Research in Ecuador

Universities are squeezed

Quito, Ecuador

THE Galapagos Islands, long a symbol of ecological diversity and evolutionary theory, also symbolize the relative strength in Ecuador of the biological sciences, blessed both by rich natural resources on their doorstep and by government support.

Dr Tjtte de Vries, director of the biology department at Quito's Catholic University, manifests the optimism born of sufficient funds. Each of the three government agencies that support research supports one of his projects (in the highlands, the tropical rain forest and the Galapagos). Moreover, his grant from the Canadian Wildlife Service to study the effect of pesticides on the peregrine falcon exemplifies the flow of foreign aid into biological research in Ecuador. "If a scientist has the initiative", says Dr de Vries, "the money is there", both for equipment and the high logistic costs of working in the rainforest.

The most important governmental agency for university research is El Consejo Nacional de Universidades y Escuelas Politecnicas (CONUEP). Of the 7,000 million sucres (100 sucres=US\$1) distributed in 1985 from the Ministry of Finance to the 17 universities and polytechnics, 500 million sucres were assigned to research. Some research contract work is handled as well by El Consejo Nacional de Ciencia y Tecnologia (CONACYT), but research in the Galapagos is supported by the Charles Darwin Foundation, whose resources come from a mixture of government and foreign sources.

In 1984, CONUEP accepted 97 projects from 13 universities, out of 248 applications. There were as many applications in 1983, but only 25 were supported. Winning government aid depends on doing research in a priority area, as defined by El Consejo de Desarrollo (CONADE) in the National Development Plan 1984-88. Preference is given to projects in health and nutrition, agriculture and technology.

Researchers in Ecuador seem cheerfully to accept government-imposed directions for science. There is no secret about the priorities, which many feel are justified for Ecuador's development. For example, Dr Joan Llauger, head of the chemistry department at the Catholic University, shows no regret at leaving his speciality in metallurgy and concentrating on nutritional questions such as the oxidation of vegetable oil. The government has no history of giving funds to research, explained Mr Juan Maldonado, head of the Charles Darwin Foundation, so researchers have not yet come to consider such aid as their right rather than privilege.

Ninety per cent of government aid flows through the state universities, so the assets of the five private universities are particularly squeezed. Even in Dr de Vries' de-

partment, the highest degree offered is between a US bachelor's and master's. More infrastructure, says Dr de Vries, is necessary to reach international parity, primarily in libraries (the Catholic University cannot afford *Nature*), equipment, field stations and computer facilities. Fields dependent on expensive equipment, such as physics, are much harder hit. The physics department at the Catholic University only prepares teachers; it does no research. Dr Ernesto Cadena of that department says that even though a medical physics graduate programme has been started with foreign aid, there are not enough good physics teachers in high schools, no money for research laboratories, and few jobs for physicists in Ecuador.

Students interested in a higher degree are often encouraged to go abroad and then return to work. Dr de Vries, who is Dutch, came to Ecuador with UNESCO. Two members of his staff got doctorates in the United States, one in Germany, and another received a master's degree in Italy. Some of his students are on fellowship in Britain, the United States and Brazil.

The lack of tradition of research on an international level is the worst problem. Dr Llauger says he invites foreign professors to lecture and presents papers abroad every year, but that few of his colleagues (far fewer than in biology) do likewise. Few universities require publication from the professors.

The plethora of universities in such a small country is itself a doubtful boon. According to Dr Gonzalo Cevallos, who has taught economics at Quito's Central University and now works for the oil firm Intrade, the philosophy of free education has resulted in every town wanting a university. There are no entrance requirements, only a small percentage graduate, and few of these can find jobs.

"Ciencia aplicado" that augments the country's productivity is a clear government priority over basic research. Governmental entities perform much of this work, though, according to many, they are merely applying foreign techniques

rather than pursuing applied research. Funds from the state budget (for 1986, 201,000 million sucres) flow through the various ministries to institutes and government companies, which, says Dr Cevallos, do "research in brackets". INIAP, for example, is an institute under the Ministry of Agriculture that does plant research such as in cross breeding, and CEPE is an oil company controlled by the Ministry of Natural Resources and Energy. The military also has applied research arms: its Geographical Institute, for example, does topographical research, primarily mapping.

The techniques and equipment used by these institutes and companies, if not actually developed in Ecuador, are often the most advanced available. The Geographical Institute uses both US LANDSAT and French satellite facilities; the oil industry uses three-dimensional seismic technology; and the forestry department is importing a tissue culture laboratory to clone trees.

Oil and its byproducts are a primary source of funds for Ecuador's development. Because of its reliance on oil to support government projects and pay off foreign debt, Ecuador will not abide by OPEC's quota of 184,000 barrels/day and is instead nearing 300,000 barrels/day. Even in oil, says Dr Cevallos, it is more economic to use foreign techniques than to try to catch up to international levels of expertise.

Oil also helps to support the growing commitment in Ecuador to learning about the country's environment and how to use it wisely. According to Mr Maldonado, the government has accepted the foundation's advice on resource management, as evinced by an increase in support from an average of 70,000 sucres in 1964-66 to 10-15 million in 1966-85. Sixty wardens have been added to the national park system this year; the peasants are asking for reforestation projects; and a research station in the Amazon basin is studying how to raise alligators, fish and guinea pigs without destroying the forest. Ecuador and Costa Rica, says Dr Roque Sevilla, director of the National Forestry Programme, are the most advanced countries in this part of the world in terms of ecologically sound resource development.

Applied science is then, finally, paramount in Ecuador. That can be explained by the government's "practicality" and the need to spend money elsewhere.

There is another, darker possibility, however. Fear is spreading that the government, backed by banking and manufacturing interests, plans to strangle the universities, which are seen as catalysts of anti-government activity. One commentator says that recent increases in university research funds are nothing in the face of 35 per cent inflation: the government, a democracy only since 1979, "is out to crush the Left with no holds barred".

Elizabeth Collins