



ORGANIZATIONAL UNIT PROPOSAL FORM

DIRECTIONS: *Use this form when proposing a new organizational unit, center, institute, department, school, or college.*

DATE OF REQUEST: 4/14/14

Date of AAC Approval:

April 17, 2014

INSTITUTION: Desert Research Institute

NAME OF PROPOSED UNIT: Center for International Water and Sustainability (CIWAS)

Date of Board Approval:

DATE OF IMPLEMENTATION: June 6, 2014

PART 1

A. Action requested

DRI seeks approval to establish the Center for International Water and Sustainability (CIWAS).

B. Brief description and purpose of proposed unit

CIWAS was created through a \$500K grant from the Conrad N. Hilton Foundation. The purpose of the Center within the Desert Research Institute (DRI) is to address gaps in knowledge, research, and human resource capacity that persist in developing countries and assist in reducing health related issues and design of sustainable water, sanitation, and hygiene (WASH) programs. Offering efficient and positive WASH solutions can be done through effective use of technology by raising awareness through media coverage, using the latest methods and equipment, and the transference of knowledge and information through short courses and workshops. The Center will focus on the knowledge and research gaps that exist on a global scale. CIWAS is one manifestation of various current and incipient initiatives to promote research related to water.

C. Outline plans for the success of the proposed unit

The grant from the Hilton Foundation will be used to provide support for CIWAS personnel to expand existing programs (e.g., the very successful West Africa Water Initiative (WAWI) supported by the Hilton Foundation and World Vision) and to seek new funding opportunities. The continuation of DRI's involvement in West Africa and the likely expansion of DRI's work in East and Southern Africa, Mexico, and India will provide a solid base from which to develop large sustainable programs. DRI is working with Global Impact, a nonprofit organization that raises funds for humanitarian needs around the world, to initiate a charitable giving campaign to support CIWAS activities. Recently DRI assumed the role as the headquarters for the University WASH (water, sanitation, and health) Consortium, a group of US academic institutions focusing on WASH issues. This role greatly enhances our worldwide visibility and will aid with developing partnerships for future programs.

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PART II

A. Mission statement

The vision of CIWAS is to grow DRI's capacity to provide both information and the technical capacity to governmental and non-governmental organizations working to identify and solve problems related to human health and management of environmental resources, especially water.

B. Goals and objectives

i. Teaching

The Center will undertake capacity building activities on water and environmental management issues focused specifically on challenges in the developing world. This will be accomplished by offering short courses and workshops that will be conducted both in country and at DRI in Reno, NV. Additionally, we will seek to develop semester-long graduate and under-graduate courses that could be offered at the University of Nevada, Reno focusing on the needs of students and professionals wishing to work in the international development sector.

ii. Research

The Center will engage in interdisciplinary, applied environmental research focused on addressing WASH issues specific to developing countries. Not just focusing on water, DRI research will be directed toward topics including climate change, desertification, especially in West Africa, and WASH programming. Dr. Braimah Apambire will be in charge of enhancing integrated water resources management (IWRM) activities for all developing countries, mainly water-stressed countries in developing nations around the world. DRI will collaborate with UNR to develop programs with African universities to build up capacity, as well as explore existing networks for African WASH NGO's. DRI will identify areas for capacity building and knowledge management. DRI has a successful history of developing long-term, well-funded research programs.

iii. Service

The Center will develop and disseminate relevant information to enhance human development and environmental science in developing countries. This will be done by developing web-based catalogs of publications that range in topics from emergency response to climate change. Furthermore, DRI will disseminate guidelines on best practices created from work done in developing countries. A final objective is to provide consulting services to funders, including the Hilton Foundation, and international NGO's on the technical aspect of WASH interventions. DRI will provide advice on areas to invest in the water sector and on the design of future water initiatives.

