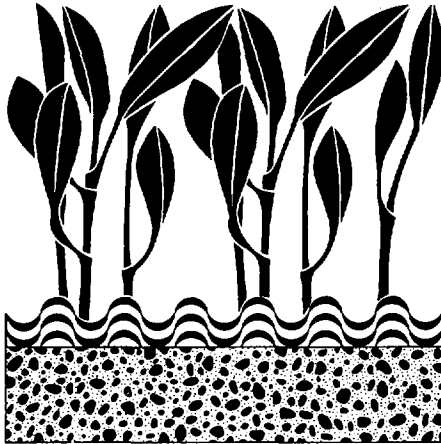




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Soils Newsletter



JOINT FAO/IAEA DIVISION
OF ISOTOPE AND RADIATION APPLICATIONS
OF ATOMIC ENERGY
FOR FOOD AND AGRICULTURAL DEVELOPMENT
INTERNATIONAL ATOMIC ENERGY AGENCY, VIENNA

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TO OUR READERS

This Newsletter outlines the Agency's plans for implementing Technical Cooperation projects in 1982 for which the Soils Section has technical responsibility. Requests for cooperation in 1983 are presently being evaluated. It is planned to include details on applying for such assistance in our next Newsletter so that readers from developing Member States who are interested in initiating or strengthening nuclear technique aided research will have time to prepare requests for 1984 and submit them through the appropriate government channels.

The Soils Section held consultants meetings on isotope use in tree crop research and on mycorrhizal associations in November. In the process we met new scientists and discussed with them ways in which nuclear techniques can be efficiently used in such research. The Joint Division is currently determining the most effective way of encouraging the studies and the proceedings of the meetings are being prepared.

We are still interested in contacting scientists wishing to conduct isotope aided studies in pasture and forage systems. A new coordinated research programme has been established with the generous support of the Government of Italy to improve biological nitrogen fixation in such systems.

We are introducing our new staff member Dr. Kir Kalinin and reporting that Dr. V. Ladonin has returned to conduct agricultural research in the USSR. Applications for two positions in the Division, the Head of the Soils Section and the Second Officer post will close 30 April and 16 June respectively. We hope to have some additional enthusiastic new staff members to introduce in our next Newsletter.

SOIL FERTILITY IRRIGATION
AND CROP PRODUCTION SECTION

We kindly request our numerous readers to notify us promptly of any change in mailing address, to ensure that they receive the Soils Newsletter.

CHANGES IN STAFF

Dr. Kir V. Kalinin joined the Soil Section on 1 March as First Officer. Dr. Kalinin has served with the Ministry of Agriculture of the USSR in research and with the Council of Mutual Economic Assistance. He was also an agriculture advisor to the Soviet Embassy in New Delhi. Dr. Kalinin will play a strong role in coordinating the fertilizer efficiency related activities of the Section.

Dr. Vadim Ladonin left the Joint FAO/IAEA Division on 15 March to resume his agriculture research career in the USSR. Vadim has served the Soils Section for more than four years during which time he had responsibility for the nitrogen residue coordinated research programme and initiated the nitrogen-herbicide programme. He was technical officer for many training courses and scientific visits and contributed to the field programmes of the Division.

Reports on
TECHNICAL COOPERATION PROJECTS

Fifteen new technical cooperation projects dealing with the application of isotopes and radiation techniques will be implemented during 1982. The projects have been planned to solve problems related to fertilizer use efficiency, plant nutrition, soil fertility, biological nitrogen fixation, soil moisture and water management in Member States in Africa, Asia, and Latin America.

I. AFRICA

1. Ghana

The IAEA is continuing its assistance to the Ghana Atomic Energy Commission for establishing a Center for Nuclear Agriculture at the Kwabenya Nuclear Research Establishment. The Agency will provide assistance in the form of expert services and equipment to support this multi-year project.

2. Ivory Coast

The assistance to be provided by the Agency to the Institute for Research on Citrus and Other Fruits has the goal to identify practices that will increase the efficiency of water and fertilizer use in pineapple production.

The IAEA will provide 3 m/m expert service, a neutron moisture probe and accessories and isotopically labelled fertilizers.

