SAVANA: Implementation and Evolution of an International Research and Education Consortium

By R J Swap, S C Walther and H J Annegarn

Researchers at the University of Virginia (UVA) have created a new educational consortium, the Southern African Virginia Networks and Associations (SAVANA). SAVANA was envisioned as a framework among partner institutions in the U.S. and southern Africa, designed to facilitate research, education and outreach activities related to the environment. All SAVANA initiatives require each institutional partner to be involved from the outset, ensuring that financial and intellectual benefits accrue both to US and to African partners.

SAVANA has arranged a variety of activities based on the three major principles of the consortium: relationship, respect and reciprocity. These activities have included distance-learning, Summer Study Abroad courses, January Term Intensive preparatory courses, semester exchanges, graduate level fellowships, and year abroad teaching fellowships. Students from the U.S. and Africa are involved jointly in interdisciplinary projects within local communities and workplaces and share travel and living experiences.

The scientific foci of SAVANA include regional responses to global environmental change and sustainability, systematic responses to environmental change at the state level and the translation of scientific research to policy. The inter-disciplinary activities of the SAVANA consortium have expanded to incorporate human systems, livelihoods and community health to better understand regional environments.

A cornerstone consortium activity at UVA is hosting students and faculty from partnering institutions. Graduate students and faculty from our partnering institutions have been hosted in "sandwich programs" in which students remain registered at their home institutions but spend up to 18 months at UVA. Likewise, southern African institutions have hosted U.S. students and faculty at their campuses.

Other formal components of the academic program have included a month-long study abroad course called "People, Culture, and the Environment of Southern Africa." This course was developed as an intensive introduction to the complexity of human-environmental interaction in southern Africa. The course takes approximately 15 U.S. and 5 regional students through urban and rural engagements within the Limpopo River catchment from its headwaters (Johannesburg) to the sea (Mozambique).

Central to the success of the program, and consistent with the SAVANA philosophy, is the involvement of southern African lecturers and students in the course as full-time participants. Living and travelling together provides U.S. and African students with an intensive learning experience beyond what is possible in formal learning settings. The course has been offered for six years, with over 80 U.S. and 20 southern African student participants.

At UVA, an intersession January-term course entitled "Ethics, Protocols, and Practices of International Research" has also been developed to prepare students for international research experience. Over the past three years, 55 U.S. students and 18 southern African colleagues have participated in this course.

SAVANA partners include Eduardo Mondlane University, Mozambique; University of Witwatersrand, South Africa; University of Botswana, Botswana; University of Venda, South Africa; and University of Virginia, Charlottesville.

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Water and Health in Limpopo Province, South Africa:
A Collaborative Effort of the University of Venda and the University of Virginia

Our universities have convened a dynamic team of faculty and students from relevant disciplines to develop a life cycle approach to improving water, sanitation and health in a developing community in Limpopo province.

The Limpopo Province, in northeast South Africa, shares borders with Botswana, Mozambique, and Zimbabwe. Statistics South Africa (2002) reports that the Limpopo province is one of the country's poorest, with over 60% of the population living below the poverty line. This province, like many impoverished areas, is heavily burdened by disease. Nearly 20% of the population is infected with HIV. In addition, water-borne diseases are rampant. Limpopo province has the highest prevalence of childhood diarrhea in South Africa. Diarrheal disease is second only to HIV as a cause of death in the province. A contributor to the heavy toll of diarrheal disease is the fact that about 90% of the province's population lives in rural areas with limited access to potable water and sanitation. Community leaders in Limpopo Province identify poor access to water as their number one concern.

Our project, **Water and Health in Limpopo Province,** seeks to address this concern and builds on 7 years of existing relationships with the University of Venda. The relationships have grown through the work of the Southern Africa Virginia Networks and Associations (SAVANA), the University of Venda faculty who have trained as fellows at UVa with CGH sponsorship, and UVa students' projects in the Venda region.

This new initiative capitalizes on our close relationships and combines the resources of our two universities to work with a community in need. We are bringing together, for the first time, faculty and students from environmental science, medicine, engineering, anthropology, nursing, and environmental planning to address the paramount issue in Limpopo Province, improving access to clean water and sanitation.

Through this initiative, we will develop appropriate interventions and build needed capacity to increase access to safe water and sanitation in a specific community. In

addition, we will rigorously monitor our progress by measuring the initiative's impact on the community's health and well-being, with a special focus on children.