C. Major participants or collaborators

i. Internal to campus

Faculty within DRI's three Divisions and four Interdisciplinary Centers will support CIWAS activities on an as needed basis.

ii. External to campus

Conrad N. Hilton Foundation, Addis Ababa University, Coastal Salinity Prevention Cell, Drexel University, The Maharaja Sayajirao University of Baroda, Student Association for International Water Issues (SAIWI), University for Developmental Studies Northern Ghana, University of North Carolina Water Institute, University of Oklahoma Water Center, U.S. Water Partnership,

World Vision, WASH Advocates, Water, Engineering and Development Centre (WEDC), World Health Organization - Household Water Treatment & Safe Storage, Africa Grantmakers' Affinity Group, Cisco Foundation, Gates Foundation, Global Environment and Technology Foundation (GETF), Global Water Partnership, Howard G. Buffett Foundation, IRC - International Water and Sanitation Centre, Pacific Institute, Rockefeller Foundation, Rural Water Supply Network (RWSN), Skoll Foundation, Skoll Global Threats Fund, SustainableWASH.org, UNESCO - Water, USAID, WASHfunders, WHO/UNICEF JMP, World Bank.

D. Evidence of contact within and between affected academic units

The proposed center builds on existing research programs and collaborations such as the WAWI program supported by the Hilton Foundation and World Vision. This long term study has involved researchers across DRI, along with students performing their research at DRI but receiving their degrees from UNR.

E. Proposed physical location

Desert Research Institute, 2215 Raggio Parkway, Reno, Nevada 89512-1095.

F. Proposed organizational structure (include organizational structure within the campus)

Dr. Braimah Apambire will serve as the CIWAS Director. Additional DRI faculty will support the program on an as needed basis.

G. Activities to be sponsored (e.g. courses, seminars, research, and outreach) – indicate if courses or seminars will be offered through the proposed unit. Please specify if they will be offered for academic credit and applicable to a degree program. Give estimated enrollment.

DRI will collaborate with UNR to develop programs with African universities to build up capacity. Collaborative courses on water and environmental management issues focused specifically on challenges in the developing world will be developed. Seminars detailing CIWAS activities will be presented on a routine basis at DRI as part of the VPR's Environmental Seminar Series.

H. Resource Analysis – source of funds necessary for the proposed change (enrollment-generated state funds, reallocation of existing funds, grants, other state funds)

The \$500K grant from the Conrad N. Hilton Foundation will provide the primary initial source of funding.

I. Projected Budget – identify portions of costs which will require state resources, grants, gifts and/or contracts

No state resources will be required. In addition to the Hilton Foundation support, current research funding (e.g. WAWI) and internal DRI funds will be applied as needed.

Please attach any supporting documentation (i.e. support letters from community, industry).



Center for International Water and Sustainability (CIWAS)

***“WASH Capacity Building, Action Research & Information
Dissemination in Developing Countries”***

Background and Projects

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April 2014

1. Background, Issue and Need

Developing countries today face significant obstacles in achieving goals related to improved health and socioeconomic benefits while trying to sustainably manage environmental resources, especially water. Though organizations (governmental and non-governmental) are working to improve human health and provide basic services while managing environmental resources, approximately 740 million people (11% of the world population) do not have access to improved water sources and more than 2.5 billion people (37% of the world population) live without basic sanitation. Contaminated water and poor sanitation contribute to 88% of all diseases in the developing world (WHO/UNICEF, 2004). In many cases, these illnesses have serious health effects such as reduced mental capacity, stunted physical growth and physical disability, internal organ damage, and premature death (UNDP, 2006; UNICEF, 2005). It is estimated more than 5,000 children die every day from poor hygiene practices, contaminated drinking water and poor sanitation (UNICEF, 2004). Besides human health, unsafe water and poor sanitation impact educational outcomes, productivity, and overall costs, essentially keeping developing nations from developing.

Factors such as increasing population, poor water quality, and global climate change pose new constraints to sustainable development. It is becoming increasingly critical to bridge gaps between scientific research and applied problem-solving in the context of developing nations to ensure that optimal solutions are discovered and applied. By 2025, it is estimated that more than 2.8 billion people, 35% of the world's projected population, will live in 48 countries facing water stress or water scarcity. If safe water cannot be sustained, community members may return to traditional non-potable supplies, and human health and socioeconomic benefits will be lost.

Insufficient human resource capacity across disciplines related to WASH continues to be a barrier to effective and sustainable service provision. At the 2012 World Water Week conference, András Szöllösi-Nagy of the UNESCO-IHE Institute for Water Education said, "Africa has the technology and the money to implement commitments on water and sanitation but clearly doesn't have the capacity." In Africa, as in other regions, there are large, experienced international, regional and national non-governmental organizations (NGOs) in the WASH field, but there are a very limited number of local/in-country NGOs with the necessary technical capacity to deliver positive WASH solutions (CAP-WASH, 2012). Local NGOs in Africa still require significant support and technical assistance to improve their capabilities in sustainable, state-of-the-art, locally tailored WASH approaches (CAP-WASH, 2012).

