collaboration on food problems

An idea of the world-wide collaboration in progress to apply nuclear techniques for the benefit of food and agriculture is given in the annual report presented by the Board of Governors to the General Conference. This work continues to centre on research programmes co-ordinated by the Joint Division operated by the Food and Agriculture and the Agency, carried out in a number of countries simultaneously.

Altogether the Joint Division has embarked on 21 of these programmes, with research contractors in 58 countries — Argentina (3), Australia (3, one cost-free), Austria (3 cost-free), Belgium (4, 1 cost-free), Brazil (3), Bulgaria, Burma, Canada (cost-free), Ceylon (3), China (7), Colombia, Cuba, Czechoslovakia, Denmark (5, cost-free), El Salvador (2), Finland, France (2 cost-free), Federal Republic of Germany (9 cost-free), Ghana (2), Greece, Hungary (5, 2 cost-free), Iceland, India (6, 2 cost-free), Indonesia, Iran Iraq, Italy (5 cost-free), Israel (3, 1 cost-free), Ivory Coast (cost-free), Japan (6, 4 cost-free), Kenya (5), Republic of Korea (6), Lebanon (2), Madagascar, Malaysia (cost-free), Mexico (2), Morocco, Netherlands (7, 3 cost-free), Pakistan (10), Peru, Philippines (7), Portugal (3, 1 cost-free), Puerto Rico (cost-free), Romania, Spain (4), Sudan, Sweden (2 cost-free), Switzerland (cost-free), Thailand (7), Turkey, Uganda, United Arab Republic (2), USSR (cost-free), United Kingdom (5 cost-free), USA (14 cost-free), Venezuela, Viet-Nam, Yugoslavia (5, 2 cost-free).

The figures in brackets refer to the number of contracts if there are more than one. Cost-free means that expenses are borne by the contractors and do not fall upon the Agency.

The method of operating the system is to agree at annual coordination meetings upon experiments designed to obtain precisely defined information and to evolve a programme in which each participant carries out a specific task. In this way results over a wide area can be correlated and examined in a way which would be impossible for any one laboratory.

Five of the programmes related to soil fertility, irrigation and crop production, four to plant breeding and genetics, two to animal production and health, five to insect eradication and pest control, four to food preservation and one to residues and pollution.

Improving plant and animal products

Experiments in eleven countries to find out which parts of the tree root system absorb most fertilizer have, by the use of phosphorus as a tracer, achieved their object. Others aimed at establishing the best ways to use scarce water (also in eleven countries) will conclude at the end of this year. They have demonstrated the effectiveness of the neutron moisture meter in determining the amounts of irrigation water that should be used and at what intervals to irrigate. A programme to study wheat fertilization started in 1968 and the mass of data obtained from each of the thirteen countries taking part has been fully computerized for the purposes of rapid evaluation. A rice production programme was started last year with eight Asian countries taking part. Basic data needed for full interpretation of these four programmes is being established by examinations in eleven countries of the physico-chemical relationship of soils in plants.

In addition to research co-ordination meetings, a seven-weeks training course was held in Teheran on topics related to soil fertility and irrigation. Isotopically labelled fertilizers have been sent out from the Seibersdorf laboratory for the various programmes, and nitrogen-15 assays of plant samples from the field experiments have been carried out there. International training courses were held in 1969 and 1970.

Co-ordinated experiments in ten countries on rice mutation breeding have completed their fifth year and the results were reviewed at a meeting in New Delhi. Several promising rice mutant lines are now being tested as a result. A programme on induced mutations in plant breeding is nearing the end of its fifth year and results are to be reviewed at a meeting in Castelar, Argentina. Neutron seed irradiation (14 countries), apart from its definite objective helps developing countries to make better use of research reactors by the installation of relatively simple irradiation facilities. Work on the improvement of protein quantity and quality in major food crops is in progress in seven countries. An international training course was held in 1969.

Work connected with animals (two programmes, each with nine countries taking part) is producing promising results connected with use of vaccines and to improve mineral nutrition of animals. Two international training courses were held in 1970.

"Conclusive results" of sterile insect tests

The sterile insect release technique figures largely in the insect eradication and pest control programmes. One of them (in six countries) concentrates mainly on the tsetse fly, including behaviour after sterilization by irradiation and problems of raising it in captivity. "Conclusive results", it is stated, have been obtained by the Central American experiment carried out on behalf of the United Nations Development Programme (Special Fund) on the use of the radiation induced sterile male technique in controlling the Mediterranean fruit fly. After releasing eleven million sterile flies four times a week until more than a billion had been freed, infestation in the release area was found to be from ninety to ninety-eight per cent lower than in control areas where the technique had not been used. Equally encouraging results were obtained with smaller experiments on the island of Procida in Italy and in Murcia, Spain. Support for these experiments was provided by the Seibersdorf Laboratory, as well as training in mass-rearing methods. Methods for rearing the Mediterranean fruit fly and the olive fly have been partially mechanised or otherwise improved at Seibersdorf. Here radiation studies are also being carried out on the tsetse fly, with which good progress has been made in rearing it on artificial membrane instead of animal hosts, and the olive fly.

Pesticides and pollution

Increased public concern about the effects of chemical pesticides has stimulated interest in the use of isotopic tracers and radioactive techniques to study the question of whether residues might be harmful. The Food and Agriculture Organization, the World Health Organization and the International Union of Pure and Applied Chemistry also have interests in the subject and a programme drawn up by panels of experts is being carried out in collaboration with them.

In connection with radioactive fallout, data is being collected by the Agency and FAO for the UN Scientific Committee on the Effects of Atomic Radiation.

Food preservation

With a growing number of irradiated food products being given clearance by public health authorities in various countries, the Agency continues to collect and exchange information about legislation being adopted in Member States, as well as on the matter of wholesomeness. At a meeting in April 1970 held at the Paris headquarters of the Organization for Economic Co-operation and Development, several Governments agreed to launch a new international programme on food irradiation under the joint auspices of the Agency and the European Nuclear Energy Agency. One main method will be the award of research contracts to laboratories, giving first priority to the testing of potatoes for wholesomeness, and to wheat and wheat products. The aim is to secure confirmation of provisional clearance recommended for these

irradiated products by a joint Agency/FAO/WHO Expert Committee last year. This clearance will be reviewed in 1974 and additional data must be provided by that time. Eighteen countries are taking part in the four projects related to food preservation.

Preservation of foods of marine origin, and the control of pathogenic bacteria and fungi in food and feed products have been other subjects studied. An international training course on food irradiation technology and techniques was held in USA during 1969, and a training manual on food irradiation technology has been prepared.

Eighteen scientists from 16 Latin American and Asian countries took part in an Agency tour of USA and Canada to study applications of radioisotopes and radiation techniques in industry during August and September. This photo was taken at the US Atomic Energy Commission headquarters, Washington.