ATOMIC ENERGY IN LATIN AMERICA

Most countries in Latin America, including all those on the mainland, are Members of the Agency. Interest in the possibilities of nuclear energy has led to considerable activity, much of it in direct collaboration with the IAEA.

Member States in the region are:

Argentina
Bolivia
Brazil
Chile
Colombia
Costa Rica
Cuba
Dominican Republic
Ecuador
El Salvador
Guatemala
Haiti
Honduras
Jamaica
Mexico
Nicaragua
Panama
Paraguay
Peru
Uruguay
Venezuela

Of these, Argentina, Brazil, Colombia and Venezuela are operating, and Mexico and Uruguay are constructing, research reactors, while Chile and Peru are studying proposals. Argentina, Brazil, Mexico and Uruguay have all agreed to accept Agency safeguards for reactors. The possibility of future needs for nuclear power is under examination by several countries, in some cases being related to desalination of water.

All atomic work in Latin America is devoted to peaceful uses, and noteworthy progress has been made with proposals for a treaty which would make the whole region a militarily de-nuclearized zone. It is proposed that when this comes into effect the Agency will be asked to apply the controls developed in its safeguards system, and to carry out the inspections necessary to establish that work in progress is solely for peaceful purposes.

RESEARCH

Utilization of research reactors to the best advantage has occupied the attention of the nations who have an immediate programme and has also led to some fruitful collaboration with others. This is a subject which the Agency also regards as being most important and on which it is prepared to advise and assist. Two important meetings, part of a series arranged by the Agency

in various parts of the world, have been held in Latin America, at Sao Paulo in 1963 and Caracasin in 1965.

Realization of the fact that nuclear techniques can be of great assistance in many other branches of research as well as of value in industrial development has led to a number of programmes being undertaken.

Maize is of course, an important crop in Latin America, and some of the research has been aimed at ensuring that fertilizers applied to the soil are used by the crops as efficiently as possible. As a result of a combined programme in which Argentina, Brazil, Colombia and Peru took part, useful information has been gained including the fact that much more phosphorus is taken up by plants when it is mixed with nitrogen for application than when the two are applied separately.

The beneficial possibilities of inducing mutations artificially in plants to enhance crop yield and to increase resistance to disease and weather conditions are now being accepted by plant breeders. Argentina is using nuclear radiation scientifically in wheat experiments as part of an Agency programme. Brazil is working on a research contract with the object of producing better strains of rice. Both of these studies are linked with Joint FAO/IAEA Division programmes, and the irradiation services are being provided by the IAEA laboratories at Seibersdorf, Austria.

In entomology the research has consisted chiefly of developing and promoting the application of the sterile male technique in insect control. The work s being put to good use in the United Nations Development Programme Special Fund project for the eradication of the Mediterranean fruit fly in Central America, where Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua and Panama are working together under the technical guidance of the Joint FAO/IAEA Division of Atomic Energy in Food and Agriculture. Fuller details are given in an article in this Bulletin entitled "Atomic War on Insects Intensified".

Considerable effort is being made to combat disease by using radioisotopes, and illnesses such as anaemia and goitre, as well as those arising from parasites and malnutrition are being investigated. The work is assisted by Agency contracts in Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guatemala, Jamaica and Uruguay, and beneficial results have already been observed. Research into aspects of radiation biology, such as the sensitivity of living systems considering internal radiation sources, is being conducted in Argentina. Chile and Ecuador are examining radiosensitivity of viruses and compounds of biological context.

Health and safety are naturally given high priority, and the Inter-American Nuclear Energy Commission (IANEC) encouraged adoption by Latin American countries of the health and safety regulations formulated by the Agency. A study group on health physics services met in Buenos Aires in November last year under Agency sponsorship.

WATER, FOOD, INDUSTRY

In an area with so many variations in geographical features there is eventual gain to be obtained from studying water movements. Hydrological investigations with the aid of radioisotopes, especially on ground water resources are being made in Chile under the Agency technical assistance programme. Others are being undertaken in Brazil, Uruguay and Ecuador, where incidentally assistance has been provided for uranium and thorium prospecting. This form of aid is carried out by making experts available, obtaining equipment, sending advisory missions and arranging for fellowships and training courses.

Irradiation as an aid to preserving food has been given special attention by Latin American scientists. Vast losses caused by insects in grain, dried fruits, vegetables and dried or smoked fish, especially in tropical or sub-tropical countries have stimulated considerable interest in modern forms of control, and projects are being considered in Argentina, Chile, Colombia, Guatemala and Peru.

Increasing use and importance of radioisotopes for industrial, medical and agricultural purposes has led to the setting up of production centres for these materials in Argentina, Brazil, Mexico and Venezuela, with active support from the Agency. Technical assistance was provided to enable a national centre to be set up in Peru for centralized importation, control, processing and distribution of radioisotopes.

