

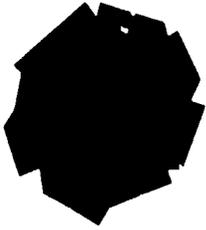
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WINROCK, INC.

SHEEP PRODUCTION
CARIBBEAN REGIONAL



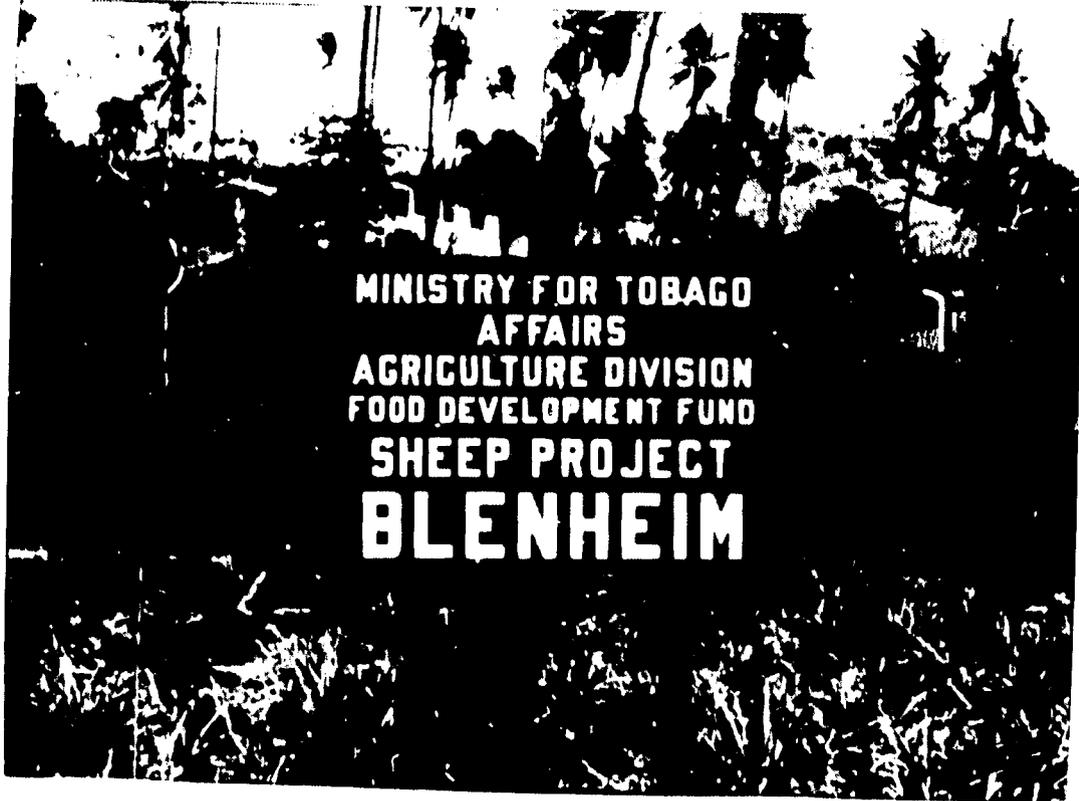
**WINROCK
INTERNATIONAL**

**SHEEP PRODUCTION SYSTEMS
APPROPRIATE TO THE CARIBBEAN REGION**

January 27, 1978

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Sheep Production Systems Appropriate To The Caribbean Region

Introduction

Demand for sheep meat - lamb and mutton - is strong in the Caribbean region. Regional production does not come near filling the requirements of local residents and tourists. In 1974, imports of fresh meat exceeded 6.3 thousand tons at a cost of U.S.\$8.7 million.

Expansion of local sheep production is not a simple matter. Most sheep have thick, heavy fleeces of wool and, as a consequence, are poorly suited to the humid tropics.

There is another, less commonly known, type of sheep which has no wool but does produce the same desirable lamb and mutton. "Hair sheep" have short, slick hair coats. They tolerate well the heat, humidity and parasites of the tropics.

As noted in the recent Winrock International study, "The Role of Sheep and Goats in Agricultural Development," hair sheep fit the diversified agricultural systems of the smallholder. Meat and hides contribute to family subsistence and provide good income potential. Well adapted hair sheep convert tropical forage, crop residues and other feed sources of no food value to man into high quality animal protein.

Local types of "pelibuey" or hair sheep are found throughout the region. But with few exceptions (e.g., the Barbados Blackbelly), little is known about their productivity and little effort has been made toward developing efficient production systems. A principal recommendation for the Caribbean region from the Winrock International study was to develop appropriate systems for increasing productivity of hair sheep.

This resource development and manpower training project is designed to fulfill this recommendation.

Objectives

1. Characterization of current productivity and improvement potential of hair sheep for the Caribbean region.
2. Selection, multiplication and distribution of superior genetic stock throughout the region.
3. Development of appropriate technology and effective management systems, including nutrition, health, predator control and marketing components.
4. Extension of these improved systems to regional producers, including smallholders, through specially trained technical personnel, including para-professionals.
5. Identification of social, economic, as well as biological, constraints to sheep production efficiency in region.

Justification

Agriculture remains the major employer of the Caribbean Region. Traditionally, most agricultural activity was oriented to export crops - sugar cane, citrus, bananas, coffee, tobacco... But, traditional markets for these crops have disappeared or been supplied from other areas, production costs have risen and farm labor are demanding a better quality of life than the near-slave conditions of the past. Not all Caribbean land is suitable to growing export crops - sugar cane, bananas, citrus and others. Much of it is nonarable, suitable only for grazing livestock. Even the cash crops yield significant residues of little value except as animal feed.

The economic importance of tourism to the region is well known. But as noted in The Changing Face of the Caribbean, "...if the Caribbean does not want to go on losing a large part of its tourist earnings through food imports, it has got to grow more food at home." And to tourists, food means meat.

Caribbean political leaders recognize the critical importance of agriculture as a source of income, foreign exchange and employment. Animal agriculture has been identified as having highest priority for development.

Regional Food Plans have been proposed as a means to integrate food production and processing resources to better serve consumers throughout the region. Hair sheep fit well into the objectives of these plans to raise the productivity of the small land holder, to improve the nutrition of urban families and to contribute the economic development throughout the region.

Excerpts from the Winrock International study further illustrate the special opportunities for hair sheep in the Caribbean and some special benefits to be derived from their utilization.

- There is little documented information available to planners and policy makers with regard to available hair sheep or other small ruminant resources, levels of productivity, advantages and disadvantages specific to local production environments. If small ruminants are considered at all in agricultural development plans, planners generally must rely on subjective opinions, sometimes biased by limited negative experiences or hearsay.

- Recognition of the potential contributions of hair sheep and encouragement of their increased utilization will be most effective if improved stocks are available. Some types are noted for prolificacy; most are noted for their ability to survive in unfavorable environments without much attention.