In addition to the impact on the partner community, we hope to extend this project as a model strategy for improving access to water and sanitation *and* ameliorating health outcomes. There are relatively few reports that specifically link water and sanitation interventions to health outcomes. This scientific evidence base is needed to support advocacy and change regionally. This project will not only develop a replicable model for university and community engagement to improve access to water and sanitation but will also help provide the evidence base to catalyze action in the region and beyond.

Water and Health in Limpopo Project Lift-Off: May 2008

We launched the initiative in late May 2008 with a workshop in Limpopo that brought together faculty and students from the University of Virginia and the University of Venda, community leaders, non-governmental organizations, and government officials. During the workshop, we collaboratively defined research questions and protocols for ethical engagement. We also traveled to potential partner communities to assess need and opportunities for impact.

By the end of the workshop, we had defined the following schedule of activities:

Phase One -- Assessment: Work with partner community to define the problem and evaluate what aspects can or should be addressed? (12-18 months: 2008-09)

Phase Two -- Solution Design(s): Determine availability of existing data? What technologies exist and might be appropriate? What are existing community practices regarding water and sanitation? What is the governance structure? What education is needed? What could be the evaluation metrics to measure success? (1 year: 2009-10)

Phase Three -- Implementation: Design and implement the necessary technology, provide and foster community and regulator education, review and possibly develop regulations, determine and provide voluntary incentives. (12-18 months: 2009-2011)

Phase Four -- Evaluation: is it (the program, technology) working, does it require fixing, improvement or change? Evaluate again and again. (on-going)

A Life Cycle Approach to Improving Water, Sanitation and Health in Developing Communities

Phase Five – Dissemination: Based on above phases, create a model process and research framework and share with other villages, the government, scholars, other regions and other countries. (on-going)

Planned Activities (Activities in Blue already completed or in process) for first three years of Water and Health in Limpopo Province

Year One (2008-2009)

- Preparatory small group trip to South Africa in late spring 2008.
- Develop joint UVa/Univen strategic plan and timeline for the program (via email and phone conferencing).
- Convene workshop in South Africa with UVa and Univen faculty and students to plan strategies for site selection, sampling, data collection, and assessment of health outcomes and community engagement.
- Identify criteria for community site selection, e.g., existing problems, feasibility of water and health data collection, and interest in participating.

- Develop selection process for UVa and Univen student scholars.
- Identify Venda-based coordinator to handle in-region project logistics.
- Faculty lead teams to develop research plan for individual research questions.
- "Photovoice project" to promote community engagement with presentation of community members photo documentary at the UNIVEN museum in fall 2008.
- Develop unified data collection system.
- Identify and purchase equipment needed for assessment phase.
- Follow-up workshop to launch data collection in fall 2008.
- Co-develop 2009 J-term and/or summer study abroad course (funded by student tuition) on methods for conducting research on water resources, sanitation systems, and health outcomes, while engaging the community. (To be held at UVa with Univen partners.)
- Select project scholars for summer 2009: 4 UVa students and 4 Univen students.
- Pursue additional funding sources for implementation phase.

Year Two (2009-2010)

- Faculty travel with student scholars to Venda in summer 2009 to continue data collection, begin analysis, and pilot interventions
- Provide UVa/Univen faculty mentoring for student project participants.
- Report and evaluate student summer projects and progress made on overall plan.
- Integrate project research and contacts with Venda students into existing global health-related courses such as Swap's EVSC 461/ANTH 461: People, Culture and Environment of Southern Africa, Firehock's PLAC 556/LAR 528: Green Cities: Green

Sites, and Louis' SYS 670 Environmental Systems Management, and SYS 782 Ethics Education for Scientists and Engineers in Emerging and Developmental Technologies. The project will also encourage integration with Venda courses.

- Pursue additional funds to support the implementation of the strategies designed by the project.
- Select Year Three student scholars.
- Propose 2010 J-term course for in-region implementation of interventions.

Year Three (2010-2011)

- Faculty travel with student scholars to Venda in summer 2010 to evaluate and refine pilot interventions, continue water surveys, continue measuring health outcomes, and report back to community.
- Dissemination of model for community engagement around water issues to relevant stakeholders.
- Reporting on monitoring of health outcomes to relevant stakeholders.
- Development of recommendations for policy-makers.
- J-term course in January 2011 to evaluate project and discuss next steps (self-funded).
- Seek additional funds to carry out interventions.