3. Mali

The IAEA will assist the Government of Mali to increase cereal and cotton production through the study of soil moisture utilization and the development of effective water conservation measures.

Expert service in connection with the use of neutron probes will be provided in 1982 in addition to equipment for measuring soil moisture status.

4. Morocco

The IAEA is continuing its assistance to the National Agricultural Research Institute in Tangiers. The project is aimed at increasing rice and sugar cane production through the development of improved fertilizer management practices.

The assistance would be in the form of six man-months of expert service, isotopes and equipment.

5. Senegal

Assistance is being provided to the National Centre for Agricultural Research, Bambey for research on the rooting behaviour of plants in various soils using P-32. Isotope aided studies will also be initiated to measure the availability of local rock phosphates. The assistance will be in the form of two man-months expert service, isotopes and additional equipment.

Assistance will also be given to the Richard Toll Research Station to conduct research to determine improved irrigation practices in the Senegal River Valley. Three man-months expert assistance and equipment will be provided.

6. Sudan

Assistance will be provided by the Agency to the Gezira Research Station of the Agricultural Research Corporation to initiate research on irrigation water requirements for cotton, wheat, groundnuts and sorghum.

The Agency has been requested to provide a neutron moisture probe together with 2 man-months expert services.

7. Zaire

Assistance is being provided to the Kinshasa Regional Nuclear Research Centre for research in the field of biological nitrogen fixation by soybean and sugarcane with a view to minimizing the requirements for nitrogen fertilizer. An N-15 emission-spectrometer recently supplied by the Agency will be used in this work. The IAEA will provide some additional equipment for microbiological research.

8. Zambia

The IAEA is assisting the Mount Makulu Central Research Station with studies on the relative efficiency of various chemical forms and placements of nitrogen fertilizers through the use of N-15 techniques. The availability of local sources of natural rock phosphate will also be evaluated using P-32. The assistance would be in the form of four man-months expert service and equipment.

II. ASIA

1. Bangladesh

The IAEA is continuing its assistance to the Institute of Nuclear Agriculture in Mymensingh with studies of the development of regimes for more efficient water use in multiple cropping systems and to support work on soil salinity with a view to increasing food production.

The Agency has been requested to provide necessary soil physics equipment and six man-months of expert service.

2. Pakistan

The Agency is assisting the Atomic Energy Agricultural Research Centre in Tandojam in a multi-year project to investigate the influence of various legume/non-legume cropping sequences and different irrigation and fertilizer management regimes on crop production. The objective of the research is to maximize crop production with minimum irrigation and fertilizer inputs.

The Agency is requested to provide equipment, including an optical emission spectrometer for N-15 studies and neutron moisture probe, tensiometers and related equipment for soil moisture research. Three man-months expert service will also be provided.

3. Thailand

Subject to the provision of additional funds from Member States, assistance will be provided to the Nuclear Research Laboratory of the Department of Agriculture for research on the fate of soil and fertilizer nitrogen (N-15) and phosphorus (P-32), with various management practices, including zero and normal tillage.

The Agency would provide the project with three man-months expert service and equipment including automatic titrators and labelled N-15 and P-32 fertilizers.

III. Latin America

1. Bolivia

The IAEA is continuing its assistance to the Division of Radioisotope Application of the Bolivian Nuclear Energy Commission and the Bolivian Institute of Agriculture and Stock breeding Technology. Studies using N-15 and P-32 as tracers will be conducted to develop management practices to improve soil and fertilizer nutrient availability.

The Agency will provide assistance in the form of seven man-months expert service and equipment, including a scintillation counter and a neutron moisture probe.

2. Brazil

The Agency will continue to assist the Centro de Energia Nuclear na Agricultura, Piracicaba. The multi disciplinary project will involve soil compaction studies, livestock studies and plant nutrient uptake studies. The analytical capability for water and organic matter determinations will also be improved.

Six man-months of expert service and equipment, including a gamma probe and spare parts for the mass spectrometer will be provided for this project in 1982.

3. Panama

The IAEA will provide assistance to the Government of Panama for the utilization of nuclear techniques in agriculture. The project will focus on such topics as fertilizer and water use efficiency.