- Development of improved management techniques, including their economic evaluation, importation and characterization of improved genetic stocks and multiplication of improved stocks must be accomplished on a large scale before they can be made available to producers.

- Small ruminants and smallholders are a common combination, often involving the grazing of unfenced common lands, and non-agricultural land (roadsides, urban areas). Contributions of small ruminants to subsistence of poor families are usually not adequately assessed.

- The typical smallholder operation is subsistence oriented, low investment, low risk, low production and low return. The emphasis is on low risk, accomplished by spreading investment of land and labor over several small crops. Hair sheep using either the tethering or cut and carry feeding techniques offer an opportunity for converting crop residues, weeds and grazing on nonarable land areas into animal products for family use and limited cash income.

- Land tenure and new land development policies need to take more cognizance of the smallholder's primary goal of survival and risk minimization. Small ruminants provide a low investment, low risk alternative food source while utilizing otherwise wasted feed resources. Their manure serves as fertilizer to improve crops.

- Many countries are embarking on national reforestation programs in efforts to limit major ecological damage (erosion, water pollution). However, where population continues to increase and food and income shortages exist, small ruminants will help control competing plant species and provide food and income.

- Land degradation due to overgrazing and/or faulty cultivation practices reduce both subsistence and commercial value to producer and, ultimately, reduce availability and increase costs of food for urban residents. Small ruminants do have a role to play in improved management of grazing and cultivated lands including utilization of crop residues.

Successful realization of these special opportunities for better utilizing hair sheep to the ultimate benefit of both producers and consumers necessitates a multidisciplinary systematic approach. This is the forte of the Winrock International team of animal, plant and social scientists. Their efforts, in collaboration with those of scientists and extension personnel from Caribbean institutions, make this a highly feasible, practical development effort.

Anticipated Benefits

- Increased local supply of lamb and mutton for local and tourist trade.
- Higher income for livestock producers.
- New employment opportunities in related product marketing and processing industries.
- Superior genetic resources to improve production of hair sheep throughout Caribbean.
- Improved management technology to raise productivity, lower mortality and decrease costs through better utilization of surplus feed resources.
- Improved husbandry skills of producers and improved effectiveness of extension officers serving producers.
- Opportunities to train graduate scientists in practical research projects with local applications.

Procedures

The project protocol may be conveniently partitioned into three phases of accomplishment.

Phase I. Resource survey and program design

A. Hair sheep resources

1. Survey hair sheep resources with emphasis on evaluating productivity under native environmental conditions. Known populations of hair sheep with greatest potential for contribution in the Caribbean region include those in Barbados, Mexico, Brazil, Colombia as well as the many local unimproved stocks found throughout the region. Hair sheep originated in Africa. Stocks such as the West African Dwarf and Somalian Blackheads should also be evaluated for use in Caribbean with special attention to any disease conditions which might preclude export to the Caribbean. There are small populations of the Somalian (or Persian) Blackhead sheep already in the Caribbean region.

2. Collect and analyze production data (fertility, litter size, mortality, growth rate, mature weight) available for surveyed populations. Where possible, standard procedures should be established for cooperating local institutions to collect needed production data.

3. Identify sources of breeding stock which are superior for these key production characteristics. These superior stocks will be later sampled under Phase II of this project.

B. Caribbean production systems

1. Survey operating production systems to establish current role of hair sheep and to identify opportunities for integrating hair sheep production with other livestock and crop activities.

2. Evaluate market supply and demand for lamb and mutton, including availability of processing facilities and marketing infrastructure for live animals, hides, carcass and retail meat products.

3. Determine producer attitudes toward hair sheep, level of husbandry skills, and any sociocultural constraints to hair sheep production.

4. Identify current and potential nutritional, disease, parasite and predator constraints to hair sheep production.

C. Design of Phase II experimental protocol

1. Design experimental protocol in terms of base population sampling criteria, mating plans, production data collection, and statistical analyses appropriate to experimental objectives.

2. Develop quarantine procedures, secure facilities and obtain approval of appropriate political and veterinary agencies for importation of breeding stocks and operation of experimental facilities.

3. Secure financial support; hire scientists and technical personnel; establish cooperative agreements with local institutions; develop facilities needed to accomplish Phases II and III.

Phase II. Resource evaluation and development

Specific details for accomplishing Phase II will be developed in Phase I. However, general procedures would include:

1. Collect representative samples of superior local stocks identified by the Phase I survey. These samples will be tested in a central facility located in an environment generally representative of the Caribbean region.

2. Comparison of samples from each source and of their crossbred progeny will include level of fertility, growth rate, mature size, quality of meat and hides and tolerance to climatic, disease, parasite and other stresses.

3. Analyses of data will be used to estimate breed differences, genetic statistics, (heritability, heterosis percent) and other production coefficients required for biological and economic projections.

4. Develop and test management technology appropriate to mixed crop-livestock production systems in the Caribbean, including use of surplus and non-competitive feed sources, such as sugar cane tops, molasses, forage and browse.

5. Complete comprehensive benefit-cost and other financial analyses of hair sheep production systems, including requirements for credit and development of necessary marketing and product processing infrastructure.

Phase III. Demonstration and manpower training

1. Demonstrate hair sheep production systems determined to be most efficient and profitable in Phase II. These real models will illustrate application of appropriate technology, husbandry methods and marketing procedures. Demonstrations will improve understanding of credit and development officers responsible for transfer of the most successful systems.

2. Train technical extension personnel, including para-professionals, in the efficacious means to adapt the genetic resources, management technology and marketing strategies to the special needs of Caribbean producers. Training courses for technical extension personnel will be conducted on-site using the successful demonstration models as examples.

3. Multiply superior, performance certified breeding stocks to provide numbers needed for transfer to other countries in Caribbean region. These stocks will be used to establish hair sheep flocks or to improve the existing local strains.

Schedule of Accomplishment

Full accomplishment of project objectives will require at least five years. However, the project procedures may be partitioned into three Phases with successful accomplishment of each Phase leading into the next.

1 - year
Phase I July 1978 to May 1979

1. Survey hair sheep resources.
2. Publish comprehensive comparison of hair sheep productivity in native environments.
3. Identify stocks for purchase and transfer to central test site in Caribbean

*6/78 - 12/83
5 1/2 years total*

1 1/2 - years
Phase II June 1979 to December 1981

1. Purchase and transfer of selected stock to central test site.
2. Evaluation of genetic stocks and crosses for degree and efficiency of production in a common environment.
3. Development of appropriate management systems.
4. Benefit-cost analyses of technology, genetic resources and management techniques.
5. Publish results of comparisons and recommendations.

