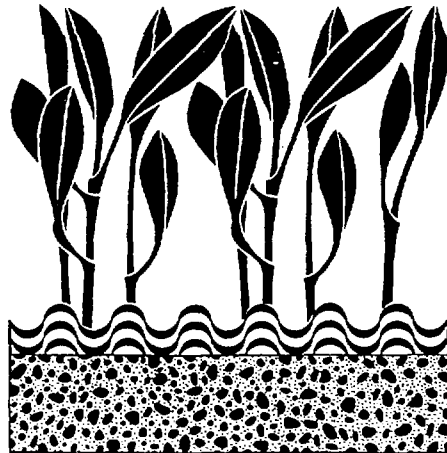




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# Soils Newsletter



JOINT FAO/IAEA DIVISION  
OF ATOMIC ENERGY  
IN FOOD AND AGRICULTURE  
INTERNATIONAL  
ATOMIC ENERGY AGENCY, VIENNA

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TO OUR READERS

We are happy to publish the fifth issue of the Soils Newsletter which now begins its third year of existence. This issue starts with a brief account of new technical assistance projects to be implemented during 1980 in different Member States; summary reports on technical assistance projects implemented in Africa, Asia, Latin America, Europe and the Middle East are presented. Mention is also made of advisory and planning missions to some Member States. A brief summary of the recommendations of the advisory group meeting on nuclear techniques in development of fertilizer and water management practices for different cropping systems is included. These are followed by a summary report on the FAO/IAEA regional seminar on the use of isotopes and radiation techniques in soil and water conservation studies in crop production for developing countries in Africa. A report on the FAO/IAEA/SIDA research coordination meeting on the use of isotopes in studies on biological dinitrogen fixation is also presented. A brief announcement is given on the implementation of new coordinated research programmes followed by an account of the representation of the FAO/IAEA Division at an ICARDA/UNDP workshop on increasing the effectiveness of water and nitrogen in rainfed farming systems in Mediterranean-type environments. As usual, we present a summary of the current activities at the Agricultural Section, Seibersdorf Laboratory. We conclude this issue with an announcement of forthcoming training courses, events and publications.

We hope you find this issue of the Soils Newsletter of interest. We thank you for your encouragement and cooperation and wish you every success in your activities for 1980.

SOIL FERTILITY, IRRIGATION  
AND CROP PRODUCTION SECTION

CHANGES IN STAFF

Dr. K.B. Mistry left the service of the Soil Fertility, Irrigation and Crop Production Section of the Joint FAO/IAEA Division early in October 1979 after two years of service. The able way in which he guided the Coordinated Research Programme on Isotope-Aided Micronutrient Studies in Rice Production with Special Reference to Zinc Deficiency was highly appreciated by the programme cooperators and by his colleagues. His very sound and constructive suggestions were very helpful in planning the Section's future programmes. He returned to the Bhabha Atomic Research Centre, Biology and Agriculture Division, Bombay, India.

Prof. G.H. Wagner returned to the University of Missouri, U.S.A., after spending one year of sabbatical leave with the Soils Section. During his stay Prof. Wagner carried out field experiments at the Seibersdorf Laboratory related to the FAO/IAEA Dinitrogen Fixation Programme of the Section. Dr. Wagner made a great effort in preparing a final report summarizing the data obtained by all cooperators in our Coordinated Research Programme on the Use of Isotopes in Fertilizer Efficiency Studies in Grain Legumes. Dr. Wagner contributed a great deal to the planning of future programmes and participated in our Regional Seminar on the use of isotopes and radiation techniques in soil and water conservation studies for developing countries in the African region.

Dr. J.B. Bole, from the Agriculture Canada Research Branch, Lethbridge, Alberta, Canada, joined the Section as First Officer in December 1979. His previous research activities include the use of radioisotopes to determine ion supply mechanisms to plant roots. He also conducted basic and applied soil fertility research and studies on waste utilization and the salinity tolerance of crops.

