique. The dream of opportunity for all people has not come true for everyone in America, but its promise exists for all who come to our shores -- and that includes nearly 7 million American Muslims in our country today who, by the way, enjoy incomes and educational levels that are higher than the American average.

Moreover, freedom in America is indivisible from the freedom to practice one's religion. That is why there is a mosque in every state in our union, and over 1,200 mosques within our borders. That's why the United States government has gone to court to protect the right of women and girls to wear the hijab and to punish those who would deny it.

So let there be no doubt: Islam is a part of America. And I believe that America holds within her the truth that regardless of race, religion, or station in life, all of us share common aspirations -- to live in peace and security; to get an education and to work with dignity; to love our families, our communities, and our God. These things we share. This is the hope of all humanity.

Of course, recognizing our common humanity is only the beginning of our task. Words alone cannot meet the needs of our people. These needs will be met only if we act boldly in the years ahead; and if we understand that the challenges we face are shared, and our failure to meet them will hurt us all.

For we have learned from recent experience that when a financial system weakens in one country, prosperity is hurt everywhere. When a new flu infects one human being, all are at risk. When one nation pursues a nuclear weapon, the risk of nuclear attack rises for all nations. When violent extremists operate in one stretch of mountains, people are endangered across an ocean. When innocents in Bosnia and Darfur are slaughtered, that is a stain on our collective conscience. That is what it means to share this world in the 21st century. That is the responsibility we have to one another as human beings.

And this is a difficult responsibility to embrace. For human history has often been a record of nations and tribes -- and, yes, religions -- subjugating one another in pursuit of their own interests. Yet in this new age, such attitudes are self-defeating. Given our interdependence, any world order that elevates one nation or group of people over another will inevitably fail. So whatever we think of the past, we must not be prisoners to it. Our problems must be dealt with through partnership; our progress must be shared.

Now, that does not mean we should ignore sources of tension. Indeed, it suggests the opposite: We must face these tensions squarely. And so in that spirit, let me speak as clearly and as plainly as I can about some specific issues that I believe we must finally confront together.

The first issue that we have to confront is violent extremism in all of its forms.

In Ankara, I made clear that America is not -- and never will be -- at war with Islam. We will, however, relentlessly confront violent extremists who pose a grave threat to our security -- because we reject the same thing that people of all faiths reject: the killing of innocent men, women, and children. And it is my first duty as President to protect the American people.

The situation in Afghanistan demonstrates America's goals, and our need to work together. Over seven years ago, the United States pursued al Qaeda and the Taliban with broad international support. We did not go by choice; we went because of necessity. I'm aware that there's still some who would question or even justify the events of 9/11. But let us be clear: Al Qaeda killed nearly 3,000 people on that day. The victims were innocent men, women and children from America and many other nations who had done nothing to harm anybody. And yet al Qaeda chose to ruthlessly murder these people, claimed credit for the attack, and even now states their determination to kill on a massive scale. They have affiliates in many countries and are trying to expand their reach. These are not opinions to be debated; these are facts to be dealt with.

Now, make no mistake: We do not want to keep our troops in Afghanistan. We see no military - - we seek no military bases there. It is agonizing for America to lose our young men and women. It is costly and politically difficult to continue this conflict. We would gladly bring every single one of our troops home if we could be confident that there were not violent extremists in Afghanistan and now Pakistan determined to kill as many Americans as they possibly can. But that is not yet the case.

And that's why we're partnering with a coalition of 46 countries. And despite the costs involved, America's commitment will not weaken. Indeed, none of us should tolerate these extremists. They have killed in many countries. They have killed people of different faiths -- but more than any other, they have killed Muslims. Their actions are irreconcilable with the rights of human beings, the progress of nations, and with Islam. The Holy Koran teaches that whoever kills an innocent is as -- it is as if he has killed all mankind. And the Holy Koran also says whoever saves a person, it is as if he has saved all mankind. The enduring faith of over a billion people is so much bigger than the narrow hatred of a few. Islam is not part of the problem in combating violent extremism -- it is an important part of promoting peace.

