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Title: Agency for International Development in Cooperation with International Feedstuffs Institute, Utah Agricultural Experiment Station, Utah State University, Logan, Utah

Project Number: 931-11-130-050-73

Project Leader: L. E. Harris

Co-Leaders: L. C. Kearl and P. V. Fannesbeck

Contract Period: November 15, 1974 to November 15, 1977

Annual Report November 15, 1974 to November 15, 1975

Objective: To provide technical assistance and advise to Less Developed Countries (LDC's) in the development and utilization of information (nutritive value) about feeds available for livestock in formulating diets that most economically satisfy the animals' requirements for regular reproduction, optimal growth, weight gains, and milk and/or other production. To accomplish this objective, which states the overall purpose of the project, the report is divided into the following sections:

Cooperating with the International Network of Feed Information Centers

INFIC meetings

Mid-East trip

Latin American Feed Information Center(s)

Symposium

Publications

Reports

The International Network of Feed Information Centers (INFIC)

A meeting was held in Stuttgart, Germany from November 16-30, 1974. Those in attendance were Dr. H. Haendler and Mr. F. Jager from the documentation center at Hohenheim University; Dr. R. Riviere and Dr. L. Rechaussat from the Institut d'Elevage et de Medecine Veterinaire de Pays Tropicaux, Maisons-Alfort, France; Dr. Mayer, FAO; and Dr. L. E. Harris and Mr. Carl Fugal from the Utah Center. Tentative agreement on the terms to be used in the international terminology was reached. Correspondence has continued with the centers in Germany, France and FAO to find solutions for technical problems encountered in translation from one language to another. Currently, the name file is nearly complete and should be ready for use in English, French or German language within a few months.

Cooperation among the above named centers has resulted in simplifying the International Source Form. This new form should be ready for use in the near future and it is hopeful that it will eliminate some of the shortcomings experienced in the old form.

Computer programs used with the "International System" have been adapted

to the German computer system and are functional at this time. Computer programs and magnetic tapes of the data and name files were forwarded to Dr. Rechaussat. We have not received word as to the progress being made in adapting them to the French system at this date. We are encouraged, however, by the progress being made at the centers in Stuttgart and Maisons-Alfort.

Dr. L. Mayer has notified us that he will probably be leaving FAO at the end of 1975. We were saddened by this news because Dr. Mayer was familiar with many of the technical and operational aspects of the international system. Dr. L. Chenost has been appointed as a replacement for Dr. Mayer.

A trip was made by L. C. Kearn, Associate Director of the International Feedstuffs Institute to the INFIC centers in London (TPI), Paris (IMVT) and Rome, FAO. A brief report follows:

ENGLAND

Tropical Products Institute (TPI), London

Personnel

Mr. D. Halliday
Dr. D. J. Morgan

Discussion

Discussions were held with Mr. Halliday and Dr. Morgan concerning the First International Symposium, "Feed Composition, Animal Nutrient Requirements, and Computerization of Diets" to be held at Utah State University, Logan, Utah, July, 1976. Dr. Morgan tentatively agreed to present a paper describing his latest research studies in swine nutrition. It was agreed that TPI would finance the expenses of Dr. Morgan to present this paper.

Mr. Halliday had just returned from an extensive trip into Mid and Far East countries. He appraised me of the situation existing in the countries I was to visit. This information was helpful to me later in my journey.

Unfortunately for INFIC, Mr. Halliday is being reassigned and his service will no longer be available to the other member countries. His replacement was unknown at the time of my visit.

FRANCE

Institut d'Elevage et de Medecine Veterinaire des Pays Tropicaux, (IMVT), Paris

Personnel

Dr. R. Riviere
Dr. L. Rechaussat

Discussion

Discussions were held with Drs. Riviere and Rechaussat concerning the First International Symposium, "Feed Composition, Animal

Nutrient Requirements, and Computerization of Diets" to be held at Logan, Utah, July, 1976. It was agreed that both Dr. Riviere and Dr. Rechaussat would present papers and their expenses would be paid by IMVT.

Further discussions were held on the transfer of computer programs and translation of the international terminology into the French language. To date, most of these two objectives have been accomplished.

The INFIC center in Paris is making giant strides forward in preparing to become a full participating center capable of processing, storing, and retrieving feed composition data.

