

BOLD IDEAS: RESEARCH AT THE UNIVERSITY OF ARIZONA

Studying sustainability in a living laboratory

By Barbara Sparks

An ocean...a mangrove wetlands...a tropical rainforest...a savannah grass-land.... Where can you find all of these biomes and more under one roof – lodged in a facility that allows scientists to manipulate environmental variables in ways that are simply not possible anywhere else on Earth?

The answer is Biosphere 2 – the University of Arizona’s gleaming 3.14-acre facility in the Arizona desert. With 7.2 million cubic feet of sealed glass and 6,500 windows, Biosphere 2 provides UA scientists with a unique living laboratory to study some of the planet’s most critical issues – including landscape evolution, water, climate, energy, and sustainability.

The sealed facility empowers researchers to move beyond simply observing natural phenomena to controlling them. By manipulating variables such as temperature, precipitation, humidity and more, UA scientists explore environmental interrelationships and the impact of change within the ecosystem.

Biosphere 2 brings together a powerful, multidisciplinary team with expertise in hydrology, geology, geochemistry, ecology, biology, physics, engineering, and atmospheric sciences to tackle the problem of a sustaining a healthy planet.

Through robust outreach and education programs, it challenges and engages the next generation of environmental stewards – from grade school through graduate school.

No one knows for sure what tomorrow holds for Biosphere 1, our Planet Earth – but researchers at Biosphere 2 are working to make the planet’s future more sustainable and healthier for us all. *Edie Jarolim is a travel journalist who lives in Tucson, Arizona.*

Sustainability

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the future of our world

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Feeding a hungry planet

The Earth is home to almost 7 billion people, and half of them rely on rice for their survival. That half will double in size during the next quarter century.

That’s why Dr. Rod Wing is passionate about finding a better way to grow rice in inhospitable environments.

Dr. Wing is a professor in the UA Department of Plant Sciences and a member of its interdisciplinary BIOS Institute. He is the UA lead for the Functional Genomics, a collaboration between the University of Arizona and the Huazhong Agricultural University in Wuhan, China.

Dr. Wing is known internationally for his work in sequencing the genome of domesticated rice and corn. Now he and his collaborators are working to develop

a variety of “super rice.”

Their goal is to identify genes in wild rice that are linked to crop yield, drought tolerance, and resistance to pests, extreme temperatures, weeds, and pathogens. They will use these findings to develop a strain of domesticated rice that will grow in normally uncultivable conditions – both increasing the acreage that’s available for production and reducing the need for unhealthy pesticides.

Rice isn’t the only focus of BIOS research. Under the leadership of Dr. Fernando Martinez, UA scientists are working with international colleagues to find other ways to feed a hungry planet.

For example, through a \$1.3 million award from the Bill & Melinda Gates Foundation, UA researchers are leading an international team focusing on improving the cultivation of cassava.

Cassava is a root crop that is a primary food source for more than 750 million people. Each year, diseases result in the loss of nearly one-third of Africa’s harvest. The UA team is collaborating with researchers in East Africa to develop a more disease-resistant variety of this dietary staple.



UA Green Research at Biosphere 2 – learn or visit <http://mygal.com/b2wlr2>

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Ashley Wade and Maggie Heston, 16SPH1605, at Biosphere 2 monitor habitat conditions.

Courtesy of Joe Bellucci, UA Biosphere 2