The assistance in 1982 will be in the form of a multi-channel liquid scintillation counter.

TECHNICAL COOPERATION ADVISORY MISSIONS

Sudan

During November 1981 J.B. Bole participated in a programming mission to develop a plan for a major project of isotope use to strengthen agricultural research throughout the Sudan. The visit allowed him to discuss water and fertilizer use efficiency research with soil and plant scientists at the Universities of Khartoum and Gezira, and at the Gezira Research Station of the Agriculture Research Corporation.

Tunisia

J.B. Bole participated in a one week programming mission to Tunisia to strengthen plans for Technical Cooperation in the field of agriculture in 1983 and in future years. The potential for incorporating isotope use in the research programmes of scientists at the Institute National de la Recherche Agronomique de Tunisie (INRAT), the Institute National Agronomique de Tunisie (INAT) and the Centre de Recherche Genie Rural (CRGR) were explored.

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

The third annual meeting of the FAO/IAEA/SIDA Coordinated Research Programme on the Use of Isotopes in Studies on Biological Dinitrogen Fixation was held at the Vienna International Center, Vienna, Austria from 25 - 29 January 1982. Dr. S.K.A. Danso served as the Scientific Secretary of the meeting; Professor M. Zifferero, Deputy Director General, Department of Research and Isotopes of the IAEA delivered the opening address. Eighteen out of the twenty participants in the programme from the following countries attended: Argentina, Australia, Bangladesh, Brazil, Egypt, France, Federal Republic of Germany, Greece, India, Kenya, Mexico, Nigeria, Pakistan, Senegal, Sri Lanka, Syria, U.K. and U.S.A. Dr. Fredriksson represented the Swedish International Development Authority (SIDA), sponsors of the programme at the meeting. Drs. S. Verniau, and S. Whitney, attended the meeting as representatives of FAO and the Nitrogen Fixation by Tropical Agricultural Legumes (NifTAL) project respectively.

Reports of studies carried out by participants in 1980 and 1981 were presented and discussed. The results showed that in soils deficient in P, the addition of phosphorus fertilizer increased the proportion of the plant's N which was derived through symbiotic nitrogen fixation. In soils containing high levels of P however, there was no difference in the amount or proportion of N the grain legumes studied derived from dinitrogen fixation.

Data presented on the 1981 experiments on nitrogen fixation by different varieties of a given legume species showed that different varieties vary widely in their ability to fix N symbiotically. It was also shown that, although different varieties fixed less N at 100 kg than at 20 kg applied N/ha, this reduction was more pronounced in some varieties than others. Total N yield was a poor criterion for assessing N fixation, since although some varieties showed no change in total plant N with increasing N rate, the portion of the plants N derived from fixation was drastically reduced.

It was decided, that the 1982 research by participants should involve any two or three factors, which acting in different ways, could influence the plant's ability to fix N. The factors which most participants decided to study were Rhizobium strains, P levels, N levels and different varieties of a given legume crop.

Report on the
CONSULTANTS MEETING ON THE USE OF ISOTOPES
IN RESEARCH ON TREE CROPS

Six consultants from Canada, Greece, Kenya, Nigeria, Sri Lanka, and the U.K. presented reports on research using isotopes in tree research, from 9 - 13 November, 1981. Experimental plans were developed for isotope aided studies to improve N and P fertilizer use efficiency in tree crops, to determine tree rooting patterns and to study water use and photosynthesis by tree crops. The potential for using isotopes to determine biological nitrogen fixation by trees or by other species growing in conjunction with them was fully discussed.

Scientists interested in details of the meeting or in pursuing the possibility of future isotope aided tree research in cooperation with the Joint FAO/IAEA Division are invited to write to the Head, Soil Fertility, Irrigation and Crop Production Section.

Report on the
CONSULTANTS' MEETING ON THE ROLE OF ISOTOPES IN STUDIES
OF ENDOMYCORRHIZAL ASSOCIATIONS

The Joint FAO/IAEA Division invited eight experts in mycorrhizal research to a consultants' meeting on the role of isotopes in studies on the potential of mycorrhizas in increasing food production, from 16 - 20 November, 1981 in Vienna. These scientists came from Australia, Canada, Spain, Syria, U.K. and the U.S.A. Dr. S.K.A. Danso was the Scientific Secretary for the meeting.