#### TECHNICAL ASSISTANCE ADVISORY MISSIONS

An Agricultural Advisory Mission was executed by Dr. M.F. L'Annunziata of the Soil Fertility, Irrigation and Crop Production Section to Costa Rica, Panama, Peru, Uruguay, and Spain during January-February 1980.

#### TECHNICAL ASSISTANCE PROJECTS

##### A. PROJECTS TO BE IMPLEMENTED IN 1980

Nineteen new technical assistance projects dealing with the application of isotope and radiation techniques to solve specific problems of soil fertility, fertilizer usage, plant nutrition, soil moisture and water management in Member States in Africa, Asia, Latin America and Europe will be implemented during 1980. The Soil Fertility, Irrigation and Crop Production Section has the technical responsibility for the implementation of these projects. A brief account of the technical programme of these projects and the nature of assistance to be provided by the IAEA are presented here.

##### I. Africa

###### 1. Egypt

The Department of Agriculture, Soils and Water Research of the Atomic Energy Establishment of Egypt is executing studies on the efficiency of nitrogen fertilizer utilization. In 1979 the Agency provided a  $^{15}\text{N}$ -analyzer for experimental services. Further studies of relevance to nitrogen losses (e.g. studies on irrigation methods, water management practices, etc.) are planned for 1980. The Agency will provide assistance in the form of equipment to support these studies.

###### 2. Ghana

The IAEA will provide assistance to the Ghana Atomic Energy Commission for establishing a centre for the use of nuclear techniques in agricultural research. The Agency mission will advise on the establishment of the centre, the research programmes, the requirements in terms of personnel, equipment, training, etc. and the nature and scope of future assistance to the centre.

###### 3. Ivory Coast

The IAEA is assisting the Coffee and Cacao Research Institute to implement nuclear-techniques-aided research programmes aimed at increasing the production of coffee and cacao through the development of adequate soil and water management practices. The assistance will be in the form of four man-months of expert services, neutron moisture probes and accessories required for their use.

#### 4. Mali

The Agency will provide assistance to the Direction Generale de l'Hydraulique et de l'Energie for the increase of crop production under dry-farming conditions through the development of adequate water conservation measures. The neutron moisture meters necessary for the soil moisture measurements at the desired depth on various locations will be supplied. Twelve man-months of expert services will be made available for this project.

#### 5. Mauritius

The IAEA will provide assistance to the Mauritius Sugar Industry Research Institute for nitrogen-15-aided studies to gain an understanding of nitrogen movement and transformation in the soil. An emission-spectrometer for this purpose, together with two man-months of expert services are being provided for this project.

#### 6. Morocco

The IAEA is continuing its assistance to the Central Station for Agricultural Research in Tangiers. During 1980, the station will receive six man-months of expert services, fertilizer enriched in  $^{15}\text{N}$  and certain expendable supplies. A research programme using  $^{15}\text{N}$ , aimed at increasing sugar-cane yields by improving the efficiency of fertilizer utilization, will be initiated.

#### 7. Senegal

In continuation of the aid provided by the Agency over the past years, the National Centre of Agricultural Research at Bambey will receive additional equipment, labelled fertilizers and isotopes for research projects. Research in the fields of soil fertility, root growth, drought resistance, and on the effects of the continuous use of sodium-rich underground water for irrigation will be conducted.

#### 8. United Republic of Tanzania

The Agency is providing two man-months of expert services to the Agricultural Research Institute at Mlingano to assist in the planning of an isotope-aided research programme aimed at increasing the yields of important field crops through more efficient use of fertilizers.

#### 9. Zaire

The Kinshasa Regional Nuclear Research Centre is carrying out a project on the study of inoculation techniques, with some testing of carrier materials and the isolation of bacteria involved in nitrogen fixation by cereals. The IAEA will provide a refrigerated centrifuge, a microbiological incubation oven, and the isotopes required for the studies.

