PROFILE

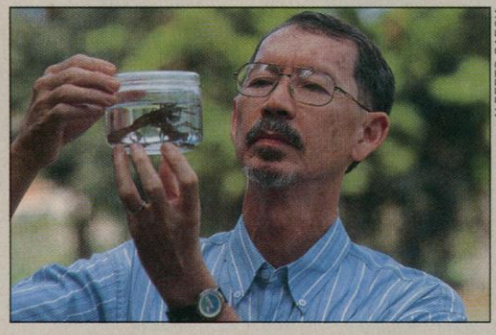
Making a Splash in Marine Science

MANILA, THE PHILIPPINES—Every new Ph.D. wants a challenge, but few get the kind of task handed to marine biologist Edgardo Gomez. Shortly after Gomez joined the University of the Philippines, Diliman, in 1974 after studying at the Scripps Institution of Oceanography in La Jolla, California, the school's vice president of academic affairs handed him a two-page charter for a new marine science center and told him to make it happen. "There was no space, no money, nothing," says Gomez, now 59. He set up labs in an abandoned botanic culture house and, as an early staffer recalls, "begged on his knees" for money to buy equipment.

The venture has come a long way since that inauspicious start. The Marine Science Institute (MSI) now has a 10,000-square-meter lab at Diliman, 100 staffers, and a research station on the South China Sea coast north of Manila. And its publication rate is the highest of any Philippine academic institute, averaging one international publication per faculty member per year. "He knows the science, and he has both the people skills and the political acumen to get the resources he needs," says Edward Murdy, a marine biologist at the U.S. National Science Foundation who worked at MSI in the late 1970s.

Gomez showed that savvy in 1995, when China built some observation structures on a few of the Spratly Islands, a group of coral reefs and rocky outcroppings in the South China Sea that are claimed by five nations, including the Philippines. Gomez used that territorial spat to gain government funding for a study of the links between the aquatic life on the reefs and the fisheries of the surrounding sea. "The most obvious thing that should be happening out there is marine scientific research," he told officials.

Those kinds of opportunities, he says, "provide an environment where [young researchers] can work." Helen Yap, for example, got her start at the institute in 1980 working on a coral reef study for her master's degree. At the time, says Yap, few department or institute heads in the Philippines could provide both a paying job and advanced training. And the institute preserved her slot when she went to Germany for her doctorate.



ALBERTO GARCIA

Making it happen. Edgardo Gomez has built up marine lab from scratch by focusing on research.

Gomez nearly missed his chance to start MSI. Unaware of the university's plans to start a marine science center, he was preparing to apply for an overseas postdoc until government sponsors urged him to come home. "In retrospect, [it's a] good thing that I did return," he says. "The planets and stars get aligned a certain way only once in a lifetime."

Scientists elsewhere have also benefited from that alignment. In the mid-1970s, Gomez and his team worked out a strategy to assess the condition of a coral reef, based on the percentage of cover that was living coral, that remains a major tool for coral reef assessment in the region. And William Newman, his thesis adviser at Scripps, credits Gomez for stimulating programs throughout the Pacific to rebuild giant clam stocks endangered by overfishing. "He's been a key person in getting that going," Newman says.

Gomez readily shares the spotlight with his staff. And he thinks they have only begun to make their mark. Tropical marine science is still a "wide-open field," he says. "If you have the right people with the right attitude, there is a lot you can do." –D.N.

and technology's share of undergraduates from a quarter to a third by 2000, as part of a near-doubling of overall enrollment in higher education in the next decade. Toward that end, it has opened 150 polytechnic institutions in the past 25 years.

Of course, the quality of that education is also a major concern. In Indonesia, nearly three-quarters of students in higher education attend private universities, which generally offer a less rigorous curriculum despite higher fees and better faculty salaries (see p. 1474). Officials in the Philippines are proud of the country's high rate of participation in tertiary education, but admit the level of instruction is uneven. "There are 100 engineering schools in the country graduating 20,000 engineers, but 90% of those would be only glorified technicians," says Roger Posadas, a physicist and the former head of the Diliman campus.

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No quick solutions. Roger Posadas wants higher standards for teachers.

The problem starts with poor secondary-level instruction, Posadas notes, particularly in science. A recent survey found only 4% of high school physics teachers had taken university-level physics. And there are no quick solutions. In-service training "is just a Band-Aid. The right approach would be to require a B.S. in physics for teaching high school physics," he says. "Unless we raise the standards for teachers, we can never raise the standards of education."

Linking up with research. The World Bank is funding a cluster of programs in Indonesia and elsewhere to improve the links between education and research. One, called DUE (Development of Undergraduate Education), is aimed at 17 second-tier Indonesian universities, says Makin, while a second, called QUE (Quality in Undergraduate Education), "is trying to meet the same goal for the top tier of universities." The oldest program, URGE (Unifying Research and Graduate Education), is a 5-year, multifaceted effort to beef up graduate education.

In addition to offering small and large grants based on rigorous peer review, URGE provides young scientists with starter grants, pays a bonus to first-time authors for publishing in international journals, and encourages student participation in research. Although the program runs for another year, World Bank and Indonesian government officials are already hatching plans for a successor that's likely to combine successful elements from all three programs.

"We're trying to change the system," admits Chris Smith, an educational consultant in the World Bank's Jakarta office. "We want to give young faculty, often returning from