The meeting's primary goal was to review work already done in relation to the effect of mycorrhizas on nutrient availability to plants, with particular emphasis on isotope-related studies, and to recommend where isotopes could be of value in understanding the role mycorrhizas play in enhancing nutrient uptake by plants. However, since mycorrhizal infection may affect plant/water relationships and may lead to healthier plants, capable of tolerating adverse conditions which non-infected plants cannot withstand, the meeting also reviewed the general role of mycorrhizas in enhancing plant growth.

The meeting emphasized the important function mycorrhiza play in increasing crop yields in soils of low fertility, through a greater uptake of plant nutrients. In addition, the meeting accepted the role of mycorrhizal infection in assisting plants to withstand drought and other stresses, such as, pathogens, salinity and elevated temperature better than non-mycorrhizal plants. Evidence was also presented to show that mycorrhizas enhance nitrogen fixation by legumes and play an important role in mixed cropping systems including pastures.

The meeting stressed the potential of isotope-related studies to quantify the ability of mycorrhizas to make more nutrients available to plants. The meeting therefore recommended that the IAEA through its Joint FAO/IAEA Division encourage the use of isotopes in mycorrhizal research, especially in the developing countries. It was also recommended that the IAEA Agriculture Laboratory in Seibersdorf should initiate isotope studies with mycorrhiza to provide some of the background information needed for a sound research programme.

NEW COORDINATED RESEARCH PROGRAMME
ON THE USE OF NUCLEAR TECHNIQUES IN IMPROVING PASTURE MANAGEMENT

The Soils Section is coordinating a programme of research designed to improve the productivity of pasture systems with the generous support of the Government of Italy. In the initial phase of the programme research will focus on improving biological nitrogen fixation by the legume component of mixed pasture or forage systems. Techniques utilizing ^{15}N will be applied to determine the effect of such factors as legume species or varieties, levels of P, mycorrhizal fungus inoculation or water conservation practices on biological nitrogen fixation.

Experimental plans have been developed which outline the methodology for the types of studies for which research contracts and agreements will be awarded. The contract programme provides limited funds to scientists from developing Member States of the IAEA for the isotopes and necessary equipment for conducting the research. Analysis of plant material for ^{15}N enrichment can be carried out by the Agency's Seibersdorf laboratory. Participants meet occasionally to review their progress and to plan future studies. The programme is planned to continue for five years.

A few research contracts and agreements have been awarded. However, we are continuing to solicit contract proposals from scientists who feel the proposed research would strengthen their ongoing studies in BNF of pasture or forage legumes. Those wishing to obtain more information should contact the Head of the Soil Fertility, Irrigation and Crop Production Section. The proposed experimental plans and research contract proposal forms will be provided.

Report on the
FAO/IAEA/SIDA REGIONAL TRAINING COURSE ON THE USE OF ISOTOPES
AND RADIATION TECHNIQUES IN STUDIES ON SOIL/PLANT
RELATIONSHIPS

Irapuato, Mexico

This Regional Training Course on the use of isotope and radiation techniques in studies on soil/plant relationships was held from 3 to 30 November 1981 at the ININ Agricultural Unit in Irapuato, Guanajuata and from 2 to 11 December at the Nuclear Reactor Centre, Salazar and other ININ installations in Mexico City.

Sixteen scientists from eleven Latin American Member States participated. The course was conducted in the Spanish language. Lectures as well as practical sessions (laboratory work, field and greenhouse exercises) were given on many aspects of isotope usage in studies on soil/plant relations. Scientific visits were organized to Research Institutes to observe and discuss agricultural problems. Cultural events and excursions were also arranged. Drs. F. Zapata and M.L'Annunziata served as Scientific and Administrative Officers respectively of the Course and lectured on isotope use and analysis. During the first week Mr. Carlos Velez DDG-TC from the IAEA visited the course in Irapuato and addressed the participants. Mr. S.A. Sebastinelli, from the IAEA Seibersdorf Laboratory assisted the local staff in setting-up the equipment purchased for the course and supervised the analytical

techniques. In addition to IAEA staff Dr. Leopoldo Lopez Martinez de Alva and staff members of the host institute (ININ) delivered lectures related to their specific expertise. Some lectures and practical work on radiological protection and health physics were given by staff of the National Commission of Nuclear Security and Safeguards (CNSNS). Staff of the Centre of Soil Science, Graduate College, Chapingo delivered lectures on nuclear techniques in soil physics studies and on biological nitrogen fixation. A scientific visit was made to the center later in the Course.