#### 10. Zambia

The Agency will provide assistance to the Central Agricultural Research Station of the Ministry of Agriculture and the School of Agriculture, University of Zambia, which are collaborating in a joint project aimed at increasing the yield of important field crops through more efficient use of water and fertilizers. The assistance will be mainly in the form of two moisture meters and N-15-labelled fertilizer.

## II. Asia

### 1. Republic of Korea

The IAEA will provide assistance to the Che-ju Island National University for establishing a radiation and isotopes laboratory in support of the research programmes in the field of crop nutrition, soil fertility, pesticide and herbicide residues and pastures. The assistance will be in the form of twelve man-months of expert services and radioisotope laboratory equipment.

### 2. Sri Lanka

The assistance to be provided by the IAEA during 1980 to the Atomic Energy Authority in collaboration with the Coconut Research Institute, the Tea Research Institute, and the Department of Agriculture and Irrigation of the University of Sri Lanka is to facilitate the initiation of an inter-institutional programme on  $^{15}\text{N}$ -aided studies on nitrogen fertilizer use efficiency and nitrogen balance.  $^{15}\text{N}$ -labelled fertilizers, equipment, and two man-months of expert services and an award of a training fellowship will be provided for this project.

Assistance is also being provided for the agricultural development project for increasing crop production through irrigation. The investigations include studies on soil moisture, plant water potential, crop water requirements and root activity patterns, all of which involve the use of radiation and radioisotope methods. A neutron moisture probe, GM-counting equipment, photosynthesis-rate measurement apparatus (based on the use of  $^{14}\text{C}$ ) and ancillary items and four man-months of expert services will be provided for this project.

## III. Europe and the Middle East

### 1. Greece

The IAEA is assisting the Department of Soil and Plant Nutrition of the "Democritos" Nuclear Research Centre in studies on soil fertility and soil improvement through the use of fertilizers labelled with  $^{15}\text{N}$ ,  $^{32}\text{P}$ , and  $^{33}\text{P}$ . Some complementary equipment will be provided by the Agency for this project.

Assistance is also being provided to the Institute of Land Reclamation for the project on the more rational utilization of limited water resources through the optimization of irrigation. The assistance will be in the form of a neutron moisture meter and one man-month of expert services to train staff in its use.

### 2. Syrian Arab Republic

Assistance is being provided to the Syrian Government to hold a training course on the use of isotope and radiation techniques in studies of soil-plant relationships to be held at the University of Aleppo. The assistance will be in the form of some equipment and supplies.

## IV. Latin America

### 1. Brazil

The IAEA is assisting the Centro de Energia Nuclear na Agricultura, Piracicaba for the three-year period (1979-81) in support of the second

phase of a large-scale UNDP/IAEA project. A total of twelve man-months of expert services and equipment will be provided for this project in 1980.

### 2. Cuba

The Agency will provide assistance to the Institute of Agricultural Science, Havana for the use of fertilizers and water by major crops, leading to reduced production costs and increased productivity. The assistance will be in the form of equipment, including an emission-spectrometer with an automatic inlet system.

### 3. Venezuela

The Agency is assisting the Faculty of Agriculture of the University of Zulia with a new research programme aimed at the determination of the optimum placement technique for superphosphate fertilizers with sorghum. The assistance will be in the form of a twelve man-month expert service, a liquid scintillation counter, and a Geiger-Mueller counter.

## B. REPORTS OF PROJECTS EXECUTED IN 1979

### I. Africa

#### 1. Ivory Coast

Project: IVC/5/06

Institution: Institute of Agronomic Research, Bouake

Experts: Drs. M. Vauclin and G. Vachaud

Duration of

Assignment: November 1979

Systematic research was initiated some years ago at Bouake to study the possibility of introducing upland rice to the central region of the Ivory Coast. The Agency supported this research by providing equipment, supplying isotopes and making the services of experts available for short assignments. The work carried out by Drs. Vachaud and Vauclin was mainly carried out during November 1979.

