



WATER WORKS

Taking a Transdisciplinary Approach in Bangladesh

By MELISSA SMITH

Few countries are more affected by water than Bangladesh. Water flows through and around most of the country which is home to the Ganges-Brahmaputra river delta, the world's largest. Each year, the delta is filled with waters flowing downstream from the Himalayas, causing flooding over as much as 60% of the land, temporarily or sometimes permanently displacing thousands of citizens.

Cyclones regularly strike the coast, and rising sea levels threaten to displace even more of the 150 million residents who crowd one of the world's most densely populated countries. Surface water supplies carry diseases like dysentery, while the ground water is tainted with arsenic on a scale unheard of in other parts of the world. At the same time, the flooding that displaces so many of its citizens also sustains them. Bangladesh depends on the water from those floods to produce valuable crops for use within the country and for export.

It is into this complex environment that 17 faculty and students from Vanderbilt traveled as part of a course on water, culture and

social justice in Bangladesh. Steven Goodbred, associate professor of earth and environmental sciences; Jonathan Gilligan, research associate professor of earth and environmental sciences; and Brooke Ackerly, associate professor of political science led the trip. The group spent



nine days traveling throughout the country with faculty and students from Dhaka University in Bangladesh to learn how scientists and engineers can work better with social scientists to address environmental challenges.

The course provided a unique opportunity for students to work productively with colleagues in other fields, a skill that is particularly important in addressing issues like the ones facing Bangladesh. "You can't put a solely technical solution on a problem that is technical, political, and social," says Gilligan.

Ackerly expands on that notion, giving the example of well-building efforts. "An engineer may look at the lack of access to clean water and decide to build a communal well for the entire village. What the engineer might not realize is that in a culture like that of Bangladesh, it would be considered inappropriate for a woman to leave her house alone to go to town for the well. As women are the ones gathering the family's water, putting a well in the middle of town won't solve the problem. If, however, the engineer worked with a social scientist to first learn

more about the community, they could develop a solution that fits better with the way the people live.”

The majority of students traveling were graduate students in earth and environmental sciences (EES), but there were also students from civil engineering, anthropology, and education. Due to the diversity of backgrounds, everyone got something different from the trip. As Gilligan puts it, “There is no common experience except that we all went to the same places.”

For Kimberly Rogers, a Ph.D. candidate in EES and the teaching assistant for the course, the trip was the most recent of several she has made to Bangladesh. She blogs about the important difference between this trip and all the others, “The course and this trip are the first time I’m able to formally explore how the social constructs and customs impact the science.”

Mattox Hall, one of two undergraduates who participated in the trip, expresses similar feelings about the experience, “It was a research trip in name, but it was really so much more than that.” For Mattox, experiencing the chaos of the capital city and spending time with the students from the University of Dhaka were as important as learning about the environmental issues facing the country.

Throughout the trip, participants repeatedly commented on the overwhelming



Villagers doing laundry on the banks of the Jamuna River, near Sirajganj.

optimism of the people they met along the way. In the face of flooding, rising sea-levels, and shortages of clean water, the people of Bangladesh are quick to point out how far they’ve come in the last 30 years. Poverty and mortality rates have decreased significantly, and the GDP is increasing with the growing agricultural productivity. Bangladesh has also taken a proactive role in addressing the issues, with policies like the Flood Action Plan of 1990 which called for a flood control strategy to increase preparedness as well as make the most of the flood

waters for agricultural and other uses.

A transdisciplinary approach is necessary to tackle the complex environmental problems faced by countries around the world. Social scientists need to work alongside environmental scientists and engineers to tackle the problems faced by Bangladesh and other countries around the world. More importantly, the scientists need to work with the people who live there every day. “If there’s one universal research tool, it’s humility,” says Ackerly.

Propelled by hand in a traditional Bangladesh country boat, TIES participants are ferried to shore to explore a new island forming at the mouth of the Ganges-Brahmaputra river.



Transdisciplinary Initiative on Environmental Systems (TIES)

The Department of Civil and Environmental Engineering and Department of Earth and Environmental Sciences collaborated to create TIES, a program that involves faculty and students from the natural sciences, engineering, and key social disciplines, including the social sciences, the humanities, law, and education. The centerpiece of this initiative is a unique transdisciplinary course that focuses each year on an environmental issue that is of global significance, and which is embodied in a particular field site to be studied by participants. This capstone course is required of all environmental sciences Ph.D. students and includes a field study at the case site.