Now, we also know that military power alone is not going to solve the problems in Afghanistan and Pakistan. That's why we plan to invest \$1.5 billion each year over the next five years to partner with Pakistanis to build schools and hospitals, roads and businesses, and hundreds of millions to help those who've been displaced. That's why we are providing more than \$2.8 billion to help Afghans develop their economy and deliver services that people depend on. Let me also address the issue of Iraq. Unlike Afghanistan, Iraq was a war of choice that provoked strong differences in my country and around the world. Although I believe that the Iraqi people are ultimately better off without the tyranny of Saddam Hussein, I also believe that events in Iraq have reminded America of the need to use diplomacy and build international consensus to resolve our problems whenever possible. Indeed, we can recall the words of

Thomas Jefferson, who said: "I hope that our wisdom will grow with our power, and teach us that the less we use our power the greater it will be."

Today, America has a dual responsibility: to help Iraq forge a better future -- and to leave Iraq to Iraqis. And I have made it clear to the Iraqi people I have made it clear to the Iraqi people that we pursue no bases, and no claim on their territory or resources. Iraq's sovereignty is its own. And that's why I ordered the removal of our combat brigades by next August. That is why we will honor our agreement with Iraq's democratically elected government to remove combat troops from Iraqi cities by July, and to remove all of our troops from Iraq by 2012. We will help Iraq train its security forces and develop its economy. But we will support a secure and united Iraq as a partner, and never as a patron.

And finally, just as America can never tolerate violence by extremists, we must never alter or forget our principles. Nine-eleven was an enormous trauma to our country. The fear and anger that it provoked was understandable, but in some cases, it led us to act contrary to our traditions and our ideals. We are taking concrete actions to change course. I have unequivocally prohibited the use of torture by the United States, and I have ordered the prison at Guantanamo Bay closed by early next year.

So America will defend itself, respectful of the sovereignty of nations and the rule of law. And we will do so in partnership with Muslim communities which are also threatened. The sooner the extremists are isolated and unwelcome in Muslim communities, the sooner we will all be safer.

The second major source of tension that we need to discuss is the situation between Israelis, Palestinians and the Arab world.

America's strong bonds with Israel are well known. This bond is unbreakable. It is based upon cultural and historical ties, and the recognition that the aspiration for a Jewish homeland is rooted in a tragic history that cannot be denied.

Around the world, the Jewish people were persecuted for centuries, and anti-Semitism in Europe culminated in an unprecedented Holocaust. Tomorrow, I will visit Buchenwald, which was part of a network of camps where Jews were enslaved, tortured, shot and gassed to death by the Third Reich. Six million Jews were killed -- more than the entire Jewish population of Israel today. Denying that fact is baseless, it is ignorant, and it is hateful. Threatening Israel with destruction - or repeating vile stereotypes about Jews -- is deeply wrong, and only serves to evoke in the minds of Israelis this most painful of memories while preventing the peace that the people of this region deserve.

On the other hand, it is also undeniable that the Palestinian people -- Muslims and Christians -- have suffered in pursuit of a homeland. For more than 60 years they've endured the pain of dislocation. Many wait in refugee camps in the West Bank, Gaza, and neighboring lands for a life of peace and security that they have never been able to lead. They endure the daily humiliations -- large and small -- that come with occupation. So let there be no doubt: The

situation for the Palestinian people is intolerable. And America will not turn our backs on the legitimate Palestinian aspiration for dignity, opportunity, and a state of their own.

For decades then, there has been a stalemate: two peoples with legitimate aspirations, each with a painful history that makes compromise elusive. It's easy to point fingers -- for Palestinians to point to the displacement brought about by Israel's founding, and for Israelis to point to the constant hostility and attacks throughout its history from within its borders as well as beyond. But if we see this conflict only from one side or the other, then we will be blind to the truth: The only resolution is for the aspirations of both sides to be met through two states, where Israelis and Palestinians each live in peace and security.

That is in Israel's interest, Palestine's interest, America's interest, and the world's interest. And that is why I intend to personally pursue this outcome with all the patience and dedication that the task requires. The obligations -- the obligations that the parties have agreed to under the road map are clear. For peace to come, it is time for them -- and all of us -- to live up to our responsibilities.

Palestinians must abandon violence. Resistance through violence and killing is wrong and it does not succeed. For centuries, black people in America suffered the lash of the whip as slaves and the humiliation of segregation. But it was not violence that won full and equal rights. It was a peaceful and determined insistence upon the ideals at the center of America's founding. This same story can be told by people from South Africa to South Asia; from Eastern Europe to Indonesia. It's a story with a simple truth: that violence is a dead end. It is a sign neither of courage nor power to shoot rockets at sleeping children, or to blow up old women on a bus. That's not how moral authority is claimed; that's how it is surrendered.

