

Passing on the Baton to Future Water Resources Scientists & Engineers in Developing Nations



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Abstract



'Education is important for the proper management of water resources in any nation, especially in developing nations that are faced with other equally important competing issues. In West Africa, as a developing region, in addition to other economic problems exists severe groundwater related issues. Working with students in those nations is one way of training qualified water professionals to manage water resources in developing nations. Some of these problems may stem from improper sewage and waste disposal due to lack of adequate structures. Also, in coastal regions, with indiscriminate well drilling, uncontrolled growth, and urbanization, water quality is a serious issue. During a rain event, a low-lying area was turned into a fast flowing river, carrying with it surface contaminants. In areas where water supply is not limited, for example in coastal regions in Nigeria, seawater intrusion is becoming a serious problem. Examples that qualified personal use include mentoring, teaching, and training, are presented below. Qualified personal embody the skills of mentoring, teaching, and training of local nationals.



Background Information:

Nigeria, with a fast growing population, when combined with China, and India, account for more than half of the world's population. Increase in population leads to increase in demand for water. Water resources need to be managed and trained personal are needed. Much time is spent looking for potable water in developing nations.



Problems:

"The current professionals are getting old and not many young people are coming to the hydrology profession.

Increase in demand and pressure on available water resources resulting from increase population.

Need to increase the number entering the water industries
A step in the direction to take young professionals under the wings of old timers

We need to train and pass on the baton to the future scientists and engineers!

Data not usually available to other professionals



Two young professionals from Covenant University in the field & Hands-on training around the campus and in the field

Approach:

Globalization...we now see how small the world is as areas once thought isolated is no longer true. What goes on in part A affects part B of the world.

Thinking and linking schools in the various hemisphere is one way of actualizing globalization.

Signing of memorandum of understanding (MOU) between Universities and colleges in developed nations with developing nations.

Mentoring young Professionals and students through research & training with some examples shown below

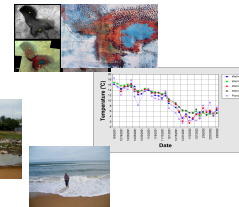


Faculty and students from University of Maiduguri



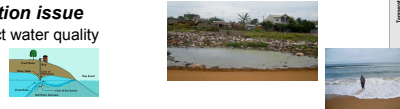
To the north, water shortage issue

Locating potable water sources...Shrinking Lake Chad as shown here
Use of resistivity meters
Use of equipment to collect water quality data... data shown to the right



To the South, more pollution issue

Waste disposal that could impact water quality
Sea water intrusion



Some training examples:

Use of simple and readily available materials
Identification of pollutants within the environment
Use of seepage meters
Use of shallow wells
Use of constructed wetlands seepage ...



Which way to go?

At a cross road

High Tech
Low Tech
Mixture?



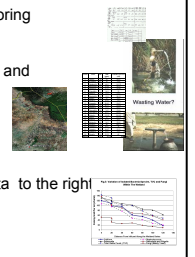
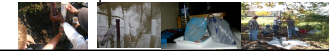
Results:

Student mentor are now professors, teaching and mentoring future professionals

To the right are two data sets (field note from Lake Chad and 'pure' water data from Lagos).

Working with locals to avoid wasting of water as shown by the uncapped tap waters to the right.

Use campus based wetland to treat waste water with data to the right! Education is important!



Possible Research Projects: In and around

Southern part of Nigeria
Land subsidence studies resulting from oil and gas, and mining
Geo-mechanical aspects of the subsurface for building activities, underground storage of oil and gas, and waste disposal sites.
Research towards more economical site investigation tools that are simple to operate. For example: shallow seismic, ground radar, remote sensing including laser and multi-spectral analysis
"Strength properties, time-dependency and weathering of soils & rocks
Geo-mechanical behavior of cemented soils and weak rock

Hazard and risk assessment for engineering structures in Nigeria

Research towards data processing and visualization tools of the subsurface for engineering works (two-and three-dimensional Geographical Information Systems)

Water resources issues: quantity and quality



Conclusion:

It's imperative to train the future scientist and engineers regarding water resources and management if we are to have trained scientists and engineers who will efficiently manage our water resources We must pass on the baton.

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