#### 2. Kenya

Project: KEN/5/06

Institution: National Agricultural Laboratories, Nairobi

Expert: Dr. J.W. Ketcheson

Duration of

Assignment: 1 October - 31 December 1979

The Kenyan Ministry of Agriculture has an active soils research programme at the National Agricultural Laboratories (NAL) and at various substations throughout Kenya. In support of this programme the IAEA supplied equipment and made the services of Dr. J.W. Ketcheson available for a total of 18 months. The expert's assignment was completed in four segments to allow periodic attendance over a five-year period.

## II. Asia

### 1. Republic of Korea

Project: KOR/5B/13

Institution: Faculty of Agriculture and Fisheries, Che-Ju  
National University, Che-Ju-Do, Che-Ju City

Expert: Prof. E.G. Niemann

Duration of

Assignment: August - September 1979

The Government of the Republic of Korea plans to establish an Isotope Laboratory at the Faculty of Agriculture and Fisheries on the new campus of Che-Ju Nation University. This laboratory will be designed to serve a two fold purpose: i) to increase agricultural production, reduce production costs, and minimize losses in the field and after harvest by applying the results of agricultural research performed with the aid of radiation and nuclides; ii) to provide training and research capabilities in the field of radionuclide application in subtropical agriculture. The advice of an IAEA expert was sought during a two-month assignment from August to October 1979 to design the laboratory, to train the research staff of the faculties in radiation and radiotracer applications in agricultural research, and to discuss research projects to be performed in the laboratory. Prof. Niemann was chosen to perform the mentioned tasks.

Project: KOR/5B/13

Institution: Institute of Agricultural Sciences,  
Office of Rural Development, Suweon

Expert: Dr. E. Danfors

Duration of

Assignment: 19 September - 20 November 1979

The expert spent two months at the Institute of Agricultural Sciences, Office of Rural Development, just south of Seoul. He trained his counterparts on the use of radiation equipment for soil moisture and density measurement and cooperated with them in planning isotope-aided research programmes aimed at improving the efficiency of water use.

### 2. Sri Lanka

Project: SRL/5B/10

Institution: Central Agricultural Research Institute,  
Peradeniya

Expert: Dr. D.J. David

Duration of

Assignment: 18 December 1979 - February 1980 (1½ months)

The object of the assignment was to assist the local staff with the installation of an atomic absorption spectrophotometer, purchased under this project, and to train them in its operation for micronutrient analysis.

### III. Europe and Middle East

#### 1. Greece

Project: GRE/5B/10

Institution: Department of Soils and Plant Nutrition,  
Nuclear Research Centre "Democritos",  
Aghia Paraskevi, Attiki

Expert: Dr. K. Darab

Duration of Assignment: October

Assignment: 31 October - 20 November 1979

Dr. K. Darab executed an assignment in connection with project GRE/5B/10 at the Nuclear Research Centre "Democritos" from 31 October to 20 November 1979. The expert's assignment was to assist in the preparation of a programme aimed at the development of adequate management practices and soil conservation measures which would ensure the productivity of salt-affected soils or soils potentially affected by salinization and/or alkalization.

### IV. Latin America

#### 1. Cuba

Project: CUB/76/005

Institution: Institute of Irrigation and Drainage  
Research, Havana

Expert: Dr. Y. Barrada

Duration of

Assignment: 1-12 December 1979

Dr. Y. Barrada, Head of the Soil Fertility, Irrigation and Crop Production Section served as a consultant for FAO in a UNDP project in Cuba during 1-12 December 1979. The purpose of the assignment was to discuss with the staff of the Institute of Irrigation and Drainage Research the possibilities of using isotope and radiation techniques in irrigation studies in Cuba and to cooperate in preparing a technical assistance request to be submitted to the IAEA for consideration for the 1981 regular programme.