ITALY

Food and Agriculture Organization of the United Nations (FAO), Rome

Personnel

Dr. Ludwig Mayer

Discussion

Discussions were held with Dr. Mayer concerning the First International Symposium to be held at Utah State University, Logan, Utah, July, 1976 and problems encountered in introducing the INFIC project into developing countries.

Dr. Mayer suggested several procedures to follow in setting-up methods for making chemical analysis and recording the compositional data.

The format and subject matter for the symposium were discussed and Dr. Mayer suggested several speakers to be invited to present papers.

INFIC Meetings

The INFIC meetings for 1976 have been scheduled to take place in Ottawa, Canada, July 5-7, 1976. Dr. J. Aitken, Director of the Canada Center will supervise arrangements for these meetings. Dr. L. Mayer has been requested to send out invitations to those individuals who have participated in the past. It has also been suggested that Dr. J. R. Pagot, Director of the International Livestock Center for Africa (ILCA), Addis Abeba, Ethiopia be invited to attend.

Mid-East Trip

In response to IFI's responsibility in furthering the aims and goals of INFIC in Mid-East countries, L. C. Kearl visited several laboratories and research institutions in Turkey, Lebanon, Jordan, Iran, and Pakistan. The objectives and procedures were explained to administrators and technicians at these institutions. Cooperation between the laboratory and INFIC, particularly Utah State University was stressed. In most cases it was agreed that IFI would provide the necessary forms for recording the data, books of instruction and would process the data at the center in Utah. By November 1977 it was further agreed, IFI would publish a list of names and data forwarded from each country. The cooperating laboratories agreed to provide data generated in their laboratories (chemical and/or biological). A detailed report is attached.

Latin American Feed Information Centers

During this past year several individuals have been contacted in Latin America concerning the need for, a satisfactory location and way of funding a feed information center in Latin America. Dr. Claudio F. Chicco, President of the Latin American Society of Animal Production, has agreed to arrange for a meeting with several leaders in Latin America to discuss this issue. He has scheduled this meeting to coincide with the ALPA meetings being held in San Jose, Costa Rica, November 25-29, 1975. Jose Emilio G. Araujo, Director General of Instituto Interamericano de Ciencias Agricolas de La Oea (IICA) San Jose, Costa Rica has been contacted with the possibility that it may be possible to set up the feed information center at IICA. Others who have been contacted and invited to participate at these meetings are: Mr. Hernan Fonseca Zamora, Director, Laboratorio de Nutricion Animal, Facultad de Agronomia, Universidad de Costa Rica, San Jose, Costa Rica and Dr. Jose D. Marull, Instituto Interamericano de Ciencias Agricolas, Apartado 19281, San Jose, Costa Rica. It is hopeful that progress toward the establishment of a feed center in Latin America may develop during these meetings.

Dr. L. E. Harris, Director of the International Feedstuffs Institute will attend the meetings held in San Jose, Costa Rica, November 25-29. From November 30 to December 6 he will visit with leaders throughout South America attending the Latin American Society of Animal Production meetings in Maracay, Venezuela. These discussions will center on establishing a feed information center to service the processing and documentation of feed composition data collected in South America. From December 7-10, Dr. Harris will visit with scientists in Brasilia, Brazil to get their opinions on this subject.

Dr. Harris will arrive in Washington, D.C., December 11 for discussions with Mr. Michael Galli, The Agency for International Development and Dr. Robert F. Barnes, United States Department of Agriculture on various aspects

Symposium

The response of scientists wishing to present papers at the First International Symposium "Feed Composition, Animal Nutrient Requirements, and Computerization of Diets" to be held at Utah State University, Logan, Utah, July 11-16, 1976 has been far beyond our expectations. To date, we have approximately 35 foreign speakers who wish to participate on the program. There are about the same number of U.S. people who will take part in the proceedings. Attached to this report is a semi-final copy of the program. This will be sent to all speakers, chairman of sessions and discussion leaders.

Upon receipt of conformation from the above named participants, the program will be printed and mailed to approximately 9,000 persons in Latin America, Europe, Africa, Mid-East countries, Canada, Australia and the United States.

Presently, we have received preliminary registration forms from approximately 100 persons who plan on attending the symposium. We anticipate an excellent attendance.