Appreciation of industrial applications led to technical assistance being given to Mexico. In Guatemala industrial gamma radiography, a method similar to X-ray photography to examine materials, is being developed to test road and building materials. In 1965 support was given for a national training course organized by Argentina on industrial applications and in 1966 a regional training course was organized in Mexico. All Latin American countries interested in promoting such work were invited to send participants, which included practical demonstrations. Industrial engineers also found it of value. This year a regional adviser is being sent and experts will help to start projects in Chile and Colombia. A regional training course on maintenance and repair of nuclear electronic equipment was held in Rio de Janeiro last year.

Agricultural development is of great importance. Several regional training courses have taken place on the application of radioisotopes in soil-plant relations. There have also been international courses for instruction on the use of similar techniques in animal science, veterinary medicine and entomology.

In furtherance of radiation protection and nuclear medicine the Agency helped to set up a radiological protection section of the Institute of Occupational Health in Santiago, Chile. A similar project was started in Peru, and help is being given in Cuba to establish a film badge and dosimetry service for hospitals using ionizing radiation. Plans have been made for holding regional courses in nuclear medicine, radiation immunology, waste management practices and monitoring.

Duplication of effort in the technical assistance programme is lessened by coordinating Agency work with that of other specialized agencies such as the World Health Organization, the Food and Agriculture Organization, the International Labour Organization, the UN Educational and Scientific Organization and the United Nations as well as with regional organizations.

MAKING SALT WATER FRESH

Water needs as far ahead as 1995 for the region of Mexico and American States to the north are being studied by a specific group of experts. In October 1965 a treaty was signed in Washington between the IAEA, Mexico and the USA setting up the group to investigate the technical and economic feasibility of a large-scale nuclear desalination plant to furnish fresh water for irrigation. The States of Arizona and California in the USA, and Baja California and Sonora in Mexico are the areas concerned.

In Chile the triangle formed by the towns of Antofogasta, Tocopilla and Calama may suffer from water shortage when plans for the development of the area are implemented. The Government is completing the installation of a potable water grid in Antofogasta, thus increasing consumption, and is planning to double copper production before 1975. Installation of several copper processing plants in Antofogasta is also contemplated. The needs and supply of water and electricity heve have been analyzed by an Agency preliminary survey mission which at the request of the authorities visited Chile in March last year. It examined the possibility of using a dual-purpose nuclear desalination plant (one which would supply electricity as well as producing fresh water) as well as alternative ways of obtaining water and power.

The costal region of Peru consists of a series of valleys irrigated by rivers flowing to the Pacific Ocean from the Cordillera. Human activity is concentrated along the valleys due to the lack of rainfall and no water is available for agriculture. At the Government's request the Agency sent a mission last year to make an initial assessment of the situation and of possibilities of supplying water and power by nuclear or conventional means to some coastal areas.

Prospects and problems of nuclear power application in Latin America will be discussed at a Study Group meeting planned by the Agency later this year.

MATERIALS AND SAFEGUARDS

Argentina, Mexico and Uruguay have all made use of the service provided by the Agency for procuring fuel and facilities for reactor research centres. The safeguards system is applied to the fissionable material supplied in this way.

The Agency is progressively assuming responsibility for implementing safeguards under bilateral agreements in which the United States is a party.

About three-quarters of all facilities are under the safeguards system, and agreements which USA has with Colombia, Costa Rica and Venezuela may be added.

It is clear that all Latin American countries are well aware of many of the ways in which atomic energy can assist in development, and that its role in the region will expand rapidly.

HIMALAYAN EXPEDITION TO STUDY GOITRE

A New Zealand team carried radioisotopes and equipment when scaling the Himalayas on an expedition of mercy. Besides helping to build a hospital, they studied the serious results in the area resulting from the prevalence of goitre in an effort to bring relief to the mountain-dwelling Sherpas. In one village nearly every inhabitant was suffering from thyroid disorder.

Leading the expedition was Sir Edmund Hillary, who not only gained world fame as the first conqueror of Everest but formed a lasting friendship with the Sherpas whose assistance was valuable in that feat. He had determined to return in order to help establish a hospital for them and in October last year was able to carry out the difficult project, thanks to generous voluntary contributions from the people of New Zealand. They had already helped him to set up some schools.

With him on his return was a medical research group headed by Dr. H.K. Ibbertson, of Auckland Hospital, New Zealand. Under a research contract placed by the Agency at a cost of $15 500, supported by a grant of £3000 ($8400) from the Wellcome Trust of London, they flew from New Zealand and then, with the help of sturdy native porters, man-handled their heavy equipmen up the steep slopes. Among the supplies, all of which survived the hazardous journey, were a portable X-ray generator, instruments for use with radioisotopes and a supply of radioactive compounds. Eventually they established camp at Kunde, 13 500 ft (4 200 metres) above sea level and probably vying with other Agency-supported expeditions in the Andes as the highest goitre research project in the world.

Having established themselves in two tents, they set up a clinic and managed to deal with patients who numbered between twenty and sixty a day. Giving them traces of radioactive iodine in order to make measurements was,