2 1/2 years
Phase III June 1980 to December 1983

1. Multiplication and distribution of superior genetic stocks throughout Caribbean.
2. Development of demonstration models for smallholder systems.
3. Train producers, technicians and extension personnel in operation of improved management systems.

The hair sheep breeding flock will continue after 1983 as a source of superior stock for transfer throughout the Caribbean region. The research, demonstration and training center will also continue; however, the focus of programs should be re-evaluated no later than January, 1982 to determine what, if any, changes in program efforts should be made.

Location

The central site chosen for the biological evaluation of hair sheep resources should be in an environment broadly representative of the Caribbean region. Sufficient grazing and other feed production areas must be available to support at least 500 ewes of breeding age and their progeny. The site should include arable land in order to test the feasibility of integrated crop-livestock systems. Preferably, sources of crop residues and by-products from agricultural industries (sugar, citrus, copra and others) should be readily available for nutritional evaluation.

This site should be operated by a local or regional institution with a strong interest in development of hair sheep resource for utilization throughout the Caribbean. Commitment of the site and associated personnel and facilities for a minimum of five years would be necessary for successful accomplishment of all program objectives.

One site known to meet most of these requirements is the Blenheim Sheep Station, Ministry of Agriculture, Tobago. This station currently maintains a small flock of hair sheep. Expansion of the flock at Blenheim and at another nearby site are currently under consideration within the Ministry of Agriculture for Trinidad and Tobago.

Personnel

Active cooperation and participation by experienced Caribbean institutions, scientists and other technical personnel are critical to the success of this program. Many components of the project could be staffed in whole or in part by personnel from regional institutions, such as the University of West Indies, Caribbean Agricultural Research and Development Institute and the national Ministries of Agriculture. Informal discussions between representatives of these institutions and Winrock International personnel have indicated their genuine interest in the program objectives and willingness to participate on a cooperative basis.

It is proposed that the initial survey of hair sheep resources would be accomplished by Winrock International scientists (see attached vitae). In the course of this survey, cooperative agreements would be developed with scientists and technical personnel representing Caribbean institutions interested in the longterm objectives of Phases II and III of the program.

Personnel requirements for Phase II and III will be determined in Phase I. Types of personnel needed will include:

Research scientists: geneticists, nutritionists, physiologists, agronomists, veterinarians, economists.

Training and extension personnel.

Resident manager for research and demonstration site.

Technical personnel to collect and analyze experimental data (e.g., graduate students from University of West Indies).

Local livestock workers to care for hair sheep flock and operate demonstration site.

Winrock International Personnel (curriculum vitae attached)

Project Leader - H. A. Fitzhugh

Principal Investigator (Phase I) - G. E. Bradford

Participating Scientists - E. K. Byington
G. E. Cooper
C. H. Mannasmith
A. Martinez
M. E. Sarhan

H. A. FITZHUGH, Director of Research, Winrock International Livestock
Research and Training Center

Education: B. S. Animal Science, Texas A&M University, 1961
M. S. Meats Science, Texas A&M University, 1963
(Minor Genetics)
Ph.D. Animal Breeding, Texas A&M University, 1965
(Minor Statistics)

Postdoctorate, ARC Animal Breeding Research Organization,
Institute of Animal Genetics, University of
Edinburgh, Scotland, 1965-66

Employment History:

1975-Date Director of Research, Winrock International Livestock Research
and Training Center, Route 3, Morrilton, Arkansas 72110.

1975 Research Geneticist; Coordinator, Cattle Germ Plasm Evaluation
Program; U. S. Meat Animal Research Center, ARS/USDA, Clay
Center, Nebraska.

1973-75 Executive Vice President; Director of Research and Operations;
Member, Board of Directors, Agri-Link Corp., Irvine, California.

1968-75 Partner, Genetics Applied to Production (agricultural consulting),
College Station, Texas.

1966-73 Associate Professor, Animal Breeding Section, Animal Science
Department, Texas A&M University, College Station, Texas.

1965-66 NATO Postdoctoral Fellow, ARC Animal Breeding Research Organi-
zation, Edinburgh, Scotland.

1963-65 Research and Teaching Assistant; Genetics Section, Department
of Plant Science; Institute of Statistics, Texas A&M Univer-
sity, College Station, Texas.

1962 Research Coordinator, Estacion Experimental de los Llanos,
Consejo Bienestar Rural, Venezuela.

1961-62 Research Assistant, Department of Animal Science, Texas A&M
University, College Station, Texas.

1960 NSF Undergraduate Science Fellow, Department of Biochemistry,
Texas A&M University, College Station, Texas.

Selected Professional Experiences:

Dr. Fitzhugh has authored or co-authored over 50 scientific and technical articles in the areas of animal breeding and management with emphasis on development of livestock production systems. He has presented over 30 invitational speeches to academic and industrial organizations in 12 states and 6 foreign countries.

1975-Present -- Organized and administered research programs involving economic and biological evaluation of livestock production systems, emphasizing adaptation of scientific theory and technology for producers in underdeveloped countries and regions of developed nations. Leader of project planning livestock (cattle, sheep, goats, swine and poultry) marketing and production programs to be implemented in conjunction with Navajo Indian Irrigation Project by the Navajo Agricultural Products Industries of Farmington, New Mexico.

1973-75 -- Directed operation of vertically integrated beef production, processing and retail marketing firm with over 20,000 cows on ranches in the west-northwestern states and over 40,000 cattle on feed in 18 states; total investment in production and marketing activities exceeded \$20 million.

1970-72 -- Economic evaluation of land and livestock development and management programs for Ganado Rojo Ranches, a division of Superior Oil Company; using linear programming and computer simulation models.

1969-74 -- Advised on genetic improvement programs and designed computer programs to process performance data for American Brahman Breeders Assn., Houston, Texas; Red Angus Assn. of America, Denton, Texas; American Polled Hereford Assn., Kansas City, Missouri.

1962 -- Coordinated research program in Llanos of Venezuela for improving range and cattle management under extensive, low investment conditions.

Professional Organizations:

American Society of Animal Science
Biometric Society
Asociacion Latinoamericana de Production Animal
Alpha Zeta
Phi Kappa Phi
Sigma Xi

Foreign Experience:

Costa Rica, France, Germany, Great Britain, Italy, Mexico
Venezuela. Good reading and fair conversational knowledge of Spanish.