Publications

Harris, L. E. and L. C. Kearl. International collection and dissemination of information on animal feeds. World Animal Review No. 14. Food and Agriculture Organization of the United Nations, Rome, Italy. 1975.

Reports

Annual reports describing objectives, accomplishments and personnel responsibilities have been forwarded to Utah Agricultural Experiment Station, Utah State University.

In accordance with the terms of the contract a semi-annual report was submitted to AID in April 1975.

Quarterly financial reports are forwarded to AID directly from the Controllers Office, Utah State University.

Trip to Mid-East

**Leonard C. Kearl, Associate Director
International Feedstuffs Institute
Utah State University
Logan, Utah**

Summary

The International System of collecting, naming and disseminating feed composition data was presented to 49 individuals representing 27 institutions and agencies in 5 Mid-East countries. Consultative meetings were also held with Mr. D. Halliday, Tropical Products Institute, London; Dr. R. Riviere and Dr. Rechaussat, Institut d'elevage et de Medecine Veterinaire des Pays Tropicaux, Maisons-Alfort and Dr. L. Mayer, FAO, Rome.

Sixteen of the Mid-East organizations already generate chemical and/or biological feed composition data. All except one, expressed a willingness to share their data with the International Network of Feed Information Centers (INFIC) and specifically with the International Feedstuffs Institute at Utah State University, Logan, Utah.

The facilities and equipment varied from up-to-date modern equipment capable of conducting analysis for most of the common nutrients to laboratories only capable of nitrogen and dry matter determinations.

Lack of facilities and emphasis on other programs were deterrents to current production of chemical and/or biological data in 3 or 4 cases. Inadequate equipment curtailed activity in 2 or 3 other organizations. Perhaps the most seriously limiting factor, however, was a shortage of funds. In some cases funding should be provided for clerical help in transcribing data to the INFIC source forms. In most cases the available personnel had the qualifications and training to conduct chemical and/or biological procedures to procure reliable data.

Supplies and explanatory materials have been forwarded to 15 individuals at 15 institutions who agreed to supply data to the INFIC system.

The most serious constraint to obtaining data from these organizations may be our inability to maintain personal contact. Correspondence by mail will have to suffice in aiding these people to understand the system involved in correctly filling in the source forms and accurately describing the product. For the project to be successful, frequent and unusually precise correspondence must be maintained.

Introduction

The Food and Agriculture Organization of the United Nations (FAO) requested in 1971 that representatives from countries engaged in collecting feed composition and animal biological data meet and discuss the possibility of establishing a world organization to collect, summarize, and publish feed composition and animal nutrient requirement tables on a world wide basis. In fulfillment of this request, the International Network of Feed Information Centers (INFIC) was organized in 1973.

The aim of INFIC is to combine world data on composition and nutritive value of materials which are or may be used as feeds and to combine them with the nutrient requirements of domestic animals to produce more meat, milk, eggs and fiber. Efforts are also being made to standardize: Terminology, procedures of chemical analyses and ways of expressing the data.

To assist in collecting and identifying the relevant data in developing nations of the world, geographic responsibilities were assigned to various members of INFIC. The International Feedstuffs Institute at

Utah State University was asked to continue the program in Latin America and, in cooperation with FAO and the Tropical Products Institute (TPI), London, to introduce the programs into the countries of the Middle-East.

This report describes visits to the institutions and agencies in Turkey, Lebanon, Jordan, Iran and Pakistan. Personnel assigned to research projects and laboratories are listed, and a brief description of the facilities are included. The possibility of each units eventual collaboration with INFIC and particularly with the International Feedstuff Institute, Utah State University is evaluated.

The trip was made from May 25 to July 23, 1975. This project is being financed by the United States Agency for International Development, (USAID) Washington, D.C.

Objectives

In order to introduce the INFIC programs into laboratories in the Mid-East, it was decided that the following program objectives should be discussed.

1. Introduction of the international vocabulary and principles of describing feeds
2. Identifying the most suitable and useful analytical determinations.
3. Introduction of the international system of data recording.
4. Clarification of the documentation methods and how they apply to participating institutions.

In addition, the laboratories, facilities, and capabilities to generate feed data were evaluated at each institution.

