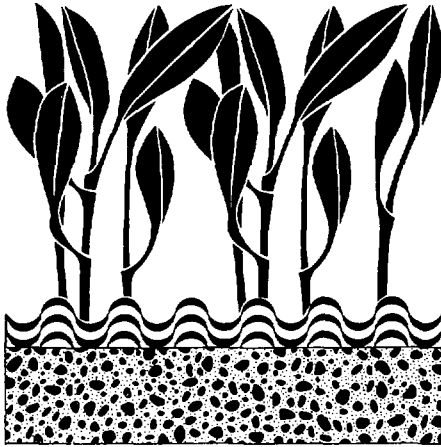




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Soils Newsletter

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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CONTENTS

1. TO OUR READERS	2
2. CHANGES IN STAFF.....	2
3. TECHNICAL ASSISTANCE PROJECTS.....	2
4. FELLOWSHIPS.....	7
5. REPORT ON THE FAO/IAEA RESEARCH COORDINATION MEETING ON NUCLEAR TECHNIQUES IN DEVELOPMENT OF FERTILIZER AND WATER MANAGEMENT PRACTICES FOR MULTIPLE CROPPING SYSTEMS.....	10
6. REPORT ON THE FAO/IAEA RESEARCH COORDINATION MEETING ON ISOTOPIC TRACER-AIDED STUDIES ON THE ROLE OF HERBICIDES AND RELATED CHEMICALS IN SOIL AND FERTILIZER NITROGEN MANAGEMENT.....	10
7. REPORT ON THE WORKSHOP ON CONCEPTS IN THE USE OF ¹⁵ N AND RADIOISOTOPES IN STUDIES OF PLANT NUTRITION.....	11
8. NEW COORDINATED RESEARCH PROGRAMMES TO BE IMPLEMENTED DURING 1982..	11
9. SOILS RESEARCH AT THE AGRICULTURE SECTION OF THE SEIBERSDORF LABORATORY.....	12
10. TRAINING COURSES.....	13
11. COMING EVENTS.....	18
12. OTHER ITEMS.....	19

TO OUR READERS.

The Newsletter will be a little late as the month of September has been very busy. All of our efforts were required to conduct Research Coordination meetings for the Multiple Cropping and the Herbicide-Nitrogen Use Efficiency Programmes. A week long Workshop was also conducted for participants in both programmes. In the process we have met many new scientists who are now much more aware of how powerful isotopes can be as tools in agricultural research.

This issue will emphasize the Soils Section's activities in support of the Agency's programme of Technical Assistance. The projects which have received assistance from international experts in the past year will be outlined. Information about the Agency's Fellowship programme will also be presented. This is an appropriate time to stress Technical Assistance since scientists from developing Member States should now be submitting requests for such assistance to the IAEA through their appropriate local government body.

We are now interested in contacting scientist wishing to conduct isotope aided studies in pasture systems. A new coordinated research programme is being established which will emphasize nitrogen fixation by the legume component of mixed pastures in its initial phase. This programme should complement our present activities in the field of biological nitrogen fixation.

SOIL FERTILITY, IRRIGATION
AND CROP PRODUCTION SECTION

CHANGES IN STAFF

Dr. J.B. Bole became head of the Soil Fertility, Irrigation and Crop Production Section, effective 15 June, 1981.

Ms. Charlotte Fiscus has joined the Agricultural Chemicals Section within the Joint FAO/IAEA Division after efficiently serving the Soils Section for 6 years. In addition to her other duties, Ms. Fiscus played a major role in compiling previous issues of the Soils Newsletter. She has been replaced as secretary to the Soils Section by Ms. Maria Gabriela Ventura.

NEW DIRECTOR GENERAL

On 1 December, 1981, Mr. Hans Blix of Sweden will replace Dr. Sigvard Eklund as Director General of the International Atomic Energy Agency. Dr. Eklund has been named Director General Emeritus of the Organization following his 20 years of service.

Reports on
TECHNICAL ASSISTANCE PROJECTS

The Soils Section currently has technical responsibility for 29 active projects in 19 developing Member States of the IAEA. A brief description of the projects approved for implementation in 1981 was presented in the previous Soils Newsletter. The projects can

provide equipment and scientific guidance from internationally known scientists, as well as technical advice and cooperation from Agency personnel. Training required for conducting the research can also be provided through the Agency's Department of Technical Assistance, now called, Department of Technical Co-operation. The Seibersdorf Agricultural Laboratory staff is also active in these programmes by providing fellowship training and occasionally by acting as experts or by providing isotopic analysis in support of the research. Summaries of the final reports of field experts assigned to several of the projects is included here.

I. AFRICA

1. Egypt

Project: EGY/5/006
Institute: Atomic Energy Establishment, Cairo
Expert: Mr. R. Reinhart, Leipzig, GDR
Duration: 16 September - 18 December, 1980

Mr. Reinhart set up the ^{15}N emission spectrometer provided by the Agency and trained local staff in its operation. Preliminary greenhouse studies were conducted using ^{15}N labelled fertilizers. A second mission is being provided to assist the AEE to plan and initiate field studies with additional fertilizer provided by the Agency.