Now is the time for Palestinians to focus on what they can build. The Palestinian Authority must develop its capacity to govern, with institutions that serve the needs of its people. Hamas does have support among some Palestinians, but they also have to recognize they have responsibilities. To play a role in fulfilling Palestinian aspirations, to unify the Palestinian people, Hamas must put an end to violence, recognize past agreements, recognize Israel's right to exist.

At the same time, Israelis must acknowledge that just as Israel's right to exist cannot be denied, neither can Palestine's. The United States does not accept the legitimacy of continued Israeli settlements. This construction violates previous agreements and undermines efforts to achieve peace. It is time for these settlements to stop.

And Israel must also live up to its obligation to ensure that Palestinians can live and work and develop their society. Just as it devastates Palestinian families, the continuing humanitarian crisis in Gaza does not serve Israel's security; neither does the continuing lack of opportunity in the West Bank. Progress in the daily lives of the Palestinian people must be a critical part of a road to peace, and Israel must take concrete steps to enable such progress.

And finally, the Arab states must recognize that the Arab Peace Initiative was an important beginning, but not the end of their responsibilities. The Arab-Israeli conflict should no longer be

used to distract the people of Arab nations from other problems. Instead, it must be a cause for action to help the Palestinian people develop the institutions that will sustain their state, to recognize Israel's legitimacy, and to choose progress over a self-defeating focus on the past.

America will align our policies with those who pursue peace, and we will say in public what we say in private to Israelis and Palestinians and Arabs. We cannot impose peace. But privately, many Muslims recognize that Israel will not go away. Likewise, many Israelis recognize the need for a Palestinian state. It is time for us to act on what everyone knows to be true.

Too many tears have been shed. Too much blood has been shed. All of us have a responsibility to work for the day when the mothers of Israelis and Palestinians can see their children grow up without fear; when the Holy Land of the three great faiths is the place of peace that God intended it to be; when Jerusalem is a secure and lasting home for Jews and Christians and Muslims, and a place for all of the children of Abraham to mingle peacefully together as in the story of Israel as in the story of Israel, when Moses, Jesus, and Mohammed, peace be upon them, joined in prayer.

The third source of tension is our shared interest in the rights and responsibilities of nations on nuclear weapons.

This issue has been a source of tension between the United States and the Islamic Republic of Iran. For many years, Iran has defined itself in part by its opposition to my country, and there is in fact a tumultuous history between us. In the middle of the Cold War, the United States played a role in the overthrow of a democratically elected Iranian government. Since the Islamic Revolution, Iran has played a role in acts of hostage-taking and violence against U.S. troops and civilians. This history is well known. Rather than remain trapped in the past, I've made it clear to Iran's leaders and people that my country is prepared to move forward. The question now is not what Iran is against, but rather what future it wants to build.

I recognize it will be hard to overcome decades of mistrust, but we will proceed with courage, rectitude, and resolve. There will be many issues to discuss between our two countries, and we are willing to move forward without preconditions on the basis of mutual respect. But it is clear to all concerned that when it comes to nuclear weapons, we have reached a decisive point. This is not simply about America's interests. It's about preventing a nuclear arms race in the Middle East that could lead this region and the world down a hugely dangerous path.

I understand those who protest that some countries have weapons that others do not. No single nation should pick and choose which nation holds nuclear weapons. And that's why I strongly reaffirmed America's commitment to seek a world in which no nations hold nuclear weapons. And any nation -- including Iran -- should have the right to access peaceful nuclear power if it complies with its responsibilities under the nuclear Non-Proliferation Treaty. That commitment is at the core of the treaty, and it must be kept for all who fully abide by it. And I'm hopeful that all countries in the region can share in this goal.

The fourth issue that I will address is democracy.

I know -- I know there has been controversy about the promotion of democracy in recent years, and much of this controversy is connected to the war in Iraq. So let me be clear: No system of government can or should be imposed by one nation on any other.

That does not lessen my commitment, however, to governments that reflect the will of the people. Each nation gives life to this principle in its own way, grounded in the traditions of its own people. America does not presume to know what is best for everyone, just as we would not presume to pick the outcome of a peaceful election. But I do have an unyielding belief that all people yearn for certain things: the ability to speak your mind and have a say in how you are governed; confidence in the rule of law and the equal administration of justice; government that is transparent and doesn't steal from the people; the freedom to live as you choose. These are not just American ideas; they are human rights. And that is why we will support them everywhere.