Against this background DRI, with seed funding from the Conrad N. Hilton Foundation, recently created the Center for International Water and Sustainability (CIWAS - <http://www.dri.edu/ciwas>). The goal of CIWAS is to capitalize on DRI's expertise in environmental sciences to conduct interdisciplinary research, and provide both information and technical capacity to universities, governmental and non-governmental organizations working to identify and solve problems related to human health and management of environmental resources.

Disciplines will range from water availability to air quality, directly addressing the human resources deficit related to development of water supply and management of resources in developing countries. The use of modern technology in addressing WASH issues through more efficient and effective feedback and monitoring will be explored. Transferring this knowledge to organizations providing water could, ultimately, allow them to provide more water in less time at reduced cost.

2. Objectives

The main objectives of this Center are to:

1. **Undertake capacity building activities on sustainable WASH services and environmental management issues focused specifically on challenges in the developing world:** Short courses and training workshops on WASH and environmental management are being conducted both in-country and at DRI in Reno, Nevada. The Center is leading DRI's efforts to build the capacity of in-country project staff in water resources development, database acquisition and management, water quality management, long-term sustainability monitoring and evaluation, advocacy and water policy. DRI is developing joint programs with African universities with the goal of building capacity in areas including faculty and curriculum development in WASH. This includes faculty and student exchanges between DRI, the University of Nevada, Reno and African universities.
2. **Engage in interdisciplinary, applied environmental research focused on addressing WASH issues specific to developing countries:** Many of the problems faced by developing countries are not exclusively limited to water and sanitation and will require researchers from a variety of disciplines. DRI research includes but is not limited to the following focal areas: climate change, desertification, especially in West Africa, WASH programming, Integrated Water Resources Management, water quality, and environmental health. Research will be directed toward the study of all of these aspects as they relate to services for developing countries.
3. **Develop and disseminate relevant information to enhance human development and environmental science in developing countries:** DRI will build and maintain a web-based catalog of publications on subjects ranging from emergency response to natural and man-made disasters, sustainable development, and climate change with an emphasis on WASH and environmental research in developing countries. DRI will disseminate to the professional community and general public guidelines on best practices and case studies from its work in developing countries. DRI is collaborating with organizations such as WASH Advocates that share common goals to advocate, raise awareness and increase media coverage of WASH issues in developing countries while addressing some of the major health, environmental, and development problems caused by poor water quality, sanitation, and hygiene.
4. **Provide consulting services international NGOs and funders, including the Hilton Foundation, on the technical aspects of WASH interventions:** To expand on its long-standing relationship with the Hilton Foundation, DRI will provide advice to funders and

international NGOs on areas to invest in the WASH sector and on design of future WASH initiatives.

3. Capability Statement of DRI

The Desert Research Institute (DRI) is the environmental research institution of the Nevada System of Higher Education. DRI conducts innovative applied research in air, land and life, and water across Nevada, the United States, and every continent. DRI excels in basic and applied research and the application of technologies to improve the effective management of natural resources; and aspires to be a leader in investigating the effects of natural and human-induced environmental change and in advancing environmental technologies aimed at assessing a changing planet, promoting preservation of diverse ecosystems, advancing responsible resource management, and improving human health and welfare. To meet the specific objectives of varying applications, DRI scientists use a variety of tools for environmental measurements, modeling, and data analysis which include advanced instrumentation for field and laboratory measurements, computer and physical modeling, statistical methods, and GIS-based systems. The results of our work, as reported in peer-reviewed literature, gray-literature reports, and technical and community presentations provide improved fundamental understanding of environmental problems, support policy and decision making, and identify and quantify environmental impacts of natural and anthropogenic processes.

Through grants from the Conrad N. Hilton Foundation, DRI has been involved in providing technical capacity building to water project staff in West Africa since 1991 in 1) the use of appropriate groundwater exploration methods and techniques to increase the success rate of water well drilling; 2) water quality analysis and interpretation of results; 3) investigation of the use of local geomaterials to treat contaminated water; 4) assistance with the development and use of hydrogeological and water quality data management systems; and 5) the training of staff through short courses and hands on experience at DRI, and graduate degree programs at the University of Nevada, Reno. In Ghana and Mali, DRI has conducted watershed studies to evaluate the sustainability of water resources. The Sahel region of West Africa is undergoing desertification and this, combined with increasing water demands in rural parts of these countries, makes knowing the sustainable available water resources of this area critical.