G. Eric Bradford, Visiting Scientist, Winrock International Research and Training Center, Morrilton, Arkansas 72110; Professor and Chairman, Department of Animal Science, University of California, Davis, California 95616

Marital status: Married (1954); 4 children

Citizenship: Canadian

Education: B. S. Macdonald College of McGill University, 1951
M. S. University of Wisconsin, (Genetics and Animal Husbandry) 1952
Ph.D. (Genetics and Animal Husbandry) 1956

Scholarships and Honors: Quebec Agricultural Research Council Postgraduate Scholarship 1951-55
Agricultural Research Council of Great Britain Fellowship 1970-71

Employment History:

1973-78 Chairman, Department of Animal Science, University of California, Davis.
1969-70 Associate Dean, College of Agricultural and Environmental Sciences, University of California, Davis.
1969-date Professor of Animal Science, University of California, Davis.
1964-69 Associate Professor of Animal Science, University of California, Davis
1957-64 Assistant Professor of Animal Husbandry, University of California, Davis.
1955-57 Assistant Professor of Animal Husbandry, Macdonald College of McGill University. (Additional appointment as Assistant Professor of Genetics).
1951-55 Research Assistant, University of Wisconsin.

Research Interest:

Genetics of growth and reproduction in sheep and mice; organization of livestock improvement programs in developed and developing countries.

Selected Professional Experiences:

1973-77.--Member, Academic Planning and Program Review Committee, University of California, Davis.

1973.-- Member, Program Committee, XIIIth International Genetics Congress (Berkeley).

1971-73.--Chairman, Academic Senate Committee on University Extension. University of California, Davis.

1970-Sept.-June 1971.--Sabbatical leave. A.R.C. Animal Breeding Research Organization, Edinburgh.

1968-69.--Chairman, Faculty of the College of Agricultural and Environmental Sciences. University of California, Davis.

1963, Aug.-Feb. 1964.--Sabbatical leave. Department of Animal Husbandry, Cornell University.

Service on curriculum development and personnel review committees. University of California, Davis.

American Society of Animal Science: 3 years each as member of the Editorial Board, Journal of Animal Science; Research Committee; and Breeding and Genetics Program Committee.

Professional Organizations:

American Society of Animal Science
British Society of Animal Production
Genetics Society of America
Society for the Study of Reproduction
AAAS

NAME: Evert K. Byington

MARITAL STATUS: Married

POSITION: Range Scientist, Winrock International Livestock Research
and Training Center

ADDRESS: Conference Center, Route 3, Morrilton, Arkansas, 72110

ACADEMIC EDUCATION: B.S., Molecular Biology and Chemistry
University of Utah, 1966
M.A. International Relations
University of Southern California, 1973
Ph.D. Range Science (Natural Resource Planning)
Colorado State University, 1977

EMPLOYMENT HISTORY:

1977-Date Range Scientist, Winrock International Livestock Research
and Training Center, Route 3, Morrilton, Arkansas 72110

1975-1976 Graduate Teaching Assistant in Range Science, Colorado
State University.

1974-1975 Research Assistant in Range Science, Colorado State
University.

1973-1974 Instructor, Department of Chemistry, Colorado State
University

1968-1973 Lieutenant/Captain in the United States Air Force

SELECTED PROFESSIONAL EXPERIENCES:

1977-Date Dr. Byington is serving as the Assistant Project
Director in an assessment of the use of drugs and
chemicals in livestock feeds. This study is being
funded by the Congress through the Office of Tech-
nology Assessment.

1974-1977 Conducted research to incorporate quantitative methods
into the Bureau of Land Management framework for multiple-
use planning on public lands. A system was developed
using goal programming and cellular mapping techniques
to analyze natural resource, economic and social data
to identify and evaluate management alternatives.

1969-1973

Administrative experience as an Air Force officer includes directing 80 personnel in maintaining and storing munitions (nuclear, non-nuclear, and missile systems) in support of Air Force units in Europe. Duties also required preparation of plans and reports, coordination between other support functions, and liaison with allied officers.

PROFESSIONAL ORGANIZATIONS:

Society for Range Management
Xi Sigma Pi

FOREIGN EXPERIENCE:

Europe: 1969-1973

George E. Cooper,

Animal Nutritionist, Winrock International Livestock
Research and Training Center

Education:

B. S.	Animal Science, Florida A & M University,	1967
M. S.	Animal Science, Tuskegee Institute,	1969
Ph.D.	Animal Science, University of Illinois,	1972

Employment History:

1977-Date Animal Nutritionist, Winrock International Livestock
Research and Training Center, Route 3, Morrilton,
Arkansas 72110

1972-77 Assistant Professor, Animal Nutrition; Coordinator
of International programs; coordinator of Tuskegee
Institute 211-d grant activities on tropical Livestock
Development; Tuskegee Institute, Tuskegee Inst., Ala.

1976-77 Chairman, USAID 211-d Livestock Consortium on Tropical
Livestock Production involving the following four U.S.
Universities: Tuskegee Institute; Texas A & M Uni-
versity; Purdue University; and University of Florida.

1969-72 Graduate Fellow in Animal Science, University of
Illinois.

1967-69 Graduate Assistant in Animal Science, Tuskegee
Institute.

1967 Research Assistant in Aquatic Entomology, Florida
A & M University.

Selected Professional Experiences:

1972-77 Dr. Cooper has been involved in undergraduate instruction
in animal science (Introductory Animal Science, Animal
Nutrition and Beef Cattle Production) and has served as
academic and research advisor for M.S. graduate students
on problems related to animal production, nutrition and
feedstuff evaluation. In addition to academic program
involvement, he has been involved in implementing prac-
tical training programs for participants from Guyana and
South America.
Organized programs for evaluating technical constraints
in livestock production for developing countries, and
served as Chairman of a four university Consortium inter-
ested in multi-disciplinary problem identification in
livestock production systems.

1977

Dr. Cooper has been involved in evaluating the role of sheep and goats in agricultural development - A state-of-the-arts study and has been the scientist in charge of the cooperatively sponsored dairy goat project which is supported by Winrock and Southern Agriculture Corporation. This project is to identify and resolve problems associated with commercial dairy goat production and evaluate the potential markets for milk and milk products from goats.

Publications:

Cooper, S. E., F. C. Hinds and J. M. Lewis. The Nutritive Value of Sheep Feces. J. Anim. Sci. 34:358 (1972). Abstract of paper presented at the meeting of the Southern Section - American Society of Animal Science, February, 1972. Richmond, Virginia.

Cooper, George E., and Glenn R. Howze. A Survey of Livestock Producers in Guyana (1975). Conducted in cooperation with the Guyana Ministry of Agriculture and the United States Agency for International Development (USAID).

Cooper, George E., Livestock Breeding Herds for Small Producers. 1976. Discussion Paper presented at the Workshop on Livestock Smallholders and Small Pastoralists. June 14-17, 1976. Winrock International Livestock Center, Morrilton, Arkansas 72110.

Glimp, H. A., H. A. Fitzhugh, R. O. Wheeler, T. D. Nguyen, A. Martinez, G. E. Cooper and R. D. Child. 1977. The Role of Sheep and Goats in Agricultural Development A state-of-the-arts study. Report of a study conducted by Winrock International and co-sponsored by USAID/TAB Livestock.

