

AN AGRICULTURAL PROJECT IN YUGOSLAVIA

Work has begun under a major project in Yugoslavia to extend atomic energy applications in agriculture, especially in respect of crops and livestock. The principal aim of the project is to expand research and training in the use of nuclear techniques and to improve farm production. The research and most of the training will be conducted at the Institute for the Application of Nuclear Research in Agriculture, Forestry and Veterinary Sciences at Zemun, near Belgrade. The United Nations Special Fund is contributing US \$546 400 to cover the cost of equipment, training and expert services, and the Yugoslav Government is contributing the equivalent of over \$1.2 million in the form of land, buildings, equipment, staff and other services. IAEA is the Executing Agency for the project and all Special Fund assistance is being provided through it. On the Yugoslav Government side, the Counterpart Agency is the Federal Nuclear Energy Commission of Yugoslavia.

An outline of the project was published in this Bulletin in October last year (Vol. 4, No. 4). Since then, the detailed plan of operation has been drawn up and most of the experts and staff appointed. Professor Cyril L. Comar, of Cornell University, USA, has been appointed Project Manager, and Dr. Milovan Iovanovic, of Yugoslavia, Project Director.

Soon after the signing of the plan of operation in Belgrade last April, Dr. Comar and a staff member of IAEA's Unit of Agriculture visited Belgrade to see

The plan of operation for the agricultural project in Yugoslavia being signed in Belgrade by Mr. Eric E. Ward (left), Resident Representative of the UN Technical Assistance Board and Director of Special Fund Programmes in Yugoslavia, and Mr. Slobodan Nakicenovic, Secretary of the Federal Nuclear Energy Commission of Yugoslavia. (Photo Tanjug)



the progress made with the preliminary arrangements. They inspected the remodelling of the existing facilities at Zemun and reviewed the specification and ordering of new equipment. They also settled some details regarding the recruitment of experts for the project and discussed how their work was to be co-ordinated. The specific areas in which these experts will work include soil fertility, soil chemistry, soil physics, soil-plant relationship, plant physiology, plant breeding and veterinary sciences.

Another task accomplished during the visit was detailed formulation of the training programme which will form an important part of the project. A number of fellowships will be awarded to Yugoslav graduate students for specialized training outside the country in such subjects as soil fertility and plant nutrition, plant physiology and genetics, animal biochemistry and nutrition, and endocrinology. About 80 post-graduate students will be trained at the Institute at Zemun and, in addition, short-term training will be given to a number of advanced research workers.

The research will be aimed at better use of fertilizers, improved irrigation and drainage, better breeding and selection of crop plants, and better livestock management. The main areas of research will therefore be (a) plant physiology and nutrition, (b) plant breeding, and (c) animal husbandry.

Plans have been made to include in the greenhouse facilities at Zemun a battery of growth chambers in which it is possible to simulate varied climatic conditions (e.g. light, humidity, temperature). In these chambers it will be possible to grow plants in an atmosphere in which the carbon dioxide is labelled with radioactive carbon (carbon-14). The radiocarbon will thus be assimilated by the plants in a perfectly normal way and be synthesized into the plant material, and this radioactive material within the plants will serve as a valuable tracer for the investigation of various metabolic pathways. Further, the labelled plant material will be added to soil and it will then be possible to study the mechanism by which the organic material is decomposed in soil.

With the help of nitrogen-15 investigations will be carried out to see what happens to the nitrogen that is available to plants from the air and from fertilizers. The aim of these investigations will be to achieve maximum plant response to fertilizer nitrogen. This is a matter of great importance because inadequacy of nitrogen fertilization is a serious limiting factor in crop production in Yugoslavia. If ways could be found to increase the efficiency of the utilization of fertilizer nitrogen by plants, there would be a great saving in the use of an expensive fertilizer.



An experiment on the seed-dressing of grains with pesticides at the Institute for the Application of Nuclear Research in Agriculture, Forestry and Veterinary Sciences at Zemun, near Belgrade. (Photo Tanjug)

Experiments will also be carried out to evaluate the relative merits of different methods of fertilizer application. This will be done with labelled fertilizers on different soils and with different plant species.

A gamma radiation field will be constructed near the Institute at Zemun. Here, growing plants will be irradiated for biochemical and genetic investigations.

In the field of animal husbandry, an extensive programme is already under way for the investigation of immunization against lung worms. Irradiated



Blood samples of poultry being taken for experimental purposes at the Zemun institute. (Photo Tanjug)

larvae are being used in this work. The investigations will now be further expanded to cover other parasitic diseases.

These are some of the major research activities to be carried out under the project. Other research plans will be developed as the work progresses. The work will be conducted under the guidance of ten experts and consultants selected by IAEA. Equipment worth \$258 700 will also be supplied by the Agency from the resources made available by the UN Special Fund.