2. Ivory Coast

Project: IVC/5/009
Institute: Institut Francais du cafe et du Cacao, Bingerville
Expert: Mr. P. Moutonnet, CEN, Cadarache, France
Duration: 14 - 28 July, 1981.

Mr. Moutonnet reviewed the progress of the research carried out by the IFCC using radiation techniques. Cocoa trees responded greatly to irrigation during their first 5 years of growth, especially, to trickle application of the water. Older trees showed minimal response to irrigation but responded greatly to added N fertilizers. Mr. Moutonnet assisted local scientists to plan future studies aided by nuclear techniques and identified the equipment needs for such studies.

3. Mauritius

Project: MAR/5/003
Institute: Mauritius Sugar Industry Research Institute
Expert: Dr. D. Ernst, Hannover, FRG
Duration: 5 February - 5 April 1981

Dr. Ernst installed a ^{15}N emission spectrometer and provided training to the local staff in sample preparation and in the effective operation of the equipment. He also recommended modifications to the equipment to reduce future servicing requirements. Dr. Ernst assisted the research group to conduct ^{15}N labelled fertilizer studies with sugar cane.

4. Morocco

Project: MOR/5/013
 Institute: Central Station for Agricultural Research, Tangier.
 Expert: Dr. M. Hamissa
 Duration: November 27, 1981 to 17 June 1981.

Dr. Hamissa assisted local counterparts in setting up experiments using ^{15}N and ^{32}P to study sugarcane nutrition. Based on those studies, it was found that lower rates of N than those currently recommended were needed for optimum growth of sugarcane in Morocco. For maximum growth, split application of N fertilizer into 2 doses was recommended, while banding of N fertilizer was superior to broadcast and incorporation.

4. Senegal

Project: SEN/5/011
 Institute: Centre National de Recherches Agronomiques, Bambey.
 Experts: (1) Dr. C. Pieri (14 January - 3 February, 1981)
 (2) Dr. G. Vachaud (27 December 1980 - 7 February, 1981)
 (3) Dr. Truong Binh (8 August - 20 September, 1980;
 3 July - 13 August 1981).

Dr. Pieri, IRAT, Montpellier, France, was able to combine the information on water flux previously obtained under the project and summarized by Drs. Vachaud and Vauclin, with data on the chemical concentration of the soil solution to measure leaching of soil nutrients. It was necessary to determine the frequency distribution of ion concentration to achieve these results. The data indicate the potential for nutrient leaching in Senegal soils but documents the difficulty in gaining confidence in the results of this type of research due to the spatial variability of the soil.

Dr. Vachaud, IMG, Grenoble, France, assisted to summarize the results of research conducted over the past 3 - 4 years on the project. Much of the information has been referred to in previous Soils Newsletters. Information provided by the project and that obtained under similar studies in the Ivory Coast form the basis of an invited paper on Soil Physics Research and Water Management to be delivered by Dr. Vachaud to the 12th International Congress of Soil Science in New Delhi. Copies of the paper can be provided on request.

Dr. Truong Binh, IRAT/GERDAT, Montpellier, France, made two visits to Bambey to advise on root studies. He assisted to plan and conduct a series of studies which established the suitability of the methodology of using radioisotopes (^{32}P and ^{86}Rb) to determine the root development and root activity of millet and groundnut in Senegal.

7. Zambia

Project: ZAM/5/004
 Institute: Mount Makulu Research Station, Chilanga
 Expert: Dr. M. Karim
 Duration: 10 December 1979 - 9 October 1980

During his extended Mission, Dr. Karim, from the Bangladesh Atomic Energy Commission, Dacca, set up a radioisotope laboratory with

equipment and supplies provided by the Agency. He trained local scientists in the safe and effective use of radioisotopes and initiated a programme of agricultural research with ^{32}P and ^{15}N .

The research Dr. Karim assisted with indicated that two sources of Zambian rock phosphate were moderately available in acid Zambian soils. Although this material was only one half as available as triple superphosphate during the period of the study, they were comparable to Gafsa rock phosphate from Tunisia. The relative economics and residual availability would make these local products economically more suitable than imported phosphates. As expected, the products were unavailable in calcareous soils. More experiments have been planned to confirm the availability of the phosphate sources.

II. ASIA

1. Bangladesh:

Project: BGD/5/03
Institute: Institute of Nuclear Agriculture, Mymensingh
Expert: Dr. U.K. Sengupta
Duration: 17 March to 16 June 1981

Dr. Sengupta instructed and helped local staff in setting up of experiments, mainly in crop physiology. The aim of these studies was to identify pulse legumes most suited for intercropping situations, or able to make optimum use of available light. His visit also enabled him to review work done under the project. Recommendations as to areas of study to be strengthened were made.