Professional Organizations:

American Society of Animal Science
Sigma Xi
Gamma Sigma Delta

Foreign Experience:

Africa: Senegal, Mali, Chad, Cameroon, Nigeria,
Upper Volta, Botswana, Swaziland, Tanzania, Kenya.
South America: Guyana.

CLARENCE H. MANNASMITH, Veterinarian, Winrock International Livestock Research
and Training Center

Education: D.V.M. Degree, Iowa State University, Ames, Iowa, 1943

Employment History:

- 1976-Date Veterinarian, Winrock International Livestock Research and Training Center, Route 3, Morrilton, Arkansas 72110
- 1973-75 Manager, Fourche River Ranch, Perryville, Arkansas. Responsible for the daily activities of the livestock holding center of Heifer Project International, a non-profit organization.
- 1946-73 Partner, General Veterinary Practice, Clarinda and Red Oak, Iowa. Practice was predominately with large animals, with a great percentage of swine practice.
- 1943-46 U. S. Army - Veterinary Corps.

Selected Professional Experiences:

Professional Organizations:

American Veterinary Medical Association
Iowa Veterinary Medical Association
Arkansas Veterinary Medical Association
United States Animal Health Association
Honorary Member, Phi Zeta

ANDRES MARTINEZ, Associate Director - Training, Winrock International
Livestock Research and Training Center

<u>Education:</u>	B. S.	Animal Science & General Agriculture Fresno State College Fresno, California	1966
	M. S.	Animal Nutrition Oregon State University Corvallis, Oregon	1969
	Ph. D.	Animal Nutrition Oregon State University Corvallis, Oregon	1971

Employment History:

1976-Date	Associate Director - Training and Development, Winrock International Livestock Research and Training Center, Route Three, Morrilton, Arkansas 72110.
1973-76	Regional Marketing Manager for Agro-Industrial Projects in Latin America and Caribbean, 1975 to 1976. Assistant Project Manager, Iran Animal Protein Development Program, March 1973 to February, 1975, FMC International, San Jose, California.
1972-73	Postdoctoral Fellow, Department of Nutritional Sciences, University of California, Berkeley, California.
1971-1972	Laboratory and Research Director, Santa Ynez Research Farm, Santa Inez, California.
1967-71	Graduate Research Assistant, Department of Animal Science, Oregon State University, Corvallis, Oregon.

Professional Interests and Expertise:

Planning and management
Applied manpower training in livestock production
Livestock production systems analyses
Applied livestock research in feeding and nutrition
Feed analysis and evaluation

International Experience:

Latin America: Extensive travel through Central and South America and the Carribean; 19 years residency in Colombia.

Middle East: Extensive travel in Iran and Lebanon; 1 year residency in Iran.

East Africa: Tanzania and Kenya

West Africa: Cameroon

Professional Organizations:

American Society of Animal Science
Latin American Association of Animal Production

Languages:

Bilingual - English and Spanish. Some knowledge of Portuguese and French.

Name: Mohamed E. Sarhan
Address: Conference Center, Route 3, Morrilton, Arkansas 72110
Phone: Office - (501) 727-5435 Residence - (501) 727-5238

Personal Data:

[REDACTED]
Marital Status - Married
Naturalized Citizen of the United States

Academic Education:

B.S. - Agronomy, University of Alexandria, Egypt. 1968
M.S. - Agricultural Economics, University of California,
Davis, California. 1973
M.A. - Economics, University of California, Davis,
California. 1973
Ph.D. - Agricultural Economics, University of California,
Davis, California. 1976

Fields of Special Interest:

Farm Management
Production Economics
Quantitative Methods
Economic Development
Livestock Systems Analysis
International Economics

Additional Expertise:

Experience with computer terminals and JCL
Write FORTRAN IV computer language
Very good knowledge of linear programming computer packages.

Current Position:

Agricultural Research Economist, Winrock International
Livestock Research and Training Center (WILRTC),
Morrilton, Arkansas 72110

April 1976-
Present

1. Principal investigator for a research study of the economic feasibility of livestock activities in the Navajo Indian Irrigation Project area of New Mexico. Duties include full responsibility for development of the analytical framework, collection of data, the economic analysis, and writing the final reports.

2. Principal investigator for a research project of an integrated beef cattle program on the Cheyenne River Sioux Reservation of South Dakota.

Previous Research and Field Work:

- 1974-1976** Post-Graduate Research Agricultural Economist, Department of Economics, University of California, Davis, California. Duties involved conducting the empirical investigation for Ph.D. dissertation.
- 1972-1974** Research Assistant, Department of Agricultural Economics, University of California, Davis, California. Duties involved work with Dr. T. R. Hedges on the development of a project concerned with the economic and social impacts of pesticide use and regulations in California.
- 1971-1972** Work-Study/Research Assistant, Department of Agricultural Economics, University of California, Davis, California. Duties included collecting, organizing and analyzing research data.
- 1969** Research Assistant, P-A-G Division, W. R. Grace and Co., Spencer Research Station, Spencer, Iowa. Duties involved participation in the station's corn breeding program, and were divided into field and laboratory work.
- 1965-1976** Research Assistant, Department of Agronomy and Plant Protection, University of Alexandria, Egypt. Duties included participation in the agricultural education and development programs throughout the Nile Delta and the eastern desert's reclamation and irrigation projects.

Membership in Professional and Honor Societies:

- American Agricultural Economics Association
- American Economics Association
- Omicron Delta Epsilon, Honor Society in Economics.
Graduate member, 1973.

Reports and Dissertation:

1. Sarhan, Mohamed E. 1974. An Economic Analysis of Optimal Mosquito Abatement Strategy and Investment Policy in R&D and Registration of Narrow-Spectrum Chemical Pesticides for Mosquito Control in California. Field Research Essay for Ph.D. degree.

2. Sarhan, Mohamed E. 1976. An Economic Analysis of Mosquito Abatement in California and the Chemical Industry's Investment in Narrow-Spectrum Pesticides. Ph.D. dissertation, University of California, Davis, California.
3. Economic Analysis of Livestock Production, Processing and Marketing Systems for the Navajo Indian Irrigation Project. Part I: Marketing Feasibility. A WILRTC Report. 1976.
4. Economic Analysis of Livestock Production, Processing and Marketing Systems for the Navajo Indian Irrigation Project. Part II: Production and Financial Analysis. A WILRTC Report. 1977.
5. Feasibility of integrated beef cattle activities on the Cheyenne River Sioux Reservation in South Dakota. A WILTRC Report. 1977.