Now, there is no straight line to realize this promise. But this much is clear: Governments that protect these rights are ultimately more stable, successful and secure. Suppressing ideas never succeeds in making them go away. America respects the right of all peaceful and law-abiding voices to be heard around the world, even if we disagree with them. And we will welcome all elected, peaceful governments -- provided they govern with respect for all their people.

This last point is important because there are some who advocate for democracy only when they're out of power; once in power, they are ruthless in suppressing the rights of others. So no matter where it takes hold, government of the people and by the people sets a single standard for all who would hold power: You must maintain your power through consent, not coercion; you must respect the rights of minorities, and participate with a spirit of tolerance and compromise; you must place the interests of your people and the legitimate workings of the political process above your party. Without these ingredients, elections alone do not make true democracy.

The fifth issue that we must address together is religious freedom.

Islam has a proud tradition of tolerance. We see it in the history of Andalusia and Cordoba during the Inquisition. I saw it firsthand as a child in Indonesia, where devout Christians worshiped freely in an overwhelmingly Muslim country. That is the spirit we need today. People in every country should be free to choose and live their faith based upon the persuasion of the mind and the heart and the soul. This tolerance is essential for religion to thrive, but it's being challenged in many different ways.

Among some Muslims, there's a disturbing tendency to measure one's own faith by the rejection of somebody else's faith. The richness of religious diversity must be upheld -- whether it is for Maronites in Lebanon or the Copts in Egypt. And if we are being honest, fault lines must be closed among Muslims, as well, as the divisions between Sunni and Shia have led to tragic violence, particularly in Iraq.

Freedom of religion is central to the ability of peoples to live together. We must always examine the ways in which we protect it. For instance, in the United States, rules on charitable giving have made it harder for Muslims to fulfill their religious obligation. That's why I'm committed to working with American Muslims to ensure that they can fulfill zakat.

Likewise, it is important for Western countries to avoid impeding Muslim citizens from practicing religion as they see fit -- for instance, by dictating what clothes a Muslim woman should wear. We can't disguise hostility towards any religion behind the pretence of liberalism.

In fact, faith should bring us together. And that's why we're forging service projects in America to bring together Christians, Muslims, and Jews. That's why we welcome efforts like Saudi Arabian King Abdullah's interfaith dialogue and Turkey's leadership in the Alliance of Civilizations. Around the world, we can turn dialogue into interfaith service, so bridges between peoples lead to action -- whether it is combating malaria in Africa, or providing relief after a natural disaster.

The sixth issue -- the sixth issue that I want to address is women's rights. I know -- I know -- and you can tell from this audience, that there is a healthy debate about this issue. I reject the view of some in the West that a woman who chooses to cover her hair is somehow less equal, but I do believe that a woman who is denied an education is denied equality. And it is no coincidence that countries where women are well educated are far more likely to be prosperous.

Now, let me be clear: Issues of women's equality are by no means simply an issue for Islam. In Turkey, Pakistan, Bangladesh, Indonesia, we've seen Muslim-majority countries elect a woman to lead. Meanwhile, the struggle for women's equality continues in many aspects of American life, and in countries around the world.

I am convinced that our daughters can contribute just as much to society as our sons. Our common prosperity will be advanced by allowing all humanity -- men and women -- to reach their full potential. I do not believe that women must make the same choices as men in order to be equal, and I respect those women who choose to live their lives in traditional roles. But it should be their choice. And that is why the United States will partner with any Muslim-majority country to support expanded literacy for girls, and to help young women pursue employment through micro-financing that helps people live their dreams.

Finally, I want to discuss economic development and opportunity.

I know that for many, the face of globalization is contradictory. The Internet and television can bring knowledge and information, but also offensive sexuality and mindless violence into the home. Trade can bring new wealth and opportunities, but also huge disruptions and change in communities. In all nations -- including America -- this change can bring fear. Fear that because of modernity we lose control over our economic choices, our politics, and most importantly our identities -- those things we most cherish about our communities, our families, our traditions, and our faith.

But I also know that human progress cannot be denied. There need not be contradictions between development and tradition. Countries like Japan and South Korea grew their economies enormously while maintaining distinct cultures. The same is true for the astonishing progress within Muslim-majority countries from Kuala Lumpur to Dubai. In ancient times and in our times, Muslim communities have been at the forefront of innovation and education.