In the US, DRI has conducted numerous watershed studies, including research in the Lake Tahoe watershed, and the Walker and Carson River basins. Knowledge and experiences gained from these studies are directly applicable to the developing world.

4. CIWAS Current and Planned Projects

1) DRI, University of Development Studies and World Vision Program

DRI has partnered with the University for Development Studies (UDS) in Ghana and international NGO World Visions to establish a Water, Sanitation and Hygiene (WASH) Center at the UDS. (<http://www.dri.edu/news/4544-dri-expands-research-and-education-opportunities-in-west-africa>). The goal of the Center is to address gaps in WASH knowledge, conduct action

research on WASH and collaborate with stakeholders in the sector to find sustainable solutions to WASH challenges confronting West Africa

Key activities will include:

- Capacity building on sustainable WASH services and environmental management issues focused specifically on challenges in Ghana and other countries in West Africa
- Developing and running of academic degree programmes for middle and high-level personnel in the WASH sector in Ghana and other countries in West Africa. Semester-long WASH courses at both the graduate and undergraduate levels will also be offered through the University of Nevada, Reno (UNR) in collaboration with DRI. Students taking these courses and members of the UNR Students Association of International Water Issues will benefit from this collaboration with UDS and World Vision.
- Provide support to the UNR Students Association for International Water Issues (SAIWI), which Dr. Apambire founded in 2000.
- Conduct basic and applied research specific to issues affecting developing countries
- Facilitate faculty and student exchange programs and internships
- Run short courses on WASH for NGO and government staff
- Develop appropriate and affordable WASH technologies for rural communities
- Collaborate with other stakeholders in the West Africa WASH sector to execute WASH projects in rural communities
- Document and disseminate WASH learnings and best practices

The WASH Center will benefit a wide range of institutions and individuals in Ghana and the West Africa sub region. The action research that will be conducted through the Center will lead to pragmatic and sustainable solutions of issues in the WASH sector specific to the region. The results will be widely disseminated through publication in scientific and academic journals, seminars and workshops to further inform. The short courses and long-term academic programmes to be run at the Center will address the persistent shortfalls in human capacity in the WASH sector by building a local base of middle and high-level expertise in the region. Projects developed and executed in collaboration with other WASH sector players in Ghana and throughout the region will enhance the socioeconomic development of rural communities.

In the long-term, the establishment of a WASH Center will help to reduce preventable mortality and morbidity among the rural and urban poor, and to minimize negative impacts on the local environment including fresh water. Maximum benefit from the WASH interventions that will be developed by the Center can only be achieved, however, if communities and individuals are made aware of the links between hygiene practices, poor sanitation, polluted water sources and disease. Hence vigorous community outreach and public education through behavior change communication strategies will be pursued in conjunction with other activities.

2) The U.S. Universities WASH Consortium

The U.S. Universities WASH Consortium was founded by university faculty and researchers in 2009 to address the WASH-related human resource capacity challenges central to achieving the Millennium Development Goals for safe water access and sanitation in developing countries.

The goal of the Consortium is to improve communication and coordination among U.S. universities engaged in overseas research and outreach on WASH issues. Consortium members identified several ways in which U.S. universities already contribute to the international WASH agenda: carrying out research on WASH challenges in developing countries; training and building the capacity of students in the U.S and abroad; developing objective measures to assist governments and NGOs setting priorities for WASH programs; contributing to the development and refinement of tools for monitoring and evaluating project progress and sustainability; and developing and testing innovative water and sanitation treatment and delivery technologies.

Starting in October 2012, WASH Advocates began researching potential hosts for the Consortium. Ten options were identified including a revolving secretariat. Based on the findings of the research including interviews with Consortium members and potential hosts, WASH Advocates recommended the Desert Research Institute's new Center for International Water and Sustainability under the leadership of Dr. Apambire.