#### 2. Uruguay

Project: URU/5/10

Institutions: National Atomic Energy Commission (CNEA)  
and Workers' University of Uruguay (UTU),  
Montevideo

Expert: Dr. J. Fernandez Gonzalez

Duration of

Assignment: 16 December 1979 - 16 January 1980

The National Atomic Energy Commission together with the Workers' University of Uruguay has a research programme assisted in part by the International Atomic Energy Agency on the use of isotopes in studies of



photosynthesis and translocation of photosynthate in grapes. The programme aims at increasing grape production and utilizing isotopes to increase the production of other crops of national importance via more efficient crop utilization of solar energy.

Report on the  
FAO/IAEA ADVISORY GROUP MEETING ON NUCLEAR TECHNIQUES  
IN THE DEVELOPMENT OF FERTILIZER AND WATER  
MANAGEMENT PRACTICES FOR MULTIPLE CROPPING SYSTEMS

Ankara, Turkey

8 - 12 October 1979

Fifteen scientists from nine Member States and three international organizations participated in an Advisory Group Meeting in Ankara, Turkey from 8 to 12 October 1979. Research and review papers were presented on the use of nuclear techniques in studying fertilizer practices, water management, root activity, and dinitrogen fixation in multiple cropping systems. Background information was provided on the relative effectiveness of multiple cropping practices in many parts of the world. The Advisory Group recommended initiating a coordinated research programme aimed at the development of improved fertilizer and water management practices for intercropping systems and suggested a working plan for the programme. The proceedings of the meeting will be published as an unpriced IAEA Technical Report.

Report on the  
REGIONAL FAO/IAEA SEMINAR ON THE USE OF ISOTOPES AND RADIATION  
TECHNIQUES IN SOIL AND WATER CONSERVATION STUDIES IN CROP  
PRODUCTION FOR DEVELOPING COUNTRIES IN AFRICA

Khartoum, Sudan

12 - 17 November 1979

Although the demand for food is increasing, many countries are losing land to degradation faster than new land can be developed. From 12 to 17 November 1979, twenty-four scientists from developed and developing countries and the sponsoring organization dealt with this serious problem in a seminar in Khartoum, Sudan. Papers were presented on the methods of determining the extent of land degradation, and the use of tillage practices, organic residues and cropping systems to combat erosion. Remote sensing and nuclear techniques to measure soil moisture were outlined. Soil and water conservation programmes in Egypt, Kenya, Sudan, Tanzania, and Tunisia were presented.

The seminar participants drew up guidelines for programmes at regional, national, and international levels to combat soil degradation. Coordinated research is required on soil, water and range management. New cropping systems must be developed and successful conservation practices adapted to problem regions. Well-equipped research laboratories must be established and additional training in conservation provided to scientists working in developing countries.

Report on the  
FAO/IAEA/SIDA RESEARCH COORDINATION MEETING ON  
THE USE OF ISOTOPES IN STUDIES ON BIOLOGICAL DINITROGEN  
FIXATION

The first meeting of participants and consultants for the FAO/IAEA/SIDA Coordinated Research Programme on the Use of Isotopes in Studies on Biological Dinitrogen Fixation for the Dual Purpose of Increasing Crop Production and Reducing Nitrogen Fertilizer Usage to Conserve the Environment was held at the Vienna International Centre, Vienna, Austria during 25-29 February 1980. The meeting was attended by 24 participants from Argentina, Australia, Bangladesh, Brazil, Canada, Egypt, France, German Federal Republic, Greece, India, Kenya, Mexico, Nigeria, Pakistan, Romania, Senegal, Sri Lanka, United Kingdom, and the U.S.A. Representatives of the Food and Agricultural Organization of the United Nations, the Swedish Industrial Development Authority and the United States Agency for International Development also participated. Several staff members of the FAO/IAEA Joint Division attended the meeting. The meeting was opened with an address from Prof. H. Kakihana, Deputy Director General, Department of Research and Isotopes of the IAEA. Dr. M. Fried acted as Chairman and Dr. M.F. L'Annunziata served as Scientific Secretary to the meeting.

The meeting was held to present and critically evaluate the results obtained from research executed by the participants of the coordinated research programme during 1979; and, on the basis of the results presented, to prepare an experimental plan which would produce further insight on the effect of certain variables on the methodology for quantifying the amount of dinitrogen fixed by legumes in the field and the effect of certain agronomic practices on the amounts of dinitrogen fixed by field-grown legume crops.