2. Republic of Korea

Project: ROK/5/18
Institute: Che-Ju National University, Che-Ju City
Expert: Dr. E.G. Niemann

Since 1979, Dr Niemann, Hannover, FRG, has visited the project three times for a total of 7 months. A temporary laboratory has been equipped with radioisotope counting equipment supplied by the FRG through the IAEA. Construction has recently been initiated on a new facility which Dr. Niemann helped plan. A research programme designed to improve phosphate fertilizer use efficiency using ^{32}P and soil moisture density probes to improve soil water use is being planned.

3. Sri Lanka

Project: SRL/5/016
Institute: Maha Illuppallama, Agricultural Research Station
Expert: Dr. E.H. Halstead
Duration: 16 July - 28 August, 1981

Dr. Halstead, University of Saskatchewan, Canada, assembled a C.M. counting system and assisted with experiments designed to demonstrate the ^{32}P soil placement and plant injection techniques for studying root distribution and activity. The preliminary field study suggested

that 75 day old groundnuts exhibited relatively uniform root activity to a depth of 60 cm. These techniques will now be used to complement studies designed to improve water management practices in Sri Lanka.

III. EUROPE and the MIDDLE EAST

1. Greece

Project: GRE/5/012
Expert: Dr. Y. Barrada
Institute: Institute of Land Reclamation, Thessaloniki
Duration: 7 April - 7 May, 1981

Dr. Barrada, former Head of the Soil Fertility, Irrigation and Crop Production Section found that the neutron moisture meter and accessories provided by the Agency were functioning properly and instructed local staff on the calibration of the equipment and in its safe and effective use. Studies to determine the interaction between fertilizer nitrogen and water use efficiency and to determine the dynamics of water and salt movement in the soil were planned.

IV. LATIN AMERICA

1. Brazil

Project: BRA/5/010
Institute: Centro de Energia Nuclear na Agricultura, Piracicaba
Expert: Dr. R. Rennie
Duration: 15 September - 12 December 1980

During the expert's assignment, the main achievements and problems in the application of nuclear techniques for studying nitrogen fixation in sugar cane and Phaseolus were examined. The expert reviewed the progress made at CENA on isolation and identification of N₂-fixing bacteria, on Rhizobium inoculation techniques, and gave some advice on the continuation of the programme. He emphasized the need of additional equipment and the importance of greater cooperation between microbiologists and breeders, for rapid advancement in this field.

Project: BRA/5/010
Institute: Centro de Energia Nuclear na Agricultura, Piracicaba
Expert: Dr. F. Warembourg
Duration: 7 April - 6 July 1981

During his three months' assignment in the field of soil organic matter studies, he developed adequate technical facilities for ¹⁴C work, including:

proper equipment for labelling plant material, either for short or long term investigations, simple, but accurate techniques for measurement of total and radioactive carbon in soil, plant materials and various extracts, initiation of short and long-term ¹⁴C-labelling studies, using the controlled-environment canopy which was developed by the expert, recommendations for the programme.

2. Peru:

Project: PER/76/002
 Institute: National Agrarian University, Lima
 Expert: Dr. Knut Mikaelson
 Duration: 12 August - 5 September 1981.

Dr. Mikaelson reviewed this project, and made recommendations. An emission spectrometer is to be set up soon. Experiments involving ^{15}N , ^{32}P and ^{33}P are expected to be carried out.

3. Venezuela:

Project: VEN/5/006, VEN/5/007
 Institute: Faculty of Agronomy, University of Zulia
 Expert: Dr. J.M. Hetier
 Duration: February - April 1981

The expert used ^{32}P to study the best method of superphosphate fertilizer application on sorghum. An automatic liquid scintillation spectrometer and some additional equipment were provided by the Agency.

During this visit, the expert helped to install the equipment, and trained his counterparts on the use of the equipment and assisted in the planning of a research programme. He identified the need for additional equipment. A second visit by the expert will take place during the second part of the year.

FELLOWSHIPS.

The IAEA offers a number of training fellowships to suitable qualified personnel from developing Member States of the Agency. This fellowship programme forms a part of the technical assistance provided to the developing Member States of IAEA. The objective is to provide training in the application of nuclear technology in areas such as agriculture, medicine and industry.

How to apply: Applications for IAEA fellowships have to be submitted in writing on an "Application for Fellowships/Scientific Visit Form TA-2EF" which can be obtained from the Training and Fellowships Section of the Agency, or through the applicant's national Atomic Energy Commission, or the Ministry which has jurisdiction over nuclear matters. This local government body would have to endorse the application and forward it to the IAEA for consideration.

Qualification: Generally the applicant must have a suitable academic background and have working experience in the area for which he is requesting training. Applicants for research training in the area of Soil Science, Soil-Plant Nutrient Studies and Agronomy, require at least a university degree in agriculture, soil science, or a related field. For advanced training, a higher degree may be necessary. For technicians, a basic technical training in agriculture, soil science, or in some cases, applied chemistry, biochemistry or biology

is required, together with a working experience in Soil Science or agriculture-related research.