Key Activities

- Conduct a gap analysis of African universities followed by a meeting of key US and African universities as part of WASH sector meeting in Europe of Africa to identify needs and possible solutions to resolve human resource capacity issues in the West Africa region...
- Develop and administer short courses to address identified human resource capacity gaps
- Coordinate and support global capacity building efforts in African universities currently underway
- Compile a list of university faculty with WASH technical and regional expertise
- Create a fundraising strategy for the Consortium and coordinate grant opportunities on behalf of and in coordination with Consortium members
- Launch a new website as well as various social media platforms including Twitter, Facebook, etc. to promote the Consortium and provide updates on activities and accomplishments.

Education and research programs of Consortium members will provide information for evidence-based advocacy and effective WASH programming, and empower governments and other stakeholders in communities and countries of greatest need to achieve universal access to safe, affordable and sustainable drinking water, sanitation and hygiene.

3) The International Circuit Rider Program

DRI is host of the International Circuit Rider Program (ICRSP) which provides assistance to non-governmental organizations and local governments who provide long-term, regular support to help communities sustain their drinking water, sanitation and hygiene systems. 20-50 percentage of the water and sanitation systems built around the world are not functioning within one to three years of completion and donors and institutions are paying increasing attention to the long-term sustainability of small water infrastructure programs. They recognize the need for community leaders, local governments, and NGOs to collaborate and contribute to funding needs to ensure long term sustainability and maximum public health benefits.

The CRP is an example of one methodology being used in Central America to address long-term sustainability issues of water and sanitation systems. The framework was introduced in the United States in 1976 under the National Rural Water Association. It was intended as a way of enforcing the Safe Drinking Water Act of 1974 and bringing safe drinking water to rural communities of 10,000 people or fewer. The program continues to be an effective way to train local water supply technicians as well as troubleshoot and solve problems that are beyond the capacity of smaller communities to handle. The CRP model has subsequently spread to Canada, Honduras, Guatemala, El Salvador, Belize, Haiti, Nicaragua, and Costa Rica, as a way of ensuring the sustainability of clean water projects (Akvo, 2013).

DRI will be developing a Train-the-Trainer (TtT) program to assist indigenous NGOs and local authorities (municipalities and associations) to set up technical assistance programs using CRP methodology. Erick Toledo, a program manager, who has several years of experience working with the CRP in Latin America, has been hired at DRI to take the lead in implementing the TtT Program.

Key Activities

- Conduct a landscape assessment of the WASH sector to assemble a body of knowledge about the CRP.
- Identify criteria to evaluate CRP successes and failures, full costing of the CRPs, business plans and roles and responsibilities of key stakeholders.
- Conduct an assessment of other sustainability programs, especially in Africa, to determine how to incorporate the Circuit Rider concept into these frameworks.
- Identify potential countries where the CRP could be implemented or expanded
- Based on information gathered above, develop criteria for ideal hosting organizations, including surveying potential organizations (governmental and non-governmental) that might be interested in adapting this methodology into their programs.
- Collect and analyze training materials and develop TtT curricula.
- Provide technical assistance on how to create monitoring, evaluation and resolution systems
- Define ultimate goals and measurements of success.
- Sketch a plan to implement the TtT Program that captures lessons learned and actual costs of the CRPs.
- Upload all CRP documentation to the DRI-CIWAS webpage

The ICRP has a proven track record of success in certain local geographic areas. The idea of broad partnerships, shared expenses and development of diverse income streams, and helping organizations to create their own CRPs gives this program the best chance to grow and benefit communities all over the world. With the WASH sector's strong interest in sustainability and donors' new requirements that WASH programs have long-term sustainability plans built into programs; the CRP is needed now more than ever.

4) DRI, Drexel University and World Vision Program

A partnership between DRI, Drexel University and World Vision will be established to provide technical and software capacity building support to World Vision field staff to assist and assist with implementation of their 2010-2016 WASH strategic plan. The plan calls for implementation of large-scale WASH projects in 10 countries. The most significant challenge to World Vision's WASH programming across Africa is hiring and retaining the necessary highly qualified and motivated technical staff to fully achieve the goals and outcomes of this new strategic plan, World Vision will need to hire over 200 staff with expertise in WASH, as well as program monitoring and evaluation. In addition, World Vision also plans to hire 225 staff members next year, including 55 technical, 150 community, and 80 project management and support staff members, all of whom will need training in WASH sector best practices. As most World Vision staff members are in-country nationals this training is particularly critical to prepare them to interact effectively with the international WASH sector.

