

ISOTOPES FOR ARAB COUNTRIES: THE CAIRO CENTRE

Research on underground water movement in Kuwait and Libya; agricultural research, comprising salinity and fertilization studies in Tunisia and Iraq, fruit fly and olive fly eradication in UAR, Sudan and Tunisia, bilharziasis and thyroid studies in UAR, Sudan and Iraq are examples of the research programme to be undertaken or continued in 1965-66 by the Middle Eastern Regional Radioisotopes Centre for the Arab Countries, located in Cairo.

The scientific programme of the Centre, carried out in close cooperation with the International Atomic Energy Agency (IAEA), consists of (a) training specialists in the application of radioisotopes in science, industry, agriculture and medicine, and (b) conducting research using radioisotope techniques in hydrology, agriculture, entomology and medicine.

The research work carried out by the Centre is not of a purely academic nature but is planned to contribute to the solution of certain practical problems which are of interest to the countries of the area. There are two principal domains, both of them of crucial practical importance to these countries and closely connected: hydrology in arid and semi-arid conditions and the life sciences in the same conditions.

The Centre, located in a modern three-floor building on the left bank of the Nile, on the way out to the Pyramids at Ghiza, was created in 1955 as one of the first main activities of the then young Atomic Energy Establishment of the United Arab Republic. As a result of a request of the Arab Countries, the Board of Governors of IAEA decided in June 1960 to transform the Centre into a Middle Eastern Regional Radioisotopes Centre for the Arab Countries. The agreement for the establishment of the Centre entered into force in January 1963.

The following countries participate in the activities of the Centre: Algeria, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Saudi Arabia, Sudan, Syria, Tunisia, UAR and Yemen. Other African or Asian countries are entitled to send trainees to the training courses under special arrangements. Nigeria and Ghana have so far been represented.

The facilities at the Centre include a radiochemical laboratory, a counting laboratory for beta and gamma assay; medical analysis laboratory to carry out haematological examination, urine analysis and other microscopic examinations; research laboratories equipped with standard research equipment and radiation counting equipment, single channel gamma spectrometer, spectrophotometer, flame photometer, electrophoresis and chromatographic apparatus; standardization laboratory with standard sources and counters, and semi-hot laboratory. Several gamma irradiation facilities have been installed for medical use and research, as well as for biological and agricultural research, at the Centre and in hospitals and universities.

Training of specialists and the conduct of research are the two main features of the Centre's scientific programme. There are a considerable

number of problems in the Arab region which the radioisotopes could help to solve; in this space it is possible to mention only a few of them.

MANY USEFUL PROJECTS

Anopheles Pharoensis Theo. is the name of one of the harmful mosquito vectors of malaria in the region. Several studies have been undertaken on its possible eradication by sterile male technique using radiation. Gamma irradiation gives vigorous but sterile males, mating normally with females to produce largely sterile eggs. A significant decrease in female egg production and egg fertility has been noted.

Anopheles Sargenti Theo., the vector of malaria in the Siwa Oasis, has been studied to determine its flight range, longevity and mortality in the field, using radioisotopes as markers. Other dispersal and flight range studies on harmful creatures, such as various grasshoppers, were conducted in a number of localities.

In medicine the bilharzial diseases - renal disfunction resulting from bilharzial infestation of the urinary tract, a dangerous and widespread disease in the region - cause serious concern. The use of radioisotopes in studying this disease will be investigated at the Centre.

Goitre is an endemic disease in some localized areas in the Middle East. Research carried out on goitrous patients coming from such areas may be of considerable interest in elucidating the genesis of various types of goitre.

Estimation of manganese and iron availability in soils, interaction of saline water irrigation and phosphorous fertilization on cowpea production are also subjects of study.

Other research projects carried out in the region include:

- study of the uptake of major and minor nutrients by animals in Libya;
- comparison of fertilization through the soil and through the leaves in UAR ;
- study of the factors influencing the yield and quality of olive oil in Tunisia.

For 1966, the scope of the research activities has been widened and includes:

- application of radiation techniques in water-use efficiency studies;
- investigation of aquifers, including determination of porosity, permeability, storage and transmissibility, using different radioisotopes and dating;
- study on human bilharsiasis;
- field studies on iodine metabolism in endemic goitre in countries of the Middle East;
- salinity and fertilizing, and their effects on crop production;
- nitrogen and phosphorous fertilization of wheat, using labelled fertilizers;

- studies on eradication of the Mediterranean fruit fly.

Other projects of lower priority include :

- water-retaining capacity of the different soil strata in Algeria ;
- study of factors influencing the production and quality of olive oil in Tunisia ;
- olive-fly eradication in Tunisia ;
- genetic effects of radiation on vegetables.

IAEA has furthermore provided the funds for a research project concerning the investigation of the Wadi El-Natrun aquifer, including determination of effective porosity, permeability, storage coefficient and transmissibility; using different radioisotopes; also for a second project, as part of a co-ordinated programme, on the application of radiation techniques in water-use efficiency studies.

Dr. Ismail B. Hazzaa is the director of the Centre, active, dynamic, full of constructive ideas. He has been inspiring and directing the six training courses on the various uses of radioisotopes - general, agricultural, medical - since the beginning of the Middle East Regional Radioisotopes Centre in 1963, with a total of 195 trainees.

RADIOACTIVE WASTE DISPOSAL: SAFETY ACHIEVED, BUT ECONOMY ALSO NEEDED

Industrial use of atomic energy on an ever-increasing scale brings corresponding problems in disposing of radioactive wastes. From the point of view both of economic operation of nuclear plants and of avoiding embarrassingly large accumulations of wastes, there must be a continuous search for the most appropriate and effective methods.

There are no generally applicable "best" processes. So much depends on local conditions and on the quantity, kind and variety of the wastes to be treated. The location of the plant is most significant, because in some places very low level wastes can be safely dispersed in rivers or the sea, or suitable geological formations may make deep burial safe and simple. But elsewhere, population is dense, land for storage scarce, and dispersal not possible, so that the emphasis is on the maximum volume reduction and transportability of the wastes. In a small establishment, one general-purpose plant, such as an evaporator, may be employed to treat all kinds of liquid waste; the large establishment is more likely to differentiate and to seek more refined processes.