Period: The length of award is normally 6 - 12 months, with all expenses while in training borne by either the IAEA or a donor country. In exceptional cases, shorter duration awards or further renewals beyond 12 months are made. The duration of the award is determined primarily by the competence already acquired by the participant.

- Limitations:
- (i) Applicants have to be from developing Member States of the Agency.
 - (ii) Applications which do not have the endorsement of the government's agency responsible for nuclear matters cannot be considered.
 - (iii) Applicants must be employed by a Government, Ministry, Research Institute, University, or similar body, and there must be an assurance of employment upon the completion of the fellowship.
 - (iv) In general, awards for training are not made if suitable training is already available in the applicant's own country.
 - (v) The submission of an endorsed application does not constitute a guarantee that an award will be made. All applications are evaluated by the IAEA and selection made on merit.

The following are IAEA fellows who are currently undergoing training in various aspects of isotope-aided research in Soil Science or Plant Nutrition:

COUNTRY of ORIGIN	NAME	COUNTRY WHERE TRAINING is taking PLACE	FIELD OF STUDY
Bangladesh BGD/8013	AFZA, Rownak	Austria	Fertilizer Use
Brazil BRA/8151	FREITAS, Jose R.de	Canada	Nitrogen Fixation
Colombia COL/8008	MORALES Luis E.	Brazil	Nucl. Tech.in Agric.
COL/8009	BASTIDAS ORTIZ O.G.	Brazil	Nucl. Tech.in Agric.
Costa Rica COS/8001	PACHECO SALZAR R.	U.S.A.	Plant Nutriton
Ecuador ECU/8002	CALVACHE ULLOA A.M.	Brazil	Soil Science
Egypt EGY/7902	SALLAM Mohamed F.A.El S.	U.S.A.	Soil Physics
EGY/8008	AHMED Farid A. M.	U.S.A.	Isot.in Plant Nutrition
Ghana GHA/7918	BAIDEN Eric D. R.	U.S.A.	Soil Science

COUNTRY of ORIGIN	NAME	COUNTRY WHERE TRAINING is taking PLACE	FIELD OF STUDY
Indonesia INS/8101	MITROSUHARDJO M.M.	Austria	Nitrogen Studies
Kenya KEN/8107	ONCHERE Jedidah R.	U.K.	Soil Fertility
Madagascar MAG/8101	RONDRO-HARISOA L.	France	Nitrogen Fixation
Pakistan PAK/8013	IQBAL Muhammad M.	U.K.	Soil Science
Peru PER/8106	IRQUIAGA CABELLERO S.	Brazil	Soil Science
Rep. of Korea ROK/8113	KOH Mun Hwan	U.S.A.	Soil and Water Cons.
ROK/8114	KIM, Sun Kwan	U.S.A.	Soil and Water Stud.
ROK/8117	JO in Sang	Belgium	Soil Moisture Measurement
Senegal SEN/8102	BA Amadou Tidiane	France	Plant Physiology
Sierra Leone SIL/8004	KAMAR Cherrnor S.	U.K.	Soil Fertility
Sudan SUD/8001	FADL Osman A.A.	U.S.A.	Soil Moisture Measurement
SUD/8003	ABDALLA Ali Naiem	Netherlands	Plant Physiology
SUD/8005	BABIKIR Mohamed F.A.	U.S.A.	Soil and Water Cons.
SUD/80012	FARAH Saeed Mohammed	U.S.A.	Soil Moisture Stud.
Thailand THA/7910	SUBMADEE, Jittra	Canada	Soil Science
Zaire ZAI/8102	NSONSA Ngudi Mayala	Belgium	Soil Microbiology
ZAI/8151	KARA-BARANGA L.	Austria	Biol. Nit. Fixation
ZAI/8152	NYEMBO Kibanga *)	Austria	Biol. Nit. Fixation
Zambia ZAM/7904	NHABBURO John G.	U.S. A.	Isotopes in Soil Plant Relation.

*) Has recently completed his training.

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

The initial Research Coordination Meeting of the Multiple Cropping Programme was held in Vienna from 14 - 18 September, 1981. Nine participants in the programme from Bangladesh, Indonesia, Nigeria, Panama, Tanzania, Thailand, Trinidad, U.S.A. and Zambia attended. A second researcher from Zambia attended at the expense of his government and a representative of FAO, Rome also reported on FAO's activities in the field of multiple cropping. Unfortunately, the participant from India was unable to attend.

Progress on the coordinated experiment designed to determine the optimum placement and time of application of N and P fertilizers has not been as rapid as the group would have liked. Although at least three experiments which provided valuable information have been completed and others are in progress, local problems and late arrival or loss in transit of the isotopically labelled fertilizer has slowed the progress of the programme.

The group developed plans for future experiments, designed to determine more precisely, N fertilizer placement and timing for the cereal component of a legume - non legume intercropping system and to study the effect of P placement on nutrient uptake and N fixation by the legume.