Capacity building and action research topics will include:

- Introduction and overview of WASH sector
- Field methods class on hydrogeology, terrain evaluation, remote sensing, geophysics, water quality, GIS, etc.
- Training course or degree program on hydrogeology, water quality, engineering or other technical aspects of water, sanitation and the environment
- Training or course on the health aspects of WASH
- Training or course on the Social and software aspects of WASH
- Training or course on cross-sector issues such as gender, environment, desertification, small-holder irrigation, multiple water uses, etc.
- Monitoring, evaluation, Learning and Sustainability
- Project design and management for WASH managers and leaders (including procurement and contracting)

Joint certificate and degree programs for World Vision will be run jointly by DRI, Drexel University, UNR and universities in the respective World Vision countries. This will allow staff to travel to the US to take some classes at Drexel and UNR, and be co-supervised by faculty at DRI and Drexel. The DRI, University for Development Studies and World Vision's collaborative WASH Center at UDS will serve as a hub for World Vision staff taking these capacity building programs in Ghana and throughout West Africa.

Key Activities

- Meetings with World Vision's leadership team, major donors, staff of World Vision learning Centers and WASH program staff members.
- Participation in World Vision's Africa WASH forum to present and obtain feedback on our program.
- Review of reports and documents including grant proposals, progress reports, M&E documents, and existing or proposed WASH standards and indicators to refine mission and objectives of the program.

- Situation analysis of World Vision programs, including interviews and administering of questionnaire to key personnel and a review of existing capacity building and research programs and challenges.
- Literature review and sectoral-leader interviews, including. Current WASH sector capacity building programs and indicators and M&E methodologies undertaken by donors, non-profits, and governments.
- Identification of appropriate areas for capacity building, research and knowledge management.
- Develop curriculum and offer workshops and courses
- Develop action research projects
- Develop and share lessons and best practices

This proposed program will place a priority on mentoring and capacity building for World Vision field staff to identify and solve problems related to the organization's WASH strategy with the overall goal of improving child well-being. The program will result in the development of competency-based training that will provide an opportunity for World Vision field staff to improve performance and meet the needs for expertise working on complex WASH projects with far-reaching impacts across sectors, including education, health and nutrition, and livelihood security. The long-term objective and outcome of this program is to train and build the skills and expertise of at least 200 World Vision staff to improve the efficacy of World Vision's WASH programming, a cornerstone of the overall World Vision strategy.

5) Action Research on Long-term Sustainability of Coastal Watersheds in the State of Gujarat, India

India's huge and growing population puts a severe strain on the country's natural resources, especially water. Declining ground water levels and increasing groundwater salinity caused by over extraction are significant factors in India as well. Water is the most limiting resource in the State of Gujarat, and it is expected to become more limited in the future. Increasing human pressure and agricultural use require a more thorough understanding of the hydrogeology of the area. DRI is designing an interdisciplinary research program with Indian researchers to work collaboratively to gain a better understanding of the groundwater salinity problems in the State of Gujarat. The overall goal of this program will be to develop an integrated water resources management (IWRM) framework to guide the long-term use of water resources, policy formulation, awareness raising, capacity building and financial instruments in the Netravati, Bhuj, and Kodinar watersheds.

Key activities

- Conduct a literature review of research, including but not limited to geologic, hydrogeologic, geochemical, isotopic, socio-economic, and cultural topic areas.
- Data collection and water sampling
- Data analyses, interpretation and modeling

The proposed research will help determine how effective the barriers to seawater intrusion and groundwater recharge structures being constructed for the Coastal Salinity Program are for reducing the salinity of ground water in the area. Results from the research will serve as a predictive tool for evaluating the type and amount of water use in the area, which will have extensive societal impacts in Gujarat by allowing better management of water resources. This project will ultimately help solve the needs and health problems of people in the State.

6) Development and Dissemination of Information

CIWAS is in the process of building and maintaining a web-based catalogue of publications on subjects ranging from emergency response to natural and man-made disasters, sustainable development, and climate change with an emphasis on water and environmental research in developing countries. These resources will be useful to DRI faculty in creating proposals, students working on international research projects, and most importantly the international WASH community. CIWAS will also share relevant information through social media outlets such as Facebook and Twitter.