The proceedings of the course containing lectures, experimental guidelines, analytical techniques and biological references was printed in five volumes. All this material was compiled and edited in Spanish by Dr. Leopoldo Lopez Martinez de Alva. The participants were very satisfied with the preparation, facilities, handouts and conduct of the course.

The group of participants was very homogeneous with a common denominator of language, educational background and similar agricultural problems.

SOILS RESEARCH AT THE AGRICULTURAL SECTION OF THE
SEIBERSDORF LABORATORY
IN SUPPORT OF THE JOINT FAO/IAEA COORDINATED RESEARCH PROGRAMMES

A. Field Experiments, 1981.

1. Symbiotic nitrogen fixation by soybean cultivars at two levels of nitrogen fertilizer application.

The ability of eight varieties of soybean to fix atmospheric nitrogen in the presence of high as well as low levels of supplemental nitrogen fertilizer was compared.

The nitrogen derived from fixation was reduced from 16 to 5 % as measured by the ^{15}N methodology by increasing the level of nitrogen fertilizer from 20 to 100 kg N/ha. However, nitrogen fixation of one variety, Dunadja, was not reduced as much as the other varieties. Nodule observation and acetylene reduction measurements supported the ^{15}N results. Further experiments have to be performed to confirm this observation. A variety with this characteristic could be useful under conditions of high N availability such as in regions where soil N mineralization is high or where the legume is used as an intercrop with a cereal.

2. Symbiotic nitrogen fixation of Phaseolus vulgaris inoculated by different strains of Rhizobium phaseoli

The objectives of this experiment were to measure effectiveness in nitrogen fixation of Phaseolus vulgaris-Rhizobium phaseoli symbiosis under field conditions.

Using the ^{15}N methodology only 4 % of the nitrogen in the inoculated plants was found to be derived from fixation. Rhizobial inoculation did affect nodulation and acetylene reduction activity but this was not translated into increased nitrogen fixation as measured by labelled nitrogen. Had these non-isotopic indicators of symbiotic nitrogen fixation been the only measurements, erroneous conclusions could have been made.

3. Effect of placement and timing of nitrogen fertilizer application for a multiple cropping system.

The main objective of this study was to determine the optimum methods of applying nitrogen fertilizer to an intercropping system by means of isotope techniques.

Nitrogen fertilizer applied in a band below a sorghum row was taken up more efficiently by the cereal than when the fertilizer was broadcast and incorporated uniformly over the entire plot. Split application did not result in an increase of fertilizer use efficiency. Side-dressing of nitrogen when the sorghum was about 50 cm high was about as effective as application at seeding time.

B. Greenhouse Experiments and Training, 1981 - 1982.

Several IAEA fellows have participated in field experiments carried out at the Seibersdorf Laboratory in support of IAEA programmes and have conducted several greenhouse experiments.

Mr. L. Kara-Baranga from Zaire has conducted a greenhouse study on the effect of delaying inoculation by Rhizobium japonicum on nodulation and symbiotic nitrogen fixation by soybean. He also investigated the effect of different sources of nitrogen fertilizer on nodulation and nitrogen fixation by soybean and broadbean. He has also performed laboratory experiments on carriers for Rhizobium.

Mr. M. Mitrosuhardjo from Indonesia conducted greenhouse experiments on the effect of soil moisture on nitrogen fixation by soybean. He has also studied the use of neutron moisture meters under field conditions.

Ms. R. Afza from Bangladesh performed field experiments with soybean to determine the effect on nitrogen fixation of top dressing and spraying of nitrogen fertilizer at the early stages of seed development. A thesis on her research will be submitted to the University of Vienna for partial fulfillment of a Ph.D. degree.