Report on the
FAO/IAEA RESEARCH COORDINATION MEETING
ON ISOTOPIC TRACER AIDED STUDIES ON THE ROLE
OF HERBICIDES AND RELATED CHEMICALS IN SOIL
AND FERTILIZER NITROGEN MANAGEMENT.

Eight participants in the coordinated research programme met in Vienna from 28 September to 2 October 1981, for the first Research Coordination Meeting of the Programme.

The main objectives of the programme are to improve the efficiency of soil and fertilizer nitrogen usage by non legume crops and to increase the amount of biological nitrogen fixation by legume crops through the proper and effective use of pesticides (e.g. herbicides, insecticides, fungicides, growth regulators).

The results obtained documented various effects of herbicides and related agrochemicals on several soil-related factors, under controlled and field conditions.

The participants strongly urged the IAEA to continue to support research aimed at understanding the effects of pesticides on soil-related factors such as, fertilizer-use efficiency by cereals and biological nitrogen fixation by legumes. Preliminary studies on soil transformation or plant metabolism suggested that positive effects of a direct nature may occur as a result of the application of certain agricultural chemicals. These effects should be confirmed, explained and exploited for the benefit of agriculture in developing countries, through isotope-aided studies.

The group developed detailed research plans for experiments designed to investigate the direct and indirect effects of herbicides on fertilizer use efficiency, and to investigate the effects of agricultural chemicals on biological nitrogen fixation by legume crops.

Report on the
Workshop on Concepts in the use of ^{15}N and
Radioisotopes in Studies of Plant Nutrition.

21 - 25 September 1981.

Research contract holders in the Multiple Cropping and Herbicide-Nitrogen Efficiency Coordinated Research Programmes participated in a week-long Workshop on the Use of Isotope Techniques in Agricultural Research. The Workshop was conducted in conjunction with the annual Research Coordination Meetings of the two groups.

The general concepts of stable and radioisotope use were reviewed and participants were acquainted with the latest developments in the field. Actual data from isotope aided field experiments conducted at the IAEA Seibersdorf Agricultural Laboratory were used to familiarize the scientists with the necessary calculations.

Staff members of the Joint FAO/IAEA Division and the Seibersdorf Laboratory lectured, led discussions and assisted with the calculation of the data. The format of the course was similar to that of the Workshop on ^{15}N use described in our previous Newsletter, except that, special attention was paid to radioisotope-aided studies and to experiments with mixed cropping systems and herbicide use.

Dr. Danso of the Soils Section has prepared a summary of the Workshop which will be available upon request. It could prove very useful to instructors lecturing on isotope use in agricultural research.

New Coordinated Research Programme
on the use of Nuclear Techniques in Improving Pasture Management.

At the recommendation of an advisory group which was convened in November 1980, the Soils Section will coordinate a programme of research designed to improve the productivity of pasture systems. Research will focus on improving biological nitrogen fixation by the legume component of mixed pasture systems, in the initial phases of the programme. 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 agreement will be awarded. The contract programme provides limited funds to scientist from developing Member States of the IAEA for the isotopes and equipment necessary for conducting the research . Participants meet occasionally to review their progress, and to plan future studies.

Scientists wishing to obtain more information about the programme 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.

SOILS RESEARCH AT THE AGRICULTURE SECTION OF THE
SEIBERSDORF LABORATORY IN 1981,
IN SUPPORT OF THE JOINT FAO/IAEA COORDINATED RESEARCH PROGRAMMES

Field Experimentation at the Agriculture Section, Seibersdorf Laboratory.

The 1981 programme dealt with the following:

- 1) The effect of pesticides on symbiotic nitrogen fixation of legume crops.
- 2) The effect of different levels of soil nitrogen on the extent of symbiotic nitrogen fixation by different varieties of the same legume species.
- 3) The extent to which two different crops, growing in a mixed cropping system, compete for phosphorus and nitrogen applied on surface or in bands.
- 4) The effect of late application of nitrogen as top dressing or spray on the symbiotic fixation of nitrogen by soybeans.
- 5) The experiments were sampled and a comparison of the available amounts of phosphorus in various sources of rock phosphate and their residual effects on different soil types were made.

The experiments were sampled and harvested in the fall of 1981. Isotope analysis will be carried out during the winter of 1981/82, and the results will be reported in the next issue of the Soils Newsletter.

TRAINING.

Ms. Rownak AFZA from Bangladesh was awarded a 12-month extension of her IAEA fellowship in the Seibersdorf Laboratory. She has completed a series of field experiments with soybeans to determine the extent of symbiotic nitrogen fixation as affected by top dressing and spraying of nitrogen fertilizer at the early stages of seed development. The results of her experiment will be published in a Doctoral Thesis, to be presented at the Agricultural University in Vienna in the course of 1982.

In April 1981, Mr. Ahmed CHARANEK, an IAEA fellow, obtained a Doctor's degree, from the Universitaet fuer Bodenkultur in Vienna based on the results of several years of field work at the Seibersdorf Laboratory.