CIWAS will disseminate to the professional community and general public guidelines on best practices and case studies from its work in developing countries. We will network with agencies that share common goals to advocate for WASH issues and increase media coverage in developing countries while addressing some of the major health, environmental, and development problems caused by poor water quality, sanitation, and hygiene.

DRI will work with WASH advocates in Washington, DC and other advocacy groups to help share information from its research programs with policy makers. This evidence-based advocacy will heighten the awareness of the water crisis in in the world and lead to more efficient use of water resources in the watersheds.

8) Water Forever Program, Mexico: Collaboration between Alternativas and DRI

The Alternativas y Procesos de Participación Social A.C. (*Alternativas*), a Mexican non-governmental organization, and DRI are in discussions to establish a partnership to address water and environmental issues in the Mixteca-Popoloca region of southern Mexico. The Mixteca-Popoloca region is an isolated, semi-arid mountainous area inhabited by more than one million people, mostly from indigenous ethnic groups. The region is one of Mexico's poorest and most marginalized zones – suffering from water scarcity, severe erosion, and diminishing natural resources. Alternativas is focused on improving water security and regeneration of watersheds in this region under an initiative called the Water Forever Program. The program is implemented using an integrated water resources management (IWRM) framework, employing appropriate technologies designed to recharge aquifers and regenerate watersheds, train local community members, and coordinate the organized participation of communities in the design of waterworks. The program also includes developing and disseminating relevant educational materials, most notably through Alternativas' Water Museum, which promotes IWRM in semi-arid environments.

Key Activities

- **Artificial recharge:** Since its formation, Alternativas has worked in 35 micro watersheds within two large river basins (Atoyac and Papaloapan Rivers) which drain toward the Pacific Ocean and Gulf of Mexico, respectively. DRI will help Alternativas evaluate natural recharge in these micro-watersheds and identify effective ways of conducting artificial groundwater recharge in the aquifers.
- **Biodiversity enrichment through watershed regeneration:** Alternativas has measured water storage, vegetation mass, and vegetation coverage in watersheds where the Water Forever Program is implemented. Preliminary measurements indicate that groundwater recharge has increased in watersheds in which recharge structures have been built. This has corresponded to increased vegetation growth as well as added diversity in algae, frogs, insects, reptiles, birds, and mammals in the program areas. DRI will use its expertise in remote sensing to measure these changes and quantify the impact of the program on biodiversity. DRI geological and biological scientists work on landform changes and the manner in which biota and ecosystems interact with the environment and how they respond to environmental change in diverse environments. These scientists will participate in this research.
- **Climate change, biodiversity, and land degradation:** DRI will contribute to the understanding of the processes associated with land degradation as well as in developing strategies to mitigate them in Mexico.
- **Small-scale irrigation:** Alternativas has helped community members form cooperatives that cultivate, process, and export a drought resistant and highly nutritious crop, amaranth. There is potential to increase the cultivated area of the crop, but lack of water has hampered this expansion. Alternativas seeks to conduct studies to understand the water consumption patterns of amaranth and introduce small-scale, water efficient technologies to increase its cultivation. DRI will assist Alternativas in these studies and introduce low-cost, small-scale irrigation technologies that use minimum quantities of water. We anticipate that this program will be of great interest in arid areas where farmers are being organized into cooperatives and can be taught best farming practices and business skills.
- **Rainwater catchment and storage:** Alternativas is interested in expanding its rainwater catchment systems in project areas in order to increase water storage and interfacial recharge in the watersheds. DRI will help to determine optimal sites for these catchment systems.
- **Capacity building:** DRI will help build the capacity of Alternativas staff members on natural resource management and water issues.

9) DRI and One Drop Foundation Burkina Faso partnership

DRI and One Drop Foundation have engaged in discussions to establish a partnership which would support One Drop's ongoing programming in Burkina Faso. One Drop's project is co-funded by the Conrad N. Hilton Foundation and is implemented in Comoé Watershed in the western part of the country. The region has long been the country's agricultural engine, generating 80% of Burkina Faso's cotton and 46% of its grain production. The arrival of various industries to the area, the massive westward migration of the country's population in recent

decades and the increased pressure on natural resources have contributed to the exhaustion of water resources and to environmental degradation. SOSUCO, a sugar cane plantation has profoundly modified the socio-economic and physical environment of the region through the high number of people it employs and the huge quantities water, fertilizers and pesticides it uses for irrigation. The health of the ecosystem has also declined due to climate change, increased evapotranspiration, decreased rainfall, drought, soil degradation.