Progress reports were presented by the Chief Scientific Investigators of 14 research contracts and 4 research agreements on work carried out during the past year. Substantial progress was reported on the methodology for determining the amounts of atmospheric nitrogen fixed in the field by legumes utilizing  $^{15}\text{N}$ -labelled ammonium sulfate as a tracer via the 'A' value and isotope dilution methods. Several participants presented results indicating that a marked reduction in the amounts of dinitrogen fixed can be measured when applying 100 kg N/ha as compared to 20 kg N/ha; however, no significant difference was reported between the 20 and 5 kg N/ha rates of labelled fertilizer applied. As the methodology requires the application of nitrogen fertilizer to the legume and control plants, low rates of isotopically labelled fertilizer between 5 and 15 kg N/ha may also serve as starter nitrogen to stimulate and enhance the total amount of dinitrogen fixed. It was also generally observed that when the legume was intercropped with the sudangrass control the dinitrogen fixed by the legume was markedly suppressed. This was also correlated with a marked reduction in the number of nodules on the legume crop. Data presented also indicate that analysis of soluble nitrogen constituents in xylem of many tropical legumes could potentially be used to estimate dinitrogen fixation by evaluating the contribution of nitrate reduction and dinitrogen fixation to total plant nitrogen. Advances were also reported in the field of associative symbiotic dinitrogen fixation with grasses, sugarcane, and rice. The results reported were critically evaluated by the meeting participants and work plans for 1980/81 were formulated to test the effect of certain experimental variables on the methodology for measuring dinitrogen fixed by legumes in the field;

namely, i) a Time Course Study for the sampling of legume and control crops for the analysis of isotopic abundances at the first flowering period, at initiation of bean development, and at crop maturity; and ii) the isotopic labelling technique of soil nitrogen. The effect of phosphorus fertilization on the amounts of dinitrogen fixed during the Time Course Study will also be tested. Certain experimental treatments will vary in accord with national interests such as the testing of legume varieties, inoculants, and certain agronomic practices. The legume crop to be tested most frequently is common bean followed by soybean, broadbean, chickpea, and cowpea.

A description of an International Network of Legume Inoculation Trials organized under the auspices of the University of Hawaii's USAID-funded NIFTAL Project was presented. The activities of FAO on biological dinitrogen fixation in the field and recommendations and priorities for future studies were discussed.

#### NEW COORDINATED RESEARCH PROGRAMMES TO BE IMPLEMENTED DURING 1980

The Soil Fertility, Irrigation and Crop Production Section has the technical responsibility for the implementation of a number of coordinated research programmes, as indicated in the Vol. 1, No. 1 of the Soils Newsletter. These coordinated research programmes deal with the application of isotopes and radiation techniques to solve very practical agricultural problems of relevance at the national as well as regional levels.

The Section's new coordinated research programmes are:

#### I. Coordinated Research Programme on Nuclear Techniques in the Development of Fertilizer and Water Management Practices for Multiple Cropping Systems

Relay, strip, and mixed intercropping, although impractical with mechanized farming techniques and chemical herbicides, are the most productive systems in labour-intensive agriculture and are widely practiced in developing countries.

Isotope and radiation techniques have been widely used to study nutrient uptake, moisture depletion patterns and dinitrogen fixation in monocultures, but they have not been applied to intercropping.

A coordinated research programme has thus been established to utilize nuclear techniques in developing efficient fertilizer and water management practices for multiple cropping systems. The programme is not designed to evaluate the merits of intercropping, but rather to use established nuclear techniques to provide information for the cropping system known to be most efficient in the region. The initial studies will focus on effective placement and timing of nitrogen fertilizer, and placement of phosphorus fertilizer using  $^{15}\text{N}$  and  $^{32}\text{P}$ . Although a few contracts have been awarded, additional cooperators are being sought. Researchers studying intercropping and interested in participating should contact J.B. Bole of this Section.