By means of placement of N-15 labelled $(\text{NH}_4)_2\text{SO}_4$ and injections of N-15 labelled nitrogen solutions at various locations and at different times during the growing season of sugar beets, Mr. Charanek showed that sugar beet, as opposed to most agricultural

crops, are able to take up nitrogen from much greater depths, frequently below one meter, in particular, during later stages of plant development.

Using neutron moisture techniques, the effect of different moisture levels on the root activity pattern of sugar beets was investigated.

Two IAEA fellows, Mr. L. KARA-BARANGA from Zaire and Mr. Martinus MITROSUHARDJO from Indonesia, and the staff of the Seibersdorf Laboratory participated in carrying out greenhouse and field experiments in support of the symbiotic nitrogen fixation and mixed cropping programmes.

TRAINING COURSES

Report on the FAO/IAEA INTERREGIONAL TRAINING COURSE ON THE USE OF ^{15}N IN SOIL SCIENCE AND PLANT NUTRITION

Leipzig, German Democratic Republic
19 May - 12 June 1981

The Interregional Training course on the Use of ^{15}N in Soil Science and Plant Nutrition was held during 19 May to 12 June 1981 at the Zentralinstitut fuer Isotopen- und Strahlenforschung, Leipzig, German Democratic Republic.

The purpose of the Course was to train scientists from developing Member States in all aspects of the use of ^{15}N -enriched and depleted compounds in soil and plant nutrition studies.

Seventeen scientists selected from Costa Rica, Cuba, Ecuador, Egypt, Indonesia, Iraq, Kenya, Democratic People's Republic of Korea, Niger, Pakistan, Spain, Sri Lanka, Tanzania, Thailand, Uganda, Zaire, and Yugoslavia, participated in the Course.

The course included lectures and practical laboratory exercises involving sample preparation for $^{15}\text{N}/^{14}\text{N}$ isotope ratio analysis and isotope ratio determination by mass- and emission-spectrometry. Experiments were conducted to determine plant uptake of labelled nitrogen from fertilizer applied to the soil and losses of nitrogen by leaching and volatilization. Time was spent discussing the participants' work in their home countries. During the Course, the participants visited the Institute of Plant Biochemistry in Halle, the Institute of Plant Nutrition in Jena, the Institute of Fertilizer Research in Leipzig, the Experimental Station of this Institute in Sproeda and the Central Institute for Crop Research in Gatersleben. Guided tours of Leipzig and Dresden were also organized for participants.

Drs. H. Broeshart and V. Ladonin, Staff Members of the IAEA, Dr. H. Faust, Course Director, and Staff Members of the host Institute and other Research Organizations of the G.D. R. delivered lectures bearing on the programme of the Course.

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

Seibersdorf, Austria

6 April - 5 June, 1981.

This year's annual training course in Seibersdorf took place from 6 April to 5 June, 1981.

Nineteen participants from 17 Member States of FAO/IAEA participated. Lectures as well as practical instructions were given on many aspects of isotope-usage to solve problems in soil-plant nutrition and soil-water management.

The scientists, as part of their training, participated in the execution of various experiments, including:

- (1) Use of indirect labelling to compare the availability of rock-phosphates from different sources.
- (2) Symbiotic N-fixation by different crops
- (3) Effect of various pesticides on N fixation by Vicia faba
- (4) ^{32}P fertilizer placement in a Vicia faba-barley intercropped system.
- (5) Use of ^{32}P , ^{33}P injection to determine the active root distribution of trees.

Aided by the instructors, results available from these experiments were analysed, discussed and interpreted by the trainees. Prof. Soper from Canada, Dr. Faust from German Democratic Republic, and Dr. Reichart from Brazil assisted in various aspects of the course, with the scientific staff of the Seibersdorf Laboratory, Dr. Fried, Director of the Joint FAO/IAEA Division, and Dr. L'Annunziata of the Department of Technical Co-operation delivering some of the lectures, as well as helping in the practical aspects of the course.

Each participant delivered a report on research problems and priorities, and stressed on the part isotopes could play in future research programmes in his/her country.

Report on the
FAO/IAEA Training Course on the use of Radiation Equipment for Soil
Moisture and Irrigation Studies

Cadarache, France.

22 June - 10 July 1981

Eighteen soil scientists and engineers participated in the three week long course which was held at the Centre d'Etudes Nucleaires de Cadarache, France. The course was conducted in the French language. A series of intensive lectures on the theory and practice of using neutron moisture probes preceded the actual use of the equipment in field studies. Probes were calibrated and then used to determine the infiltration rates and hydraulic conductivity of the soil. Soil variability was characterized based on the data from replicated observations.

The course was very successful due to the detailed preparation and enthusiastic participation of the course director Dr. P. Couchat, and the entire scientific staff of the Cadarache Centre, involved in the field of soil water dynamics. Dr. M. De Boodt (Belgium) and Prof. Cavassa (Italy) also contributed greatly to the course as did Dr. Vachaud and Mr. Thony from Grenoble, France.