Over 50% of the population in the region either take water from nearby contaminated streams or walk for two to three hours each day to collect water from a well, since there is no source of water near their home. The project seeks to improve access to WASH services as well as water for livelihood activities, specifically for small-scale agricultural production. The objectives of the project include:

Objective 1: Contribute to improving the preservation and the management of natural resources, especially water resources, in the regional sub watersheds.

Objective 2: Improve access to safe drinking and production water and access to sanitation for people living in the intervention zone while reinforcing local management capacities for these services, knowledge of good hygiene practices, and rational use of water resources for production.

Objective 3: Strengthen the capacities for communal stakeholders in the intervention zone and at the regional sub watersheds to play an important role and take responsibility for local water services and sanitation, as well as produce an integrated water management plan.

Objective 4: Educate and mobilize the local population about efficient water use and management.

Objective 5: Develop a microcredit component to offer a means to improve the economic condition and offer subsistence for poor families in rural areas.

10) DRI and Addis Ababa University Ethiopian Rift Valley (MERV) Project

The Ethiopian Rift Valley is characterized by many perennial rivers, and a chain of lakes that vary in size, and hydrological and hydro geological settings. The water resources of the Rift lakes are one of the focal points for large-scale development in Ethiopia over the last few decades. All development activities are around the scarce and fragile water bodies. Some of the lakes and their influent rivers are used for irrigation, soda abstraction, fish farming and recreation, and also support a wide variety of endemic birds and wild animals. Ethiopia's major mechanized irrigation farms and commercial fishery are confined within the Rift region. A few of the lakes have shrunk in surface area because of excessive water abstractions, while others have expanded because of increased surface run-off and groundwater inflows from percolated irrigation water. Excessive land degradation, deforestation and over-irrigation have changed the hydrological setting of a few Rift lakes. Human activities, in combination with changes in climate and geology, have influenced the hydrological setting and the water quality of the lakes, with the salinity and major ion composition may change dramatically if proper use, management and planning are instituted. Tourism has also significantly increased in the recent past due to several recreational developments along the lake shores due to the highly attractive

climate of the Main Ethiopian Rift Valley. Without water of sufficient quantity and acceptable quality, sustainable socio-economic development of the area is unlikely.

The Addis Ababa University in Ethiopia is currently undertaking a multi-disciplinary research program in the area with the aim of developing a water resources management and sustainable utilization framework to successfully improve people's livelihood and the aquatic environment. The objectives of the research project

- 1) Build a water quality risk map considering various uses
- 2) Model the water resources availability in relation to its quality in the Rift Valley of Ethiopia
- 3) Investigate the application of conjunctive water use for optimal utilization of the available resources
- 4) Optimize the use of available water resources
- 6) Assess and monitor physico-chemical quality of water bodies and investigate the responses of primary producers to its deterioration and their potential for bio-remediation
- 7) Introduce and enhance cage and pond culture fisheries in Ethiopia that help mitigate the food insecurity problem in the country and raise the income of the poor farmers and fishermen and at the same time assess the potential impact of cage and pond cultures on the fish the aquatic environment
- 8) Study the taxonomy, distribution and ecological role of macrophytes in the rift valley lakes
- 9) Investigate the influence of water quality on the use of water for various uses
- 10) Use the above results in building a comprehensive framework for the sustainable management and utilization of water resources in the Rift Valley of Ethiopia.

The university has some funding to implement this project and is currently in discussions with DRI to jointly fundraise for collaborative programming in the Rift Valley. Four faculty members of DRI are drafting a concept paper elaborating on the proposed partnership with Addis Ababa University.

5. Implementation and Funding of CIWAS Projects

An overall fund-raising strategy is being developed to support on-going and proposed projects under CIWAS. Potential fundraising collaborators include World Vision, Global Impact, Sir Ratan Tata Trust, and One Drop. There are also plans to seek funding from foundations whose strategic priorities align with CIWAS proposed projects. Once a potential funding source is identified for a particular project, appropriate DRI faculty and partners will develop a detailed proposal, workplan and budget for that specific funding target. DRI will leverage these funds through responding to RFPs from the U.S. government, international organizations and other donor agencies.