II MEETING OF THE INTER-AMERICAN COMMISSION ON ANIMAL HEALTH

BRASILIA, D.F., BRAZIL 1985

IICA

Animal Health Series
Scientific Publication No. 11

COINSA II
PROCEEDINGS

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April 29 - May 1st., 1985

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PROLOGUE

The Inter-American Commission on Animal Health (COINSA), which is composed of the Directors of Animal Health of the twenty-nine IICA Member states, has begun to take on a major role in the countries of the Americas, both in its capacity as an advisory body to the Director General of IICA in the area of animal health, and as an important hemispheric forum in which animal health problems are aired and ideas and solutions are proposed.

Participating in the work of the Commission are distinguished representatives of the international and subregional technical cooperation agencies operating in the animal health field in the Americas, along with representatives from the financial institutions and agencies, and their presence has notably enhanced the exchange of information and the coordination of priority national and multinational activities and projects.

The members of the five advisory committees formed within the Commission are renowned scientists, internationally acclaimed in their fields. Their active participation has ensured that the recommendations made by these committees are well-conceived from a technical point of view and solidly grounded.

Animal health is a fast-moving field in which technological advances of all types have a strong and direct influence. A body such as COINSA, therefore, is an essential link in gathering and publicizing information about the progress of events taking place in the field.

Héctor Campos López
Director, Animal Health Program

TABLE OF CONTENTS

GENERAL THEMES

REPORTS OF THE SUB-REGIONAL MEETINGS ON ANIMAL HEALTH HELD DURING 1984

PAPERS PRESENTED AT THE SESSION OF THE ADVISORY COMMITTEE ON LIVESTOCK INDUSTRY SUPPORT TO ANIMAL HEALTH PROGRAMS

PAPERS PRESENTED AT THE SESSION OF THE ADVISORY COMMITTEE ON ANIMAL HEALTH DIAGNOSTIC AND RESEARCH LABORATORIES

PAPERS PRESENTED AT THE SESSION OF THE ADVISORY COMMITTEE ON CONTROL AND ERADICATION OF TICKS AND OTHER EXTERNAL PARASITES

PAPERS PRESENTED AT THE SESSION OF THE ADVISORY COMMITTEE ON ANIMAL HEALTH INTERNATIONAL QUARANTINE AND EMERGENCY PROGRAMS

PAPERS PRESENTED AT THE SESSION OF THE ADVISORY COMMITTEE ON COORDINATION OF THE INTERNATIONAL COOPERATION IN ANIMAL HEALTH

ADDRESS BY THE CHAIRMAN OF THE INTER-AMERICAN COMMISSION ON ANIMAL HEALTH

Dr. Juan Vázquez Marquez
Livestock Undersecretary
Mexico

It is a great honor for me to participate in the opening of this Second Meeting of the Inter-American Commission on Animal Health.

Almost two years after COINSA was established by the express mandate of the Inter-American Board of Agriculture, which brings together the twenty-nine member states of IICA, I am very pleased to have the opportunity to address this distinguished group at the end of my term of office as President of COINSA.

Today as never before, animal production is a major component of the economic development of the nations of our hemisphere, and it was with great prescience that the Inter-American Board of Agriculture decided to deal with the impact that animal health has on the production process by setting up COINSA.

Many important things have happened since that September in 1983 when this new form of integration was set up in Mexico as a pure expression of Pan Americanism.

The economic crisis continues to haunt our countries and put constraints on the possibility of developing protection and health programs or giving technical assistance to producers. Meanwhile, animal diseases continue to be dangerous and to cause damage.

The outbreak of avian influenza in the United States, the inexorable advance of the Africanized bee towards Central and North America, the recent outbreaks of African Swine Fever in Belgium, and the increased findings of harmful substances in foods of animal origin caused by the deterioration of the environment force us to reflect on the importance of joint action by the governments and international agencies in order to address and resolve the basic problems of development.

It was in that spirit that ten recommendations for immediate action were carried out: they will enable the countries to build ongoing, feasible animal health programs on a more solid basis.

Here at this Second Meeting, we can see the major advances that are being made: the notable increase in the activities of the IICA Animal Health Program; the preparation of the Fifteen-Year Animal Health Master Plan; the research on bluetongue; the strengthening of animal quarantine and emergency programs; the evaluation of the mass communications programs for animal health operated by the veterinary services in the member states; and the improvements in the diagnostic laboratories in all regions of the area.

Coordination of international technical cooperation in the area of animal health is now beginning to be seen as a reality. And it is coming about because of the cohesion and cohesiveness that the hemisphere's animal health specialists acquire through COINSA.

I offer you my best wishes and most sincere hopes for the permanence and continuity of these efforts.

ADDRESS BY THE DIRECTOR GENERAL OF IICA

Dr. Francisco Morillo Andrade
San Jose, Costa Rica

It is for me an honor and a source of satisfaction to be here again in this beautiful and commanding country, at this time when the people of Brazil still are mourning, to participate in this Second Meeting of the Inter-American Commission on Animal Health, COINSA. This meeting has been sponsored by the Inter-American Institute for Cooperation on Agriculture, IICA, to which the Government of Brazil has extended a generous invitation and its vital support. On this solemn occasion to open the meeting, the Inter-American Commission has been graced with the presence of The Honorable Minister of Agriculture, Mr. Pedro Simón.

It is particