SMALL COUNTRY: BIG AMBITIONS

ECUADOR'S AMBASSADOR TO CHINA, LEONARDO ARÍZAGA, TALKS ABOUT HIS GOVERNMENT'S EFFORTS TO REFORM THE CHAOTIC AND 'UNFAIR' UNIVERSITY SYSTEM THROUGH UNPRECEDENTED INVESTMENT IN SCIENTIFIC RESEARCH CAPACITY

Leonardo Arízaga is an arresting presence: standing tall on the stage of Tianjin's Great Hall during the ministerial session of the TWAS General Conference, dressed in a thick white cotton shirt, he looks more like a chef than a diplomat. But it soon becomes clear his relaxed, open manner goes hand in hand with a thorough knowledge of his subject, making him a compelling public speaker, a highly effective diplomat and a passionate advocat of his country's rapidly improving science and technology infrastructure.

Arízaga is unequivocal about the huge advances in S&T policy and investment Ecuador has made since Rafael Correa assumed the presidency in 2007. Advances which have been aided by substantial financial and advisory input from China, with whom Ecuador has developed strong diplomatic and business relations.

Ecuador, located in the north of South America, is an exceptionally beautiful country, bordered by Colombia to the north, Peru to the east and south, and by the Pacific Ocean to the west. The country straddles two hemispheres and its landscape includes both coastline and mountain ranges, as well as the spectacular Galápagos Islands, located in the Pacific, 1,000 km to the west, and home to unique species, including the marine iguana, giant tortoise and the world's only equatorial penguin. Indeed, Ecuador's varied geography and climate make it the country with the highest biodiversity per square metre in the world. In its 2008 constitution, Ecuador was the first country in the world to recognize legally enforceable 'Rights of Nature', or ecosystem rights, including the directive to "sustainably conserve and manage the natural heritage including its land and marine biodiversity which is considered a strategic sector."

But, aside from encouraging participants to visit his country and see for themselves, it is the healthy state of the Ecuadorian economy, and subsequent investment in scientific research, development and capacity building that Arízaga wants to impress on his audience: "I want to talk about what we are doing – not so much what we have done."

Ecuador is designated a developing country and remains on TWAS's list of 81 science and technologically lagging countries. But, to hear Arízaga talk about his government's latest plans, you wouldn't think so.

Ecuador has the same population as the city of Tianjin (14 million) and one million people have 'left poverty' in the last five years. Like most developing countries, Ecuador exports commodities, but has been

ARÍZAGA: ECUADOR'S AMBASSADOR TO CHINA

Though based in Beijing as the Ecuadorian ambassador to the People's Republic of China since November 2010, Arízaga has long played a key role in developing bilateral relations between Ecuador and other countries. He has worked for over 25 years in the foreign service, having graduated in that subject from Georgetown University, Washington DC, USA, and then obtaining the title of doctor in international relations from the Universidad Central del Ecuador. *Arízaga entered the Ecuadorian Ministry of Foreign Affairs in 1987, held various diplomatic positions in Ecuador and abroad (including Austria and Peru) and has been a representative of Ecuador for the United Nations Industrial Development Organization (UNIDO), the International Atomic Energy Agency (IAEA) and the United Nations office in Vienna. He also served as deputy secretary for bilateral relations in the Ministry of Foreign Affairs and Commerce from 2009 to 2010.*

Directly designated Ecuador's Ambassador to China by President Rafael Correa, Arízaga, on taking up the post, said that his main goal was "to deepen political and diplomatic relations, expand China's investment in strategic and production projects and increase Ecuadorian exports to China."

fortunate to include oil among them. The corresponding high earnings have boosted the economy. "We have not been affected so much by the economic crisis of 2008-9 and, anyway, we do a lot of business with China and India," confirms Arízaga.

Correa heads the government, based in the capital city of Quito, and research policies are managed by the National Secretary of Higher Education, Science and Technology (SENESCYT), with which Arízaga has close links.

"Even though we are a successful, middle income country, we want to change our development pattern and stop depending exclusively on oil and commodities, because we know they won't last forever. We need to transform the productive sector, and science and technology will play a very important role in this.

"Our economy is doing very well and growing – our gross domestic product (GDP), at USD4,000 per capita, is comparable to China's. We don't need financial help," he assures conference participants, "Ecuador can sustain itself. But if we don't invest in our best skills, if you don't bring your colleagues to our country to teach us what you have learned, we will get stuck. We will remain a middle income country with little possibility of changing."

Traditionally, Ecuador's productive sector has depended on adding value to primary resources, including wood products, and fresh, prepared food. In the secondary sector, this added value applies to clothing and shoes, pharmaceuticals, biochemistry, metal mechanics, petrochemistry and vehicles, (including motors, bodywork and parts). The tertiary sector instead has focused on such areas as tourism, environmental services, renewable energies, logistics, transportation and software.