Submitted for Publication:

1. An Economic Analysis of Mosquito Control. Submitted to the Journal of Environmental Economics and Management.
2. Objectives and Constraints of Ruminant Livestock Production. (with O. J. Scoville). Submitted to the World Review of Animal Production.
3. An Economic Analyses of Mosquito Abatement in California and the Chemical Industry's Investment in Narrow-Spectrum Pesticides, for a bulletin to be published by the Universtiy of California Agricultural Experiment Station.

In Preparation:

1. Economic and Biological Aspects of Chemical Pesticide Control of Mosquitoes in California.
2. Linear Programming Model for the Navajo Agricultural Products Industries' Livestock feeding and slaughtering in New Mexico: A User's Guide.

Budget

Phase I July 1, 1978 - May 31, 1979

Project Salaries and Related Expenses		49,600
Scientific personnel	32,500	
Technical assistants	5,000	
Secretarial-clerical	4,500	
Fringe benefits @ 18%	7,600	
Travel (North America/Caribbean/ Latin America)		28,200
Transportation	18,600	
Meals and Lodging	9,600	
Research Consultations		2,500
Communications		2,000
Telephone	1,800	
Postage/Xerography	200	
Computation/Reports/Recommendations Preparation & Publication	4,000	4,000
Indirect costs - 30% of above costs		<u>25,900</u>
Winrock International will absorb administrative expenses		
 Total for Phase I		 \$112,200

Budgets for Phases II and III will be developed as part of Phase I. They will depend on cost of breeding stock, location of central test site, number of facilities to be constructed, local costs of labor, feed supplies, etc. Income from sale of performance certified stocks will be applied against operating costs in years 1981, 1982, 1983 and subsequently.

Approximate annual operating budgets for 1980 to 1983 would include the following costs:

Salaries and related expenses		\$112,000
Scientific and training personnel	35,000	
Project Management	15,000	
Technicians, laborers	35,000	
Secretarial-clerical	10,000	
Fringe benefits @ 18%	17,000	
Feed, veterinary supplies, station maintenance		75,000
Travel, communications		15,000
Computer, publication costs		<u>12,500</u>
Annual Totals		\$214,500
Sales of performance certified breeding stock should be approximately 500 head per year @ \$200 per head for an annual total		\$100,000

WINROCK INTERNATIONAL

BOARD OF DIRECTORS

- Burton, Marlon** Practicing Attorney in Little Rock, Arkansas - [REDACTED], [REDACTED] - B.S. in Physics from Pennsylvania State; J.D. from University of Michigan - 4 years active duty with U.S. Navy - Served Governor Winthrop Rockefeller of Arkansas as General Counsel, Executive Secretary and Legal Advisor.
- Cartwright, Thomas C.** Professor in Animal Science and Genetics Departments, Texas A&M University, College Station, Texas - [REDACTED], [REDACTED] - B.S. in Animal Husbandry from Clemson University; M.S. in Genetics from Texas A&M University; Ph.D. in Animal Breeding from Texas A&M University. 1st Lt. Air Corps, Pilot - Traveled extensively to conduct seminars, consult on cattle breeding and genetics.
- Dietel, William M.** President of Rockefeller Brothers Fund, New York City. [REDACTED], [REDACTED] - A.B. from Princeton; M.A. from Yale and University of London; Ph.D. from Yale. Was Instructor in History at University of Connecticut and Assistant Professor of History at the University of Massachusetts; Assistant Dean of Amherst College; Principal of Emma Willard School, Troy, New York.
- Ghorbal, Ambassador Ashraf A.** Ambassador of Egypt to the United States - [REDACTED], [REDACTED] in Alexandria, Egypt - Graduated Cairo University with honors; M.A. from Harvard; Ph.D. from Harvard in Political Science - Has served in Egypt's Diplomatic Service; Assistant Advisor to the President for National Security Affairs in 1972; Press Advisor to President Sadat in 1973.
- Knight, Harry** Management Consultant and President of Hillsboro Associates, Inc., New York City - [REDACTED], [REDACTED] - A.B. Amherst College, Postgraduate work at Harvard Graduate School of Business Administration; M.A. from Northwestern University - Was Finance Officer for a number of companies and city governments; wartime service with Munitions Assignment Board; Director of Finance, UNRRA; Vice President of Booz, Allen & Hamilton, 1945-66; Chairman of Knight, Gladieux & Smith, 1966-73.

Page Two
Board of Directors

- Martin, James** Vice President for Agriculture, University of Arkansas, Fayetteville, Arkansas - [REDACTED] - B.S. Auburn University, Agricultural Administration; M.S. North Carolina State University, Agricultural Economics; Ph.D., Iowa State University, Agricultural Economics - Lieutenant U.S. Army for 2 years - Has served on faculty of University of Maryland and Oklahoma State University; Professor and Head of the Department of Agricultural Economics, Virginia Polytechnic Institute and State University; Dean of Agricultural and Life Sciences, Virginia Polytechnic Institute and State University.
- McAdams, Herbert H. II** Banker, Chairman of the Board and Chief Executive Officer, Union National Bank of Little Rock; Chairman of the Board and Chief Executive Officer of the Citizen's Bank of Jonesboro; Director of Arkansas Louisiana Gas Company from 1964 to 1972 and from 1976 to date - [REDACTED] - B.S. from Northwestern University; attended Harvard and Loyola University; J.D. from University of Arkansas - Served as Chairman of the Board, Home Federal Savings and Loan Association, Jonesboro; President of Home Federal Savings and Loan Association, Jonesboro and Director of Federal Reserve Bank of St. Louis, Little Rock Branch.
- Muriithi, Ishmael E.** Chief Veterinary Officer for Kenya since 1965 - [REDACTED] - Bachelor of Veterinary Medicine and Surgery from Edinburgh University; obtained diploma in Veterinary Science from Makerere University College in Uganda - Member of Board of Trustees for International Laboratory for Research on Animal Diseases, Chairman for Kenya Beef Industry, 1968-76.
- O'Brien, Donal C.** Chief Legal Counsel with firm of Milbank, Tweed, Hadley & McCloy, New York - [REDACTED] - B.A. from Williams College; L.L.B. from University of Virginia Law School - Has been Associate with Milbank, Tweed, Hadley & McCloy 1959-67 and a partner in the firm since 1968.
- Pino, John A.** Director for Agricultural Sciences, The Rockefeller Foundation, New York - [REDACTED] - B.S. Rutgers University; Ph.D. in Zoology from Rutgers University - Captain in U.S. Infantry - Was Instructor and Assistant Professor at Rutgers University from 1947 to 1955; Associated with Rockefeller Foundation since 1955.

Page Three
Board of Directors

Rockefeller, Winthrop
Paul

Owner and operator of Winrock Farms on Petit Jean Mountain - [REDACTED] [REDACTED] - Completed School of Ranch Management, Texas Christian University, Fort Worth, Texas; attended schools in Switzerland and England - Owns more than 27,000 acres in five Arkansas counties.