Announcement of the
FAO/IAEA TRAINING COURSE ON THE USE OF ISOTOPE AND
RADIATION TECHNIQUES IN SOIL PHYSICS STUDIES

<u>Place:</u>	Department of Soil Physics, Faculty of Agricultural Sciences, State University of Ghent, Ghent, Belgium.
<u>Date:</u>	6 - 24 September 1982.
<u>Organizers:</u>	The International Atomic Energy Agency and the Food and Agriculture Organization of the United Nations, in cooperation with the Government of Belgium.
<u>Language</u>	The language of teaching will be English.

Purpose of
the course:

The object of the course is to provide intensive training on the use of radiation equipment for measuring soil moisture and bulk density, and of isotopes to determine soil water dynamics. Training will be provided for scientists in developing countries who are actively engaged in research aimed at improving the efficiency of water use on irrigated land, or management practices and water conservation measures under dry farming conditions.

Nature of
the course:

The course will deal with the principles involved in the use of neutron moisture meters and gamma density gauges, tensiometers and related equipment in soil physics research. The course will emphasize the calibration and maintenance of equipment and its proper use in field and laboratory studies. Emphasis will be placed on experimental design and the collection, processing and interpretation of data from field experiments.

Basic information essential for understanding the theories involved in using the instruments and calculating the necessary parameters will be provided during the first week of the course. The remaining two weeks will be used for practical field studies to measure water infiltration rates, hydraulic conductivity as a function of moisture content and to conduct water balance studies.

Participants'
qualifications:

Participants must have graduate training equivalent to an M.Sc. degree in soil physics, irrigation or a related field. Preference will be given to candidates who are actively involved in soil water research using nuclear techniques.

Announcement of the
INTERNATIONAL SYMPOSIUM ON ISOTOPES AND RADIATION TECHNIQUES
IN SOIL PHYSICS AND IRRIGATION STUDIES.

Aix en Provence, France
18 - 22 April, 1983.

This Symposium will provide an opportunity for exchange of information on recent advances in the use of radiation techniques in soil physics research, with special emphasis on studies of soil-water-plant relationships.

Attention will be focused on research using the various types of radiation devices and related equipment in irrigation and crop water requirement studies. The appropriate use of data derived in research to improve water management practices will be examined, the uses of computer modeling and of such techniques as spacial or temporal autocorrelation as tools in determining the physical characteristics of a field soil will be discussed.

The Symposium will also emphasize isotope aided studies aimed at the development of adequate soil and water conservation measures which would reduce the hazards of crop failures and increase production under rain-fed agriculture.

The use of tracers to measure various fluxes through the soil will also be stressed. As the movement of water in the soil is intimately coupled with the movement of dissolved and colloidal substances, measuring the amount of solution or suspension that passes through unit cross sectional area per unit time provides the basis for soil and water pollution studies. Emphasis will thus be given to studies of various techniques used for measuring or estimating deep percolation and sampling soil water.

List of topics:

The Symposium will comprise invited review papers, reports of research and posters on the following topics:

- improvements in and new techniques using nuclear equipment in agricultural research.
- the interrelationships between management factors and soil physical properties and their effect on root growth, crop water use and productivity.
- the effect of management factors on soil water conservation and nutrient dynamics in the soil.
- water and solute transmission and retention as affected by the chemical and physical properties of the soil.
- management of saline soils and waters.
- soil and water conservation practices.
- hydrodynamic characterization of experimental sites.

Further details of the Symposium will be provided in the next Newsletter or can be obtained from the Soils Section. We hope scientists will begin planning to enjoy southern France and a stimulating Symposium in the spring of 1983.

SCIENTIFIC TRAVEL ON ISOTOPES USE
IN AGRICULTURAL RESEARCH

Madagascar:

At the invitation of FAO J.B. Bole assisted the Programme Engrais Malagasy to plan a programme of ^{15}N aided research to quantify the increased efficiency of urea supergranules (USG) for flooded rice. Previous experiments conducted by the group indicated that yields were increased to a greater extent by USG than by broadcast and incorporated urea. This has also been the conclusions of studies by scientists at IRRRI and other centers, some of which were in cooperation with the Joint FAO/IAEA Division.