Report on the
INTERREGIONAL TRAINING COURSE AND STUDY TOUR ON THE
APPLICATION OF NUCLEAR TECHNIQUES IN AGRICULTURE

Moscow, U.S.S.R

25 May - 20 June 1981

The Interregional Training Course and Study Tour on the Application of Nuclear Techniques in Agriculture was held during 25 May - 20 June 1981 at the Timiryazev Agricultural Academy, Moscow and Several Republics of the Soviet Union. The Course and Study Tour provided training and scientific information on the use of isotopes and radiation techniques in different fields of agricultural research to scientists from developing countries.

Twenty-three scientists from Afghanistan, Bulgaria, Czechoslovakia, Ghana, Greece, India, Iraq, Philippines, Romania, Viet-Nam, Thailand, Turkey, and Zambia, participated in the Course and Study Tour.

Dr. V. Ladonin and Mr. B. Lisovich from the IAEA served as Scientific and Administrative Officers, respectively, during the Course. During the first two weeks of the Course, introductory lectures were given in the field of nuclear physics, radiation physics, dosimetry, radiation chemistry, radiobiology, agricultural radiobiology and the use of radioactive and stable isotopes in agricultural research. Drs. M. L'Annunziata and V. Ladonin from the IAEA; Prof. V. Rachinskij, Director of the Course, and staff members of the host Academy delivered lectures related to their specific expertise. The lectures emphasized the theoretical aspects of the use of nuclear techniques in agricultural research.

The study tour to Leningrad, Kiev, Kishinev, Tashkent, and Samarkand took place during the second two weeks. In Leningrad and Pushkin (near Leningrad) the participants visited the Agrophysics Research Institute, the Vavilov Institute of Plant Industry and the All-Union Research Institute of Plant Protection. In Kiev the Institute of Plant Physiology of the Ukrainian Academy of Science was visited by the participants. The participants were shown the Agricultural Institute and Gamma-field outside of Kishinev. In Samarkand, the All-Union Sheep-Breeding Institute was visited by the participants, and in Tashkent the All-Union Cotton Research Institute was visited. During these visits, staff members of the institutes presented information about research work carried out in the field of the use of isotopes and radiation techniques in different fields of agriculture. Broad discussions were organized at each institute. In some cases participants had separate discussions with staff members about individual problems. Cultural visits and excursions were made in many of the centers.

During the Course and Study Tour the participants had the opportunity to discuss possible cooperation with the IAEA in their future work.

Announcement of the FAO/IAEA Regional Training Course
on the Use of Isotope and Radiation Techniques
in Soil/Plant Relationships.

- Places: National Institute of Nuclear Research, Irapuato, and Postgraduate College, Chapingo, Mexico.
- Time: 3 November - 11 December 1981.
- Language: Spanish.
- Number of Participants: 15
- Organisers: International Atomic Energy Agency and the Food and Agriculture Organisation, in collaboration with the Government of Mexico. The course is being financed by the Swedish International Development Authority (SIDA).
- Purpose: The objective of the course is to provide basic training on the use of isotopes and radiation techniques to scientists in Latin America who are actively engaged in research in Soil Science, Plant Nutrition, Biological Nitrogen Fixation, Agronomy, Fertilizer and Water Management Practices. The Course will provide training to qualified personnel who would then be able to safely and effectively employ isotopes in research to enhance plant nutrient utilization and increase crop production.
- Nature of the Course: It will consist of lectures, laboratory and field experiments related to the following subjects: Characteristics of isotopes and radiation, radiation safety techniques and standards, methods of radiation detection and radioisotope assay. Other areas of training would include: The use of isotopes and nuclear techniques in soil chemistry, soil physics and plant nutrition research and the assessment of biological nitrogen fixation, fertilizer and water management practices. The field experiments will be designed as short-term trials, so as to allow them to go to completion during the six week Course. Instructions will also be given in the planning and execution of experiments, sample preparation, analysis of samples, interpretation and presentation of results.

Announcement of the Seibersdorf Training Course
on the
USE OF ISOTOPES AND NUCLEAR TECHNIQUES IN STUDIES ON SOIL/PLANT
RELATIONSHIPS.

FAO/IAEA INTERREGIONAL TRAINING COURSE 1982.

The FAO/IAEA Interregional Training Course on the Use of Isotope and Radiation Techniques in Studies on Soil/Plant Relationships will be held at the Seibersdorf Laboratory from 29 March to 22 May 1982. Eighteen participants will be selected from scientists actively working in the field of crop nutrition.

The course will provide a basic training including safe handling and detection of radioactive isotopes, in particular, the detection of isotopes by means of liquid scintillation techniques. In addition, the participants will receive a detailed training in the preparation of samples and detection of the stable isotope nitrogen-15 by means of emission spectrometry. Ample time will also be devoted to soil moisture and soil density measurements under field conditions, using neutron moisture and gamma density probes.