University of Virginia
Center for Water, Health, Environment, and Development (WHEAD)

Sustaining Access to Safe Water and Health in Communities

August 2008

1.0 INTRODUCTION

The University of Virginia's Center for Water, Health, Environment, and Development (WHEAD) is a dedicated group of faculty and students conducting research on building local capacity to provide access to safe water and sanitation services, and improve human health outcomes in developing communities. WHEAD has a special emphasis on Africa, and is partnered by the University of Venda in South Africa in pursuing this emphasis. The group has the diverse set of skills in Engineering, Medicine, Public Health, Environmental Sciences, Environmental Planning, Economics, and History that are required to craft effective, sustained solutions to this important global problem. The practical experience gained as WHEAD develops local solutions in Africa is transferable to similarly affected developing communities across the world. WHEAD works through long term relationships of trust with educational institutions, community organizations, and government offices in the host countries. These include the Ministry for Social Development and Rabat University in Morocco, Yaoundé Polytechnic Institute in Cameroon, and University of Venda in South Africa.

2.0 PROBLEM DESCRIPTION

There are 1.2 billion people that lack access to clean water for drinking and personal hygiene, and 2.4 billion that lack access to basic sanitation for defecation and other human waste. This reality contributes to elevated rates of mortality and morbidity among the affected populations, including the deaths of 1.8 million people annually (WHO, 2004) most of whom are children under 5 years of age. The situation is worst in Africa, Asia, and Latin America and the Caribbean. Asia has the largest number of people without access to water and sanitation services (WASAN), and Africa has the highest percentage of population without access.

Increased access to safe water and sanitation services can reduce the burden of disease in these developing regions of the world. For instance, it is estimated that access to clean water for hand-washing could reduce the incidence of diarrheal illness by 44%. In addition to improvements in human health, investing in the infrastructure to deliver sustained access to adequate levels and quality of service also produces significant economic, social, and environmental benefits. The World Bank (2003) reports that the return on investment on water and sanitation infrastructure projects ranges from $3 to $34 per dollar invested. Poor countries with access to improved water supplies for the majority of their citizens experience an average annual growth of GDP of 3.7% compared to 0.1% for countries that do not provide access to safe water and sanitation services. Furthermore, increased access to safe water supplies increases the productivity of communities by 50 – 90%, with a significant component of this increase coming from relieving women and girls of the task of fetching water for several hours per day. Finally,

increased access to safe water and sanitation—including separate, private toilets for girls at school—increases school attendance for girls and boys by 30% (UN-Water, 2005).

WHEAD Goals

1. To develop new approaches, systems, and technologies to reduce the incidence and impacts of water and sanitation (WASAN) related diseases in developing communities. Developing communities are those that lack the capacity to provide sustained access to one or more basic human services (food, water, shelter, sanitation, household energy, and security) to their residents with local resources.
2. To develop methods to build local capacity to sustain widescale access to adequate WASAN services and reduced rates of WASAN—related diseases in developing communities.
3. To document, validate, and widely disseminate the methods developed for goals 1 and 2.

WHEAD achieves these goals through five objectives.

i. Firstly, WHEAD conducts research and outreach activities in affected communities in order to define the epidemiology of the links between access to WASAN and human health outcomes. This is a critical first step, because the strength and causality of the link between access to adequate WASAN services and health has not been established rigorously. It is essential to understand this linkage in order to craft efficient, effective interventions for improved access to WASAN services and community health.
ii. Secondly, in close consultation with local representatives, WHEAD works to develop appropriate, effective interventions to increase sustained access to WASAN services. Interventions include programs, plans, and coordinated actions within and outside affected communities..
iii. Thirdly, WHEAD develops appropriate and effective methods to monitor incidence and prevalence of WASAN-related diseases and other health outcomes in order to document improvement as access to WASAN services increases, and herald any evidence of compromises to the water supply or sanitation systems.
iv. Fourthly, WHEAD develops and documents successful approaches that yield improved, sustained access to WASAN services and community health driven by local resources.
v. Finally WHEAD disseminates its results. Regionally WHEAD uses the Each-One-Teach-Two (E1T2) commitment, which requires each community in WHEAD completes an intervention to teach its two neighboring communities the WHEAD method to resolve their problems with access to safe WASAN services and related community health. WHEAD will also publish its results in archival journals, host workshops at relevant professional conferences, and provide access to its findings on the WHEAD website.