Stoops, Don

On July 1, 1977 retired from the World Bank, where he served as Livestock Advisor - Graduated with honors from Oklahoma State University; M.S. in Agriculture from Ohio State University - Has served in various positions with the U.S. Department of Agriculture; Was Vice President for Latin America of George Fry and Associates; Senior Loan Officer in 1959 for the Development Loan Fund; was with AID from 1962 as Chief of the East Coast of Latin America Division of Capital Development until joining the World Bank in 1964.

Thomas, Gerald W.

President, New Mexico State University - [REDACTED] [REDACTED], [REDACTED] - Associate of Arts, Pasadena Junior College, California; B.S. (Forestry), University of Idaho; M.S. Texas A&M University; Ph.D. Texas A&M University - Dean of Agriculture, Texas Tech University 1958-70; Research Coordinator, Texas Agricultural Experiment Station, 1956-58; Faculty Member, Texas A&M University, 1950-56; U.S. Soil Conservation Service, Range Conservationist, 1945-50; Forest Guard, U.S. Forest Service, 1938-41.

Tiedemann, Carl H.

Securities Co. Executive; President of Donaldson, Lufkin & Jenrette, Inc. of New York City - [REDACTED] [REDACTED], [REDACTED] - M.S. from Columbia Graduate School of Business - Started his career at D.L. & J. as head of Institutional Sales and Trading; became Chief Executive Officer in 1970; was elected Vice Chairman of the Board in 1974 and elected President in 1975.

Wheeler, Richard O.

President of Winrock International Livestock Research and Training Center, Morrilton, Arkansas - [REDACTED] [REDACTED] [REDACTED] - B.S. and M.S. from Montana State University; Ph.D. from Oregon State University - Served as Research Economist with USDA and Associate Professor at Montana State University; Served as a private consultant to U.S. firms and international organizations in Nigeria, Indonesia, Pakistan, Tanzania, Uganda and Ethiopia with emphasis on livestock development worldwide.

Page Four
Board of Directors

Zahedi, Ambassador
Ardeshir

Ambassador of Iran to the United States - [REDACTED]
[REDACTED] [REDACTED] - Attended American
College of Beirut; B.S. from Utah State University;
Honorary Doctorates in Law from Utah State University,
Chungang University of Seoul, East Texas State University,
Kent State University and St. Louis University; was
involved in many government services in Iran; served
as Ambassador of Iran to United States, Great Britain,
Mexico; Foreign Minister of Iran.

December 1, 1977

WINROCK INTERNATIONAL LIVESTOCK RESEARCH AND TRAINING CENTER

<u>Name</u>	<u>Position</u>	<u>Special Interests</u>	<u>International Experience</u>
R. O. Wheeler, Ph.D.	President	Production Economics	East & West Africa, Pakistan, Indonesia
Evert K. Byington, Ph.D.	Range Scientist	Range Management; International Relations; Natural Resource Planning	Europe
R. Dennis Child, Ph.D.	Range Scientist	Range Management; Systems Science	Central America
G. E. Cooper, Ph.D.	Animal Nutritionist	Ruminant Nutrition; Small Ruminant Production Systems	Africa, Latin America
H. A. Fitzhugh, Ph.D.	Director of Research	Livestock Genetics; Systems Science; Economic Evaluation of Livestock Production Systems	Latin America, Europe
C. H. Mannasmith, D.V.M.	Veterinarian	Animal Health & Diseases; Livestock Production	Latin America, Africa
Mary K. Marks, M.S.	Technician	Mathematics, Computer Science	
A. Martinez, Ph.D.	Associate Director Development & Training	Ruminant Nutrition & Management; Agri-Business Analysis & Development	Latin America, Middle East
Richard Newton	Training Program Specialist	Facilities & Equipment Design, Cost Analysis & Construction; Beef Cattle & Dairy Goat Production	Africa
Thanh D. Nguyen, Ph.D.	Animal Nutritionist	New Feed Resources, Livestock Production Systems, Systems Science	S. E. Asia, India, Afghanistan, France
Walt Rowden, M.S.	Director of Training	Beef Cattle & Sheep Management	
M. E. Sarhan, Ph.D.	Research Economist	Economic Development; Quantitative Methods, Macro-Economics & International Trade	North Africa, Middle East
Paul W. Schumacher	Dairy Training Program Manager	Dairy Production, Farm Management	Canada, Africa

December 1, 1977

<u>Name</u>	<u>Position</u>	<u>Special Interests</u>	<u>International Experience</u>
Randy Smith	Communications Specialist	Video Systems, Photography Training Materials Development	
Johnny Thompson	Communications Coordinator	Agricultural Public Relations, Organizational Management, Photography, Sheep Industry	
E. L. Williams, M.B.A.	Program Officer	Overall Program & Financial Development	Latin America, Caribbean
Preston Woodruff, Jr.	Financial Officer	Administration & Financial Management	

Special Consultants

T. C. Byerly, Ph.D.	Consultant	Biological Efficiency of Production; Livestock Genetics & Reproduction; Research Administration	Europe, Africa, Asia, Latin America
R. D. Child, M.S.	Consultant	Beef Cattle Production; Ranch Management; Forage Production	Latin America, Africa, Korea, Iran, Europe
H. A. Glimp, Ph.D.	Consultant	Ruminant Nutrition; Beef Cattle, Sheep & Goat Production; Livestock Management Training	Africa, Europe, Latin America
H. J. Hodgson, Ph.D.	Consultant	Forage Crop Breeding, Production & Utilization; Forage-Ruminant Production	U.S.S.R., Africa, Europe, Japan
W. W. Konkle, B.A.	Editorial Consultant	Agricultural Science Writing & Editing	Caribbean
L. J. Nygaard, Ph.D.	Consultant	Ruminant Nutrition; Beef Cattle & Sheep Production; Feedlot & Feed Mill Management	
O. J. Scoville, Ph.D.	Consultant	Production Economics; Farm Management; Agricultural Policy	Africa, Middle East Asia, Europe

**WINROCK INTERNATIONAL
LIVESTOCK RESEARCH AND TRAINING CENTER**

Winrock International Livestock Research and Training Center is classified as a non-profit, publicly supported organization described in Section 170 (b)(1)(A)(vi) and 509 (a)(1); exempt from federal income tax under Section 501 (c)(3) of the United States Internal Revenue Code.

The Internal Revenue Service of the United States Department of the Treasury has classified Winrock International as an organization that is not a private foundation as defined in Section 509 (a) of the Internal Revenue Code.

The Center is an independent, non-profit institution, not connected with any governmental, commercial or professional agency. All of its operations and financial transactions are publicly reported.

All Winrock International training and research programs are supported by funds from its own endowment and by funds from foundations, individuals, corporations, government contracts and grants. As a publicly supported organization, Winrock International accepts and actively seeks tax deductible gifts from individuals, foundations, governments and corporate donors.