The quite radical strategy that SENESCYT has developed is to transform the country's primary production sectors into secondary and tertiary sectors, such as medicines, vehicles and parts, and information and communication technologies (ICTs). But to do this means expanding scientific and technological research in the life sciences, in petrochemistry, in alternative energies and climate change, and in nano-science and ICTs.

The government is focusing on three main activities to achieve these goals: strengthening general education (which impressively "includes sending all our Eng-

lish teachers abroad to English-speaking countries"); nurturing talent; and strengthening public institutions.

'If we have a coherent policy structure, we can really improve academic levels", says Arízaga, "but we have had to make difficult decisions. For example, we closed down 14 universities in April this year because the academic level was too low."

In 2009, the Ministry of Higher Education, Science Technology and Innovation conducted an evaluation of the country's universities, grading them from A to E. Twenty-four were deemed unacceptable and were warned that they must improve or be shut down.

Indeed president Correa, a former university economics professor, is on record as saying that, "Ecuador probably has the worst universities" in South America. He coined the term 'garage universities' to describe the *ad hoc* private institutions cropping up all over the country to meet the demand for higher education, but without any system of quality control in place, with poor resources and training (often employing only part-time lecturers), but still managing to make a tidy profit. In addition, many students were selected on the basis of 'who they knew', while other students (especially those from the poorest backgrounds) were denied places.

Correa and his left-wing government place a high premium on academic excellence, rather than simply passing as many students as possible through the system. Ecuador's 'scholarship programme for excellence' to address the deficit in suitably trained professors is "unprecedented", says Arízaga. "The present government has awarded 20 times more scholarships than the last seven governments put together." This amounts to 1,702 scholarships to date with the goal fixed at 3,500 scholarships to be awarded by the end of 2012.

"We have selected the best 50 universities in world, and we are sending our best scholars to them, investing one billion dollars over a four year period, that's USD250-300 million per year. We will have 50 scholarships just for China, because we see how successful China has been in building up research capacity and converting research into marketable products. Because I live in Beijing, I have seen that first hand", he explains.

The government is also working on the 'pull factor', attracting professors and high-level researchers to Ecuador through competitive packages. "We have funds for up to 300 professors to visit our institutes and universities through the Prometheus scheme. They can stay from four months to two years." The aim is that they share their knowledge in targeted areas relevant to developing the economy, such as natural resources and renewable energies, health, agriculture fishing and biodiversity. The government provides a competitive stipend for those already with PhDs of USD6,000 per month, while junior scholars are offered USD4,000. Travel and medical insurance are all provided.

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While, in the long-term, these programmes will certainly have a major impact on Ecuador's scientific research capacity, the government's flagship project is the design and construction of an entire 'City of Knowledge', a purpose-built centre of academic excellence and a clear symbol to both national and potential international investors, that Ecuador's unprecedented investment in science and technology really means business. The city, called 'Yachay' from the native Quechuan verb 'to learn', is destined to be the first science and technology park in Latin America and it is clear that a great deal of Arízaga's efforts and hopes for the future prosperity of his country are invested in its successful development.

Yachay will be built in Urcuqui, located in the northern province of Imbabaura, close to four airports and spanning 4,270 hectares. Like other science and technology parks that have sprung up around the world (Arízaga cites among others, the City of Palo Alto in Silicon Valley, California, built as long ago as 1951, and *Daedeok Innopolis* built in South Korea in 1973), Yachay will include research centres, an information depository, a university, an agricultural technology development centre and a high-technology industrial park.

> ***Yachay, the City of Knowledge, will make the most of Ecuador's celebrated megadiversity.***

Unlike other science parks, however, Arízaga emphasizes that Yachay will make the most, both geographically and academically, of Ecuador's celebrated 'megadiversity', and that the project is based on socially and environmentally sustainable principles. In addition, cross-sector innovation will be encouraged with generous financial incentives.

Does Arízaga have any recommendations or advice for other developing countries wishing to invest in science and technology? He mentions the country's political stability since 2007 (whereas in the preceding decade, 7 presidents had taken office) and demonstrable economic growth as being fundamental in Ecuador's turnaround and key factors for China's continued investment – one of the highest investments China has made in any country, amounting (with loans included) to USD 5.3 billion.

"The good thing about working with China," says Arízaga, "is you can get things done very quickly. For example, we don't yet have a national science academy, so we have asked China to help us. We like the Chinese model. We will send professors to the Chinese Academy of Sciences (CAS) and they will receive our students. CAS will also help us draft the new curricula in nanoscience, for example."

Arízaga is certainly very good at public relations for his country, and is clearly proud of what his government has achieved. "It's easy to sit around and talk about the future," he muses, "but we can really see the results in the projects we have built and that gives me great satisfaction professionally and personally. I'm a diplomat, my father was a diplomat but I hope my son will learn in the City of Knowledge." ■