Most of the second half of the course will be spent on the planning and execution of isotope-aided studies in both the greenhouse and field, and participants will be aided in calculating and interpreting results obtained from studies conducted during the training course.

Participants will also have an opportunity to lecture on the programmes in their home countries and to discuss their future work with colleagues and staff.

Announcement of the
FAO/IAEA Training Course on
the Use of Isotope Radiation Techniques
in Soil Physics Studies.

Place: Faculty of Agricultural Sciences, State University of Ghent, Belgium.

Time: 6 - 24 September, 1982.

Organizers: International Atomic Energy Agency and the Food and Agriculture Organization of the United Nations in cooperation with the United Nations and the Government of Belgium.

Language: English.

Purpose: The course will provide intensive training in the use of radiation equipment for measuring soil hydrodynamic parameters and bulk density. Scientists will gain practical experience in using neutron moisture probes and related equipment in basic and applied research designed to improve the efficiency of water use on irrigated land and the development of adequate water management practices under rainfed agriculture.

Participation: Participants should have an advanced degree in soil physics or a related field and experience in agricultural research. Preference will be given to persons under 35 years of age. Invitations will soon be extended to Member States of the sponsoring International Organizations to nominate candidates for the course.

Nature of
the Course:

The course will include lectures, laboratory and field exercises, discussion periods and scientific visits. The use of isotopes and radiation techniques in soil physics research will be fully explored in lectures. Practical field exercises will include the calibration, proper handling and effective use of radiation equipment, processing the data from such studies, and interpretation of the results. Laboratory studies will also be conducted. The course will provide valuable training to assist scientists from developing countries to plan and conduct research to determine improved water management practices.

COMING EVENTS.

FAO/IAEA Consultants meeting on the Use of Isotopes in Research on Tree Crops. A small group of consultants will review the potential for isotope aided research with tree crops and develop experimental plans for research to solve problems with tree crops in developing countries.

Vienna, Austria
9 - 13 November, 1981.

FAO/IAEA Consultants Meeting
on the Role of Isotopes in Studies of Nutrient Availability
in Endomycorrhizal Associations.

Seven international experts have been invited to review research conducted on endomycorrhizal infection, especially on food crops, and to critically assess what has hindered the large scale adoption of mycorrhizal inoculation to enhance nutrient availability, especially phosphorus, to plants. The invited scientists, together with staff of the FAO/IAEA Division and the Seibersdorf Laboratory will appraise the role isotopes have played in enhancing an understanding of the nature and function of endomycorrhizal associations, and suggest possible isotope-related studies to clarify gaps of missing knowledge in this important fungus-plant interrelationship. The group would also help to develop recommended practices for the inoculation of endomycorrhizae on a field scale if it is felt that the present scientific knowledge is sufficient to begin this practice.

Vienna, Austria
16 - 20 November 1981.

FAO/IAEA/SIDA Research Coordination Meeting on
Isotope Techniques in Studies of Biological Dinitrogen Fixation.

The third meeting of participants in this programme consisting of 13 research contract and 7 research agreement holders will be held in Vienna from 25 - 29 January, 1982. At this meeting, participants will present and discuss their research findings on experiments conducted during the 1980/81 period.

Experimental plans for research to be conducted in 1982 will be developed, based on a critical evaluation of the achievement of the programme participants during the past three years and those of other researchers in the field of symbiotic nitrogen fixation.

Vienna, Austria
25 - 29 January 1982.

FAO/IAEA International Symposium on Isotope and Radiation
Techniques in Soil Physics and Irrigation Studies.

This Symposium is planned for 1983. Further information will be furnished later.

Vienna, Austria
November, 1983.

OTHER ITEMS.

EMISSION SPECTROMETERS.

Many of the ^{15}N emission spectrometers provided by the Agency use a NaI crystal to separate the spectra of the isotopes. Special precautions are necessary to protect the crystals in humid climates. We are thus interested in knowing of problems with the NaI crystals of instruments provided by the Agency. If such problems are wide-spread, we may be able to assist in replacing the crystals. If serious problems have been encountered, it may be necessary to request the purchase of instruments which employ other diffraction techniques.

Delivery of Isotopes and Equipment.

Problems with delivery of isotopically labelled fertilizers and equipment to research contract holders and technical assistance recipients have become frequent in recent months. The IAEA normally arranges for delivery through the local UNDP Office. Recipients are always notified of the delivery date and requested to inform the Equipment Section on the arrival of the order and its condition. Unfortunately, this practise is seldom followed. We are thus not aware of any problem until it is too late to locate missing items, or file successful insurance claims if an item has in fact not been delivered. We would thus urge persons expecting delivery of items from the IAEA to:

- 1) inform their local UNDP Office of the expected arrival date and of any failure of equipment to arrive on schedule.
- 2) inform us of any delays in delivery.
- 3) inform us promptly when items are delivered, and in what condition.

MAY WE WISH YOU ALL A HAPPY NEW YEAR.

Soils Newsletter

Joint FAO/IAEA Division
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for Food and Agricultural Development

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