II. Coordinated Research Programme on Isotopic Tracer-Aided Studies of the Role of Herbicides and Related Chemicals in Soil and Fertilizer Nitrogen Management

(In collaboration with the Chemical Residues and Pollution Section of the Joint FAO/IAEA Division). A major objective of the research programme is the evaluation and effective use, with the aid of isotope techniques, of herbicides and related agrochemicals in soil and fertilizer nitrogen management practices for the purpose of i) enhancing efficiency of fertilizer nitrogen use by crop plants; ii) reducing the nitrogen losses from soil and fertilizer through the use of herbicides and related chemicals; iii) decreasing the herbicide residues in plants and soils and determining their influence on nitrogen fertilization. The programme implementation will involve the award of five research contracts to institutes in developing Member States and five cost-free agreements.

REPRESENTATION OF THE FAO/IAEA DIVISION AT AN ICARDA/UNDP WORKSHOP ON INCREASING THE EFFECTIVENESS OF WATER AND NITROGEN IN RAINFED FARMING SYSTEMS IN MEDITERRANEAN-TYPE ENVIRONMENTS

A Workshop on Increasing the Effectiveness of Water and Nitrogen in Rainfed Farming Systems in Mediterranean-type Environments was held in Aleppo, Syria from 13-18 January 1980. Dr. Y. Barrada, Head of the Soil Fertility, Irrigation and Crop Production Section represented the FAO/IAEA Joint Division at the meeting. The International Centre for Agricultural Research in the Dry Areas (ICARDA) and the United Nations Development Programme (UNDP) sponsored the successful workshop, which was attended by 26 participants and 8 observers in addition to about 5 staff members of ICARDA.

Fifteen high-level scientific papers were presented at the workshop. The papers dealt with very important topics such as the analysis of climatic resources, environmental variables determining agricultural production, water dynamics, plant water relations, biological dinitrogen fixation, nitrogen transformation, interaction between nitrogen and water, and optimising the use of water and nitrogen. The role of nuclear techniques in the above studies were discussed.

Based on the papers presented and the lively discussions that followed each of the presentations, the workshop recommended a set of research priorities and suggested broad outlines for their possible implementation.

SOILS RESEARCH AT AGRICULTURE SECTION, SEIBERSDORF LABORATORY

I. Symbiotic Nitrogen Fixation by Legume Crops under Field Conditions

The results of the field experiments carried out during 1979 in support of the Coordinated Research Programme on the Use of Isotopes in Studies on Biological Dinitrogen Fixation were reported to a meeting of contractors in Vienna in February 1980. It was found that:

- 1) The labelling of soil with  $^{15}\text{N}$  by means of incorporation of barley or wheat, receiving 10 kg N/ha at 5 or 10%  $^{15}\text{N}$  atom excess was successful. During three successive years the

experimental site was used for symbiotic dinitrogen fixation studies. It was not necessary to incorporate sugar to stimulate microbiological activity.

- 2) The standards which were used for fixation, i.e. barley, sudangrass, non-nodulating soybean lines, and ineffective Rhizobium strains, gave similar estimates of soil N supply.
- 3) The use of a standard crop grown as a single plot or alternated with the legume gave similar estimates of dinitrogen fixation by the legume.
- 4) Accurate measurements of nitrogen fixation could be made when the  $^{15}\text{N}$  solutions were sprayed on the surface of the plots or when finely divided  $^{15}\text{N}$  fertilizer was applied in a solid form.
- 5) Placement of  $^{15}\text{N}$  fertilizer in bands gave identical estimates for symbiotic N fixation as surface broadcast.
- 6) Testing of mutant lines of Vicia faba and of different Rhizobium strains with soybeans was successfully carried out. Barley was used as a standard for Vicia f. and non-nodulating soybeans as a standard for soybeans.