TURKEY

Ataturk University, Erzurum

Personnel

Dr. Ali Istar, Dean, College of Agriculture
Dr. Sumer Hasimoğlu, Department of Animal Science
Dr. Ibrahim Manga, Department of Soil Sciences
Dr. Ayhan Aksoy, Department of Poultry Sciences

Facilities

On-campus facilities were modern and appeared adequate to meet the requirements of the teaching and research programs.

Off-campus facilities included large native pasture and cultivated land areas. The facilities for housing and caring for livestock were very limited, however.

Equipment

The chemical laboratory equipment was very limited. In fact, the Kjeldahl apparatus was the only major piece of equipment in operation.

Off-campus equipment was limited to small scales and some individual and group cattle and sheep pens.

Animals

There were 3,000 sheep and 300 cattle available for experimental use. These were mostly small, low-producing indigenous breeds.

Discussion

It was agreed among the participants that the prescribed procedures would be followed in analyzing and recording data. It was also agreed that at periodic intervals the laboratory would perform analyses on samples of feed forwarded from a reference laboratory. It was further agreed that Utah State University's, International Feedstuffs Institute would provide source form books, books of instruction, process the data for storing in the international data bank and provide computer printouts of these data at the conclusion of the initial period (1977).

At the conclusion of the meetings, the laboratory and research facilities were toured.

Recommendations

Ataturk University was established in 1958 and is experiencing an accelerated expansion program. Apparently, this has placed tremendous financial pressures on the University. As a result,

funds for purchasing equipment and supplies to carry-on adequate research programs in the College of Agriculture are very limited.

For the feed composition work to proceed at a satisfactory rate, additional funds must be provided to upgrade and repair existing laboratory equipment and to purchase needed supplies and critically needed equipment.

Continued communication and exchange of ideas is recommended.

Ankara University, Ankara

Personnel

Dr. Remzi Akyildiz, Associate Dean, College of Agriculture and Head, Department of Animal Science.

Facilities

On-campus facilities were adequate for teaching and research programs.

Equipment

The laboratory was equipped to conduct proximate analysis and limited mineral analyses. The basic equipment such as grinding drying, etc. were present.

Discussion

Dr. Akyildiz has years of experience in teaching and research and is competent to conduct any of the analytical work now being performed at his facilities.

He supports our program and will provide data as it becomes available. He agreed to forward tables he has prepared of past work in his laboratories.

Supplies and books of instruction have been forwarded for his use in documenting data on the international source forms. AOAC and other acceptable methods of analysis will be used. A tour of the laboratory followed.

Recommendations

Limited funding handicaps any acceleration of analytical activity. Continued correspondence should be maintained.

Ministry of Agriculture, Ankara

Personnel

Dr. Mehmet Kiroğlu, General Director of Agriculture.
Dr. Osman Yavuz, General Director of the Feed Registration and Control Affairs Office.

Discussion

After a brief explanation of the aims and goals of INFIC, Dr. Kiroğlu supported our proposed work in Turkey and arranged meetings with the director, Grassland and Animal Husbandry Institute and Dr. Yavuz. Dr. Yavuz is responsible for feed quality control throughout the feed industry in Turkey. His office issues quality standards for the industry and prescribes the methods and procedures to be followed in analyzing and recording data. He supports our program and has forwarded some feed composition data that was available through his office. He will use our source form when appropriate and forward data to us periodically. We have received some data from his office.

Recommendations

Close contact should be maintained with these officials and their continued support should be solicited.

Grassland and Husbandry Research Institute, Ankara

Personnel

Dr. Nazmi Alinoğlu, Director
Dr. Ali Karabulut

Facilities

The facilities at this institution are excellent in every way. The administration building is modern and very well arranged.

A separate building is used as a chemical laboratory and for small-animal digestion studies.

Approximately 1/2 mile from these facilities are the large-animal sheds. These include milking parlors, fattening pens and buildings for equipment, storage, etc.

Several thousand acres of good productive land are available to support animal and plant studies.

Equipment

The laboratory is well equipped for conducting proximate analyses and analyzing for several macro and micro minerals and some vitamins.

The necessary equipment is available for small animal metabolic studies and for large animal production work.