And this is important because no development strategy can be based only upon what comes out of the ground, nor can it be sustained while young people are out of work. Many Gulf States have enjoyed great wealth as a consequence of oil, and some are beginning to focus it on broader development. But all of us must recognize that education and innovation will be the currency of the 21st century and in too many Muslim communities, there remains underinvestment in these areas. I'm emphasizing such investment within my own country. And while America in the past has focused on oil and gas when it comes to this part of the world, we now seek a broader engagement.

On education, we will expand exchange programs, and increase scholarships, like the one that brought my father to America. At the same time, we will encourage more Americans to study in Muslim communities. And we will match promising Muslim students with internships in America; invest in online learning for teachers and children around the world; and create a new online network, so a young person in Kansas can communicate instantly with a young person in Cairo.

On economic development, we will create a new corps of business volunteers to partner with counterparts in Muslim-majority countries. And I will host a Summit on Entrepreneurship this year to identify how we can deepen ties between business leaders, foundations and social entrepreneurs in the United States and Muslim communities around the world.

On science and technology, we will launch a new fund to support technological development in Muslim-majority countries, and to help transfer ideas to the marketplace so they can create more jobs. We'll open centers of scientific excellence in Africa, the Middle East and Southeast Asia, and appoint new science envoys to collaborate on programs that develop new sources of energy, create green jobs, digitize records, clean water, grow new crops. On science and technology, we will launch a new fund to support technological development in Muslim-majority countries, and to help transfer ideas to the marketplace so they can create more jobs. We'll open centers of scientific excellence in Africa, the Middle East and Southeast Asia, and appoint new science envoys to collaborate on programs that develop new sources of energy, create green jobs, digitize records, clean water, grow new crops. Today I'm announcing a new global effort with the Organization of the Islamic Conference to eradicate polio. And we will also expand partnerships with Muslim communities to promote child and maternal health.

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All these things must be done in partnership. Americans are ready to join with citizens and governments; community organizations, religious leaders, and businesses in Muslim communities around the world to help our people pursue a better life.

The issues that I have described will not be easy to address. But we have a responsibility to join together on behalf of the world that we seek -- a world where extremists no longer threaten our people, and American troops have come home; a world where Israelis and Palestinians are each secure in a state of their own, and nuclear energy is used for peaceful purposes; a world where governments serve their citizens, and the rights of all God's children are respected. Those are mutual interests. That is the world we seek. But we can only achieve it together.

I know there are many -- Muslim and non-Muslim -- who question whether we can forge this new beginning. Some are eager to stoke the flames of division, and to stand in the way of progress. Some suggest that it isn't worth the effort -- that we are fated to disagree, and civilizations are doomed to clash. Many more are simply skeptical that real change can occur. There's so much fear, so much mistrust that has built up over the years. But if we choose to be bound by the past, we will never move forward. And I want to particularly say this to young people of every faith, in every country -- you, more than anyone, have the ability to reimagine the world, to remake this world.

All of us share this world for but a brief moment in time. The question is whether we spend that time focused on what pushes us apart, or whether we commit ourselves to an effort -- a sustained effort -- to find common ground, to focus on the future we seek for our children, and to respect the dignity of all human beings.

It's easier to start wars than to end them. It's easier to blame others than to look inward. It's easier to see what is different about someone than to find the things we share. But we should choose the right path, not just the easy path. There's one rule that lies at the heart of every religion -- that we do unto others as we would have them do unto us. This truth transcends nations and peoples -- a belief that isn't new; that isn't black or white or brown; that isn't Christian or Muslim or Jew. It's a belief that pulsed in the cradle of civilization, and that still beats in the hearts of billions around the world. It's a faith in other people, and it's what brought me here today.

We have the power to make the world we seek, but only if we have the courage to make a new beginning, keeping in mind what has been written.

The Holy Koran tells us: "O mankind! We have created you male and a female; and we have made you into nations and tribes so that you may know one another."

The Talmud tells us: "The whole of the Torah is for the purpose of promoting peace."

The Holy Bible tells us: "Blessed are the peacemakers, for they shall be called sons of God."

The people of the world can live together in peace. We know that is God's vision. Now that must be our work here on Earth.

Thank you. And may God's peace be upon you. Thank you very much. Thank you.