As flooded rice is the major food crop in Madagascar, and the government is building a urea manufacturing plant it is important to quantify the increased efficiency which can be achieved by providing nitrogen fertilizer for rice as USG. Field studies comparing several sizes and placements of ^{15}N labelled simulated USG are presently being conducted.

Bangladesh:

S.K.A. Danso lectured in a training course on the Microbiology of Nitrogen Cycling at the Bangladesh Agricultural Research Institute, Dacca and the Bangladesh Agriculture University, Mymensingh, from 26 November to 11 December, 1981. The course was co-sponsored by SCOPE, UNEP, UNESCO, ICRO, FAO, IAEA and the Bangladesh Society of Microbiology. Eighteen trainees from Bangladesh, India, Nepal and Sri-Lanka attended this course. Scientists from Bangladesh, Sweden, India, Sri Lanka, U.S.A. and the IAEA, Vienna, Austria, lectured on various aspects of the microbiological processes responsible for losses or gains of N in soil and in the atmosphere. Dr. Danso gave introductory lectures on concepts involved in the use of ^{15}N , led participants in calculating ^{15}N -derived data, and explained how to interpret these results with examples drawn from various N turnover studies.

Sweden:

At the invitation of the Department of Microbiology, Swedish University of Agricultural Sciences in Uppsala, S.K.A. Danso delivered a series of lectures to members of the Microbiology Department, Soil Science Department, Forestry Department, and other interested members of the Agriculture University, and of Uppsala University from 9 - 12 March, 1982. These lectures involved a review of ^{15}N usage in all aspects of N turnover in soil and air, concepts of N isotope use, calculations, and interpretation of data. Dr. Danso, in addition, met with individual members of the Microbiology Department involved in the project "Ecology of Arable Land", which is studying N gains and losses in forest soils, and helped to formulate isotope-aided research to define various processes in N transformation.

India:

Dr. F. Zapata of the Agency's Seibersdorf Laboratory participated in an FAO Expert Consultation on Fertilizer Use under Multiple Cropping Systems held in New Delhi, 1 - 6 February 1982. Preliminary results of the FAO/IAEA coordinated programme on increasing fertilizer use efficiency in multiple cropping systems were presented. Dr. Zapata also attended the International Congress of Soil Science and presented a paper on research performed at the Seibersdorf Laboratory in support of the coordinated programme on biological nitrogen fixation. The study used ^{15}N to show the time course of nitrogen fixation by faba beans and soybeans.

COMING EVENTS:FAO/IAEA/SIDA Interregional Training Course
on the Use of Isotopes and Radiation Techniques in Studies
of Soil/Plant Relationships.

The fifth interregional training course hosted by the Seibersdorf laboratory is to be held from 29 March to 21 May 1982. The course will provide training on the use of both stable and radioactive isotopes to scientists in developing countries who are actively engaged in research in soil science and plant nutrition, fixation of atmospheric nitrogen and fertilizer and water management practices.

This year 21 trainees have been selected from scientists nominated by developing Member States of the FAO and IAEA. A full report of the course will be included in the next Newsletter.

Seibersdorf, Austria
29 March - 21 May, 1982.

FAO/IAEA Research Coordination Meeting
on Isotopes and Radiation Techniques for Efficient Water
and Fertilizer Use in Semi-arid Regions.

The second meeting of the group will be held in Vienna in May. Participants will report on their research progress in developing management practices to conserve water and increase production under rainfed conditions.

Vienna, Austria
24 - 28 May 1982

FAO/IAEA Research Coordination Meeting
on the Use of Nuclear Techniques in the Development of Fertilizer
and Water Management Practices for Multiple Cropping Systems.

The second meeting of the group will be held in Vienna in November. Reports on isotope aided research designed to identify the optimum placement of N and P fertilizer for an intercropped cereal and grain legume will be presented. Additional studies performed by some participants used ^{15}N to determine the effect of P placement on BNF by the legume component of intercropped plants.

Vienna, Austria
8 - 12 November, 1982

Soils Newsletter

Joint FAO/IAEA Division
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