Animals

Several breeds (imports and indigenous) of cattle (dairy and beef) and sheep are available for research work.

Discussions

The objectives (1-4) were explained to Dr. Alinoğlu and Dr. Karabulut. They were receptive to our program. The staff at this institution is well trained in their specific duties.

Dr. Alinoğlu supports our program and has supplied us with some data from his files.

Supplies and instruction books have been forwarded to this institution.

Recommendations

This organization appears to be very well financed and managed. Regular correspondence should be maintained.

Cereals Testing Laboratory, Ankara

Personnel

Mr. Ögüç Unver

Discussion

Mr. Unver's laboratory tests cereal grains for their baking qualities. The type information generated at this institution is not suitable for INFIC. Mr. Unver, however, was extremely helpful in escorting me to a large commercial feed mill and assisting in arranging for my schedule in Ankara.

Summary for Turkey

Ultimate benefits for Turkey will depend entirely on the amount of data supplied by the donor institutions. In many cases, lack of funds may impede the quantity of data available.

Personnel responsible for the various laboratories are well qualified to perform or supervise the chemical methods used.

The Turkish government has established an agency to regulate quality control and to standardize analytical procedures used in determining the composition data of feedstuffs (commercial).

Cooperation by the International Feedstuffs Institute, Utah State University with each of the afore mentioned institutions should be continued and expanded as rapidly as the personnel at the donor institutions become familiar with the international system of chemical and data recording procedures and as funds become available.

Mr. Stanley Samuelson, AID representative, was helpful in arranging meetings with Dr. Kiroğlu and Mr. Unver.

LEBANON

Lebanese Industry Institute, Beirut

Personnel

Dr. Adnan Shaykh

Facilities

The facilities were modern and the space provided for the laboratory was adequate for current work and allows for some expansion.

Equipment

The equipment for proximate and mineral analyses was in good repair.

Discussion

The objectives of the mission were explained to Dr. Shaykh and he was instructed in how to fill in a source form.

Dr. Shaykh was unable to give me a positive answer in regard to this institution participating with Utah State University in the feed project. He did, however, say he would take the matter up with the Board of Directors for approval. To date, I have not received further information.

Recommendation

Correspondence should be maintained because this could become a good source of data.

American University of Beirut (AUB), Beirut

Personnel

Dr. N. J. Dagher, Associate Professor
Dr. L. A. Jones, Associate Professor

Facilities

The facilities were adequate for teaching and research activities. Because of the unrest in Beirut, I was unable to visit the research farm.

Equipment

Except for the vacuum pump on the drying unit, the equipment was in fair condition. The capabilities are for proximate analyses and analyses of cellulose, dry matter and some minerals.

Discussion

The objectives were explained to Dr. Dagher and Dr. Jones. They were both in agreement with our aims and goals and agreed to forward us data as it becomes available.

Dr. Jones is commencing some digestibility trials using sheep. This should generate some biological data for inclusion in the data bank.

As per our agreement, source forms and instructions books have been forwarded to Dr. Jones.

A meeting was held with Dr. Horszczaruk, FAO Animal Nutrition Expert to explain the purpose of our visit to Beirut.

Recommendation

Correspondence should be maintained with Dr. Jones and Dr. Dagher.

Summary for Lebanon

Because of the internal unrest in Beirut, it was difficult to assess potentials. It is my judgement that Dr. Jones, AUB will provide us with limited data. Dr. Shaykh may have difficulty in getting approval from his superiors, especially if he does not develop a strong conviction as to the merits of the project.

An effort was made to contact Dr. Joseph Hrawi of the Tel-Amara Experiment Station. Unfortunately, Dr. Hrawi was in the local hospital during my brief stay in Beirut.

JORDAN

Animal Production and Range Department, Ministry of Agriculture, Amman

Personnel

Dr. Hassan Gharaybeh, Director
Dr. Irfan Ruhl, Head of Cattle and Sheep Section
Dr. Adib Drayfi, Assistant Director
Dr. Jacques Grison, FAO Project Manager

Facilities and Equipment

Scheduling did not permit a visit to their facilities.

Discussion

The International system of describing and recording feed composition data was explained to the staff at this organization. They indicated an interest in our programs and requested the necessary supplies to record their analytical data.