Winrock International Livestock Research and Training Center has its headquarters on Petit Jean Mountain in Arkansas (about seventy miles from Little Rock). Extensive livestock facilities surrounding its offices were built by the late Winthrop Rockefeller, Governor of Arkansas from 1967 until 1971. It was Mr. Rockefeller's wish that the experimental operations he had begun would continue. A grant was made from his estate which enabled the Center to begin its operation in 1975.

Internal Revenue Service

Department of the Treasury

District
Director

1100 Commerce St., Dallas, Texas 75202

EXHIBIT E

Person to Contact:

Pamila McReynolds

Telephone Number

(214) 749-3693

Refer Reply to:

EO:2:309:PMcR DAL:EO:75-1215

Date: **AUG 29 1975**

**Winrock International Livestock
Research and Training Center, Inc.
Winrock Farm Route #3
Morrlilton, Arkansas 72110**

Accounting Period Ending: **November 30**
Form 990 Required: **(X) Yes () No**
Advance Ruling Period Ends: **November 30, 1980**

Gentlemen:

Based on the information supplied, and assuming your operations will be as stated in your application for recognition of exemption, we have determined you are exempt from Federal income tax under section 501(c)(3) of the Internal Revenue Code.

Because you are a newly created organization, we are not now making a final determination of your foundation status under section 509(a) of the Code. However, we have determined that you can reasonably be expected to be a publicly supported organization of the type described in section 170(b)(1)(A)(vi) and 509(a)(1).

Accordingly, you will be treated as a publicly supported organization, and not as a private foundation, during an advance ruling period. This advance ruling period begins on the date of your inception and ends on the date shown above.

Within 90 days after the end of your advance ruling period, you must submit to us information needed to determine whether you have met the requirements of the applicable support test during the advance ruling period. If you establish that you have been a publicly supported organization, you will be classified as a section 509(a)(1) or 509(a)(2) organization so long as you continue to meet the requirements of the applicable support test. If, however, you do not meet the public support requirements during the advance ruling period, you will be classified as a private foundation for future periods. Also, in the event you are classified as a private foundation, you will be treated as a private foundation from the date of your inception for purposes of sections 507(d) and 4940.

**Winrock International Livestock
Research and Training Center, Inc.**

Grantors and donors may rely on the determination that you are not a private foundation until 90 days after the end of your advance ruling period. In addition, if you submit the required information within the 90 days, grantors and donors may continue to rely on the advance determination until the Service makes a final determination of your foundation status. However, if notice that you will no longer be treated as a section 509(a)(1) organization is published in the Internal Revenue Bulletin, grantors and donors may not rely on this determination after the date of such publication. Also, a grantor or donor may not rely on this determination if he was in part responsible for, or was aware of, the act or failure to act that resulted in your loss of section 509(a)(1) status, or acquired knowledge that the Internal Revenue Service had given notice that you would be removed from classification as a section 509(a)(1) organization.

Donors may deduct contributions to you as provided in section 170 of the Code. Bequests, legacies, devises, transfers, or gifts to you or for your use are deductible for Federal estate and gift tax purposes if they meet the applicable provisions of sections 2055, 2106, and 2522 of the Code.

You are not liable for social security (FICA) taxes unless you file a waiver of exemption certificate as provided in the Federal Insurance Contributions Act. You are not liable for the taxes imposed under the Federal Unemployment Tax Act (FUTA).

Organizations that are not private foundations are not subject to the excise taxes under Chapter 42 of the Code. However, you are not automatically exempt from other Federal excise taxes. If you have any questions concerning these taxes, please let us know.

If your sources of support, or your purposes, character, or method of operation is changed, you should let us know so we can consider the effect of the change on your status. Also, you should inform us of all changes in your name or address.

If the yes box at the top of this letter is checked, you are required to file Form 990, Return of Organization Exempt From Income Tax, only if your gross receipts each year are normally more than \$5,000. The return is due by the 15th day of the fifth month after the end of your annual accounting period. The law imposes a penalty of \$10 a day, up to a maximum of \$5,000, for failure to file the return on time.

You are not required to file Federal income tax returns unless you are subject to the tax on unrelated business income under section 511 of the Code.

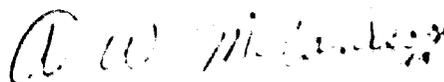
Winrock International Livestock
Research and Training Center, Inc.

If you are subject to this tax, you must file an income tax return on Form 990-T. In this letter we are not determining whether any of your present or proposed activities are unrelated trade or business as defined in section 513 of the Code.

You need an employer identification number even if you have no employees. If an employer identification number was not entered on your application, a number will be assigned to you and you will be advised of it. Please use that number on all returns you file and in all correspondence with the Internal Revenue Service.

If we may be of further assistance, please contact this office.

Sincerely yours,



A. W. McCannless
District Director

cc: Edward J. P. Zimmerman
Room 5600 -- 30 Rockefeller Plaza
New York, New York 10020

Pursuant to section 6501(c)(4) of the Internal Revenue Code and as part of a request submitted with Form 1023, that the within designated organization be treated as a publicly supported organization within the meaning of section 170(b)(1)(A)(iv) or (vi) or section 509(a)(2) during an extended advance ruling period,

Winrock International Livestock Research and Training Center, Inc. District Director
(Name of organization)

Winrock Farm
Route 3, Morrilton, Arkansas 72110 and the
(Number, street, city or town, State and ZIP code)

consent and agree as follows:

The period of limitation upon assessment of the tax imposed under section 4940 of the Code for any taxable year within the advance ruling period as extended shall not expire prior to one year from the date of expiration of the time prescribed by law for the assessment of a deficiency for the last taxable year within the advance ruling period, as extended, to wit (check one)—

- First taxable year at least 8 months: The period of limitations for the first 5 taxable years shall extend 8 years, 4 months, 15 days beyond the end of the first taxable year.
- First taxable year less than 8 months: The period of limitations for the first 6 taxable years shall extend 9 years, 4 months, 15 days beyond the end of the first taxable year,

except that if a notice of deficiency in tax for any such years is sent to the organization before expiration of such period, the time for making an assessment shall be further extended for the period in which the making of an assessment is prohibited and for 60 days thereafter.

Ending date of first taxable year: November 30, 1975

NAME OF ORGANIZATION	DATE
Winrock International Livestock Research and Training Center, Inc.	July 7, 1975
OFFICER OR TRUSTEE HAVING AUTHORITY TO SIGN	
SIGNATURE <u>[Signature]</u> Vice President	July 7, 1975
DISTRICT DIRECTOR	
<u>[Signature]</u>	8/28/75
BY <u>[Signature]</u> - <u>Shop manager</u>	