## II. Mass- and Emission-Spectrometry

The Micromass 602 D was utilized for routine analyses starting in December 1979, to analyze 3,000 plant samples provided by the Seibersdorf field experiments and those from contractors. Modifications in the equipment were introduced to improve the analytical output.

### TRAINING COURSES

#### Interregional Training Course on the Application of Nuclear Techniques in Agriculture

- Place:** Timiryazev Agricultural Academy, Moscow, USSR
- Time:** 1 September to 30 November 1980
- Organizer:** International Atomic Energy Agency in cooperation with the USSR State Committee on the Utilization of Atomic Energy and the Timiryazev Agricultural Academy
- Language:** The lectures will be given in Russian, with simultaneous interpretation into English
- Purpose:** The objective of the course is to provide intensive training on the use of stable and radioactive isotopes and radiation techniques to scientists from developing countries who are actively engaged in research in different fields of agronomy (plant nutrition, irrigation, plant physiology, fertilizer management practices, soil science, etc.). The course will help developing countries to effectively utilize isotope and radiation techniques in applied research aimed at increasing crop production.

Interregional Training Course on the Use of  
Isotope and Radiation Techniques in Studies on Soil/Plant Relationships

- Place:** IAEA Laboratory, Seibersdorf, near Vienna, Austria
- Time:** 31 March to 6 June 1980
- Organizers:** International Atomic Energy Agency and the Food and Agriculture Organization of the United Nations. The training course is financed by the Swedish International Development Authority (SIDA).
- Language:** English (participants should have no difficulty in following lectures and expressing themselves in English).
- Purpose:** The objective of the course is to provide intensive training on the use of both stable and radioactive isotopes and radiation equipment to scientists in developing countries who are actively engaged in research in soil science including plant nutrition, fixation of atmospheric nitrogen and fertilizer and water management practices. The course will help developing countries build up adequately trained personnel who will be able to effectively utilize isotope and radiation techniques in sound applied research aiming at increasing crop production.

COMING EVENTS

FAO/IAEA Advisory Group Meeting on Nuclear Techniques in Improving Pasture Management. The meeting will be held in cooperation with ICARDA in Aleppo, Syria (closed meeting).

Aleppo, Syria  
9-14 June 1980 (tentative)

FAO/IAEA/GSF Seminar on Isotope Techniques in Studies of the Useful Conservation and the Pollutant Potential of Agricultural Nitrogen Residues and Research Coordination Meeting on the Agricultural Nitrogen Residues with Particular reference to their Conservation as Fertilizer and Behaviour as Potential Pollutants.

Vienna, Austria  
25-29 August 1980

FORTHCOMING PUBLICATIONS

1. "Soil Nitrogen as a Fertilizer or Pollutant"  
(Report and Proceedings of the Fourth Research Coordination Meeting of the FAO/IAEA/GSF Coordinated Programme of Research on Agricultural Nitrogen Residues held in Brazil, 1978).
2. "Grain Legumes: Management for Optimum N-Fixation and Fertilizer Utilization" (Results of a five-year, eleven-country, FAO/IAEA coordinated research programme using isotopically labelled fertilizers).
3. "Radiation and Isotope Techniques in Studies of Soil-Water Regimes"  
(Results of a five-year coordinated research programme carried out

in ten countries designed to develop techniques for studying water movement in different unsaturated soils and obtain reliable estimates of drainage percolation of representative soil profiles in Member States).

4. "Nuclear Techniques in Development of Fertilizer and Water Management Practices for Different Cropping Systems" (Proceedings of the FAO/IAEA Advisory Group Meeting on Nuclear Techniques in Development of Fertilizer and Water Management Practices for Different Cropping Systems, held in Ankara, Turkey, from 7-12 October 1979).
5. "Zinc Fertilization of Flooded Rice" (Results of a five-year FAO/IAEA coordinated research programme using <sup>65</sup>Zn-labelled fertilizer conducted in ten countries).

Soils Newsletter

Joint FAO/IAEA Division of Isotope and Radiation  
Applications of Atomic Energy for  
Food and Agricultural Development

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