The books of instruction and source forms have been forwarded,

Recommendation

Correspondence should be maintained and they should be encouraged to share their data with us.

Soils Section Department of Agricultural Research and Extension, Amman

Personnel

Mr. Adil Harami
Mr. George Sunna

Facilities

Modern and well planned.

Discussion

The aim and goals of our project were discussed in detail with Mr. Harami and Mr. Sunna. The laboratory was under the supervision of Mr. Harami and employed several technicians. Samples were forwarded from several sources to this laboratory for analysis. Mr. Harami and Mr. Sunna both expressed interest in our project and agreed to forward data to Utah.

This laboratory appeared to be the best equipped and financed of the laboratories visited in the Mid-East.

Supplies have been forwarded to Mr. Harami, according to our agreement.

Recommendation

Close cooperation should be maintained with Mr. Harami. This laboratory should provide quality data on several different nutrients and feeds.

The University of Jordan, Amman

Personnel

Dr. Subhi Qasem, Professor of Plant Pathology and Dean, College of Agriculture
Dr. Ahmad Faqih, Professor, Department of Animal Science.

Equipment and Facilities

Scheduling did not permit my visiting the laboratory or research facilities. The building housing the College of Agriculture, however, was new and appeared modern in every respect.

Discussion

The aims and objectives of our project were discussed with Dean Qasem and Dr. Faqih. Apparently the University of Jordan is in an expansionary period. New buildings are being constructed

and departments and even colleges are moving to new and/or different locations.

AID has funded Washington State University to dispatch a team of experts to assist Dr. Qasem in establishing curriculum and on-going research programs.

Source forms and instruction books have been forwarded to Dr. Faqih.

Recommendations

Correspondence should be maintained in the hope of receiving data at some future time. It is my opinion that until this institution becomes well established in teaching and research programs, very little time will be available for feed composition work.

Summary for Jordan

The Jordanian Ministry of Agriculture is strongly emphasizing the expansion of crop and livestock production in Jordan. They hope by 1980 to be able to produce most of the meat, milk and eggs consumed in Jordan. To accomplish this, reliable feed composition data will be required to calculate the most efficient rations for maximum livestock production. Hopefully, they will share this data with us.

Dr. Faqih will attend the symposium at Utah State University in July 1976.

Mr. F. Qushair, AID representative, was helpful in arranging meetings with the above institutions and providing transportation to the various places.

IRAN

Animal Husbandry Research Institute, Heydarabad.

Personnel

Dr. R. B. Beheshti, Assistant Director Animal Husbandry Research Institute.

Dr. M. B. Gadaki, Professor
Salami Saber Tehrani, Technician
Mohsen Selimi Vabid, Technician

Facilities

The laboratory and research facilities were among the best encountered. There was ample space in the laboratory for current operations and some expansion in the future.

The research facilities included good housing and open pens for sheep, cattle and dairy cows.

Adequate pasture and crop lands were available to provide feed and conduct research studies.

Equipment

The laboratory is well equipped to do proximate analyses, and to analyze for Ca, P., other minerals and some vitamins.

Animals

Both indigenous and foreign breeds of beef cattle, sheep and dairy cattle are available for research work.

Discussion

The program was discussed in detail with Dr. Beheshti, Dr. Gadaki and the laboratory technicians. A seminar was presented describing the system to Dr. Kaymaram, Director of the Institute and 23 other members of the staff,

Dr. Gadaki has direct responsibility for the nutrition studies and supervises the work being done in the laboratory. He supports our program and agreed to forward feed tables compiled in his office, as well as other data we thought to be useful in the program.

Source forms, instruction books and miscellaneous publications were forwarded to Dr. Beheshti and Dr. Gadaki as agreed.

Recommendations

Close liaison between INFIC and this institution should be maintained.

Summary

Cooperative work between the Animal Husbandry Research Institute, Heydarabad and Utah State University, Logan has been on-going for several years. Mutual respect is evidenced by personnel from both institutions. This will be an asset in keeping communication open between the two institutions.

The AOAC methods are generally followed in the laboratory procedures.

A good supply of data is expected from this organization.