3.0 NEEDS OF WHEAD

Until recently, WHEAD has been an informal association of UVA faculty and students working in developing communities worldwide. The Center for Global Health (CGH) has sustained its research, education, and outreach efforts since 2001, through broad-based

collaborations with partner institutions. Similarly, the sustainable infrastructure systems (SIS) program in SEAS, and the SAVANA program in Environmental Sciences have sponsored research projects and student exchanges since 1999. These projects have been offered on the basis of available funding through sponsored grants from agencies such as the National Science Foundation and the National Institutes of Health. The piecemeal, incremental nature of funding has prevented the investigators from the School of Engineering and Applied Science, the School of Medicine, the College of Arts and Sciences, and the School of Architecture from mounting a long-term, sustained, collaborative, systematic program to address the root causes of WASAN-related infectious diseases, and to build local capacity to eradicate these problems in a targeted set of communities. In order to make a more significant contribution, we have recognized that the WHEAD Center must be a formal organization within the University that integrates the efforts of faculty across the University into a focused program of research, education, community outreach, and knowledge dissemination to address the problems of WASAN-related infectious diseases and local capacity building in developing communities. The Center is actively seeking funding, technical expertise, computing, and other resources (research equipment, advisory board members) through partnerships with Industry, Foundations, Government Agencies, and partner academic institutions to sustain long term, comprehensive engagements with a selected set of developing communities. Currently WHEAD members have strong ongoing partnerships and projects in Cameroon, Brazil, Guatemala, Haiti, India, Indonesia; the Philippines; South Africa, and Trinidad and Tobago. In the US, there are project sites in Albemarle County, the City of Lynchburg, Nelson County, and the City of Norfolk, Virginia; as well as in the colonias areas of Las Cruces, New Mexico; El Paso, Texas, and across the Rio Grande in Ciudad Juarez, Mexico. WHEAD is developing its first model of regional community intervention in Limpopo South Africa through its partnership with the University of Venda. This will be the primary model for the interdisciplinary collaboration proposed to bring systems based solutions to the problems of WASAN-related infectious diseases and community development in developing countries. However, WHEAD faculty will continue their relationships with existing projects in the other locations listed, as these will be targets for dissemination of the lessons learned from the Limpopo region. These communities will also serve as controls to compare the effects of the interdisciplinary approach used in Limpopo to the discipline-driven approaches employed at the other sites.

In order to achieve its goals WHEAD has five critical needs:

i. Sustained funding for at least five years in order to become firmly established. During this period WHEAD will produce; demonstrated improvements in access to WASAN and human health services in Limpopo, graduates of the academic and community outreach programs both at Venda and at UVA, and scholarly dissemination of the program model and accomplishments that others can emulate. Our team has determined that the required funding to achieving the WHEAD goals viably is about $2.5mm uniformly spread over a five year period (~ $500K per year).
ii. An advisory board, consisting of members from academia, industry, government, the military, development funding organizations, and related grassroots organizations. This board will help to evaluate the research goals and objectives of the Center as

well as its performance in meeting those objectives. The advisory board will also assist the Center in securing funding, and in advertising the WHEAD program.

iii. Collateral and logistical support. These include computers, laboratory and field equipment and supplies, transportation for people and equipment between UVA and Venda, and on the ground at project sites, and assistance in the use of satellite imagery and mapping technologies in identifying and managing water, sanitation, and health hotspots at project sites.

iv. Liaison with national and state governments. WHEAD will need influential liaisons with the national government and affected local governments in the areas where it is working to maintain access to communities, and continue project activities.

v. External champions for WHEAD who provide the activity base and corresponding funding that serve as the catalyst for WHEAD. These members will be advocates and recruiters of other companies for WHEAD in their respective communities.

4.0 WHEAD Industry/University Cooperative Research Center

In pursuit of sustained funding for its activities, WHEAD is becoming a National Science Foundation (NSF) Center through its Industry/University Cooperative Research Centers (I/UCRCs) program. The I/UCRCs program *develops long-term partnerships among industry, academe, and government. The centers are catalyzed by a small investment from the National Science Foundation (NSF) and are primarily supported by center members, with NSF taking a supporting role in their development and evolution. I/UCRCs stimulate highly leveraged industry/university cooperation by focusing on fundamental research recommended by Industrial Advisory Boards* constituted from the industry members of each center. [NSF, 2008].

Industry, Foundations, and Governmental organizations can be members of the WHEAD Center. Under the guidelines from NSF, an I/UCRC must have a minimum of five members, each of whom pays $30,000 per year for a minimum of 3 years to participate in the Center. NSF will match this contribution with $50,000 per year for up to 10 years to provide sustained seed funding for the Center to become firmly established.

WHEAD is a dynamic initiative at the University of Virginia that invites the participation of industry, foundations, university, and government organizations as active members.

5.0 REFERENCES

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