The University of Pahlavi, Shiraz

Personnel

Dr. Gambiz Ghronban, Dean, College of Agriculture
Dr. Nabid Argmanet (Shahuki), Assistant Professor
Dr. Bahram Goshtasbpour, Assistant Professor
Dr. M. Makarechian, Professor
Dr. K. Keshavarz, Professor
Dr. N. Sefidbakht, Associate Professor
Mr. Absulhasain Tarid Naeini, Instructor

Facilities and Equipment

Illness prevented me making my scheduled visit to the laboratory and research facilities at this institution. I was able to visit briefly at the sheep research farms. These were well equipped for the type work that was being conducted there.

Animals

I only had the opportunity of seeing some of the sheep available for research purposes. I understand, however, that larger animals as well as some poultry are available.

Discussions

Data recording, terminology and types of information required were discussed in a seminar, which all the above named persons attended. Detailed discussions on filling in the source form and naming of feeds were had with Dr. Sefidbakht and Dr. Goshtasbpour. These people agreed to participate in our program and forward data at periodic intervals. I believe that the major limitation to their participation will be lack of adequate funding to carry-on extensive research programs.

Recommendations

Correspondence should be maintained with Dr. Sefidbakht and Dr. Goshtasbpour.

Summary for Iran

Relations are good with both these institutions. The Animal Husbandry Research Institute at Heydarabad appears to be well funded and they conduct an estimated 10,000 nutrient analyses (about 1,000 samples) each year. We should receive considerable data from this organization.

Facilities at the College of Agriculture and more specifically the Department of Animal Science, University of Pahlavi are good (teaching and sheep research), but appear to be handicapped because of lack of funding. Perhaps this can be overcome, Data received from this institution should be reliable.

The Iranian Livestock Complex was visited and they are in a very extensive building program. I would suggest that they coordinate their livestock activities with the staff at the University of Pahlavi in order to have access to the expertise in animal production and nutrition that is available there.

PAKISTAN

Poultry Research Institute, Karachi

Personnel

Dr. G. O. Ranit

Facilities and Equipment

The facilities at this organization were not visited because of scheduling problems. I have been informed, however, that the construction of the facilities has just been completed and that the equipment is newly installed. The laboratory should be operational sometime this fall (1975). Analyses will include proximate, Ca and P. other minerals, amino acids and vitamins.

Discussions

Dr. Warren, project manager, was in Lahore during my brief stopover in Karachi. In his absence I explained our program to Dr. Ranit, a colleague of Dr. Warrens. I was informed that Dr. Bushman, who was on home leave (USA), would be in charge of the laboratory. Dr. Ranit said he would explain our program to him. Source forms and instruction books have been forwarded to Dr. Bushman.

Recommendations

Correspondence should be established and maintained with Dr. Bushman.

Summary

A Pakistani member of the staff will visit Utah State University during the summer of 1976 to learn laboratory techniques and data recording procedures.

This organization is sponsored by FAO and staffed by international experts. Cooperation in our program is expected and we are hopeful of receiving data as soon as the laboratory becomes operational.

Ministry of Food and Agriculture, Islamabad

Personnel

Dr. M. Y. Bhatti, Additional Secretary, Agriculture and Rural Development, Ministry of Food and Agriculture,

Discussion

The aims and goals of INFIC were explained to Dr. Bhatti. He expressed interest in our program and suggested the possibility of Pakistan hosting a feed center there for processing data collected in the Mid-East countries. He arranged a meeting for me with Dr. Hashmi, Chairman, Pakistan Science Foundation.

Pakistan Science Foundation, Islamabad

Personnel

Dr. Z. A. Hashmi, Chairman

Discussion

The aims and goals of INFIC were explained to Dr. Hashmi. He expressed an interest in our work and arranged for me to meet with Dr. Mohajir, Project Director, Pakistan Scientific and Technological Information Center (PASTIC).

Pakistan Scientific & Technological Information Center (PASTIC), Islamabad

Personnel

Dr. A. R. Mohajir, Project Director

Discussion

The aims and goals of INFIC were explained to Dr. Mohajir. He expressed an interest in having his center process the feed data collected in the Mid-East countries. The International Feedstuffs Institute was requested to submit a letter requesting that PASTIC act as the processing center for the Middle East area in collecting, processing and publishing feed composition data.

Dr. Mohajir has been requested to provide information on the capabilities of his computer and accessory equipment.

Recommendations

Correspondence should be maintained with Dr. Mohajir concerning the possibility of establishing an INFIC data processing center at his institution.

College of Animal Husbandry, Lahore

Personnel

Mr. Yagoob Malik

Facilities

These were adequate for the type activities conducted at this station. Housing facilities for poultry, caged brooders for baby chick studies and housing for laying flocks were limited. Small pens and sheltered areas were available where sheep and cattle trials were being conducted. The chemical laboratory was located in a modern building. Ample space was available for storage of samples and supplies, and the laboratory was well arranged.

Equipment

Equipment was available for the proximate analyses, and some vitamin and mineral analyses.

Discussion

This laboratory and animal experiment area were well organized. The outer buildings were obsolete in some respects, but were still functional for several types of studies. The chemical laboratory and equipment were in good condition and appeared to be well arranged for efficient operation.

This laboratory processes about 1,000 samples of feedstuffs annually, AOAC or other acceptable chemical procedures are used.

The limiting factor in acquiring these data will be lack of funds to transcribe the data to the international source form. Funds have been requested from the Ministry of Food and Agriculture to be used for this purpose.

Source forms and books of instruction have been forwarded to this institution.

Recommendation

The personnel at this institution support the goals of INFIC and will supply data if funds are made available to copy it onto the international source forms. This obstacle maybe removed in the near future.

Correspondence should be maintained with Mr. Malik.

University of Agriculture, and Punjab Agricultural Research Institute, Lyallpur

Personnel

Dr. Sayyed Abrar Hussain Gilani, Associate Professor and Chairman
Department of Nutrition
Mr. Hashmat Ali Naseem, Agricultural Chemist (Biochemistry)

Facilities and Equipment

The time schedule did not permit visiting these facilities.

Discussion

Both Dr. Gilani and Mr. Naseem expressed support of the goals of INFIC. They agreed to provide data as they can be transcribed to the International source form. Funds are very limited and the present personnel would be required to carry this extra work load.

Recommendations

Dr. Gilani and Mr. Naseem support our program and correspondence should be maintained with these organizations.

Government Livestock Farm and Animal Production Institute, Bahadurnagar (Okara)

Personnel

Dr. Muhammad Akram, Animal Nutrition Research Officer

Facilities

This organization carries on animal studies. There are excellent facilities for milking cows, fattening cattle and working with buffalo.

Animals

There are about 400 milk cows, 1500 sheep and 1100 young stock and buffalo at this station. These are indigenous and improved breeds of cattle and sheep.

Discussion

This station does metabolic and production studies. Some breeding work is also being carried out. The feed analysis work is performed at the College of Agriculture in Lahore.

Dr. Akram will forward biological data as they become available.

Other studies such as wool quality and statistical analyses are performed at this institution.

The personnel and facilities are very good. The buildings and land area are large enough to support extensive research projects and the staff is trained to carry-on several projects concurrently.

This appears to be a well organized research station.

Recommendations

Because of the nature of this organization, limited data will be available. This type data, however, is in short supply everywhere. Correspondence should be maintained. Dr. Akram will support our program in everyway possible.

AID, Islamabad

Personnel

Mr. Chughtai
Mr. W. R. Nilsestuen

Discussion

The purpose of our mission was explained to Mr. Chughtai and Mr. Nilsestuen.

AID was helpful in providing some transportation, and in arranging meetings with the institutions and government officials in the Islamabad and Lahore area.

Summary of Pakistan

The Poultry Research Institute in Karachi is under the direction of FAO and supervised by U.S. personnel. This institution will finance one technician to visit Utah State University during the summer of 1976 to learn the INFIC procedures for processing and recording data. Subsequent to this visit data should be processed and forwarded to us.

Financial support should be provided to Dr. Gilani at the University of Agriculture, Lyallpur and to Mr. Malik at the College of Animal Husbandry, Lahore to engage clerical help for transcribing data from their record books to the INFIC source forms. By implementing this procedure data would be available for shipment to the INFIC processing center at Utah State University.

Information should be exchanged between INFIC and the Pakistan Scientific & Technological Information Center concerning the operation of a 'Center' for processing data generated in the Mid-East countries. The establishment of a 'center' to process all data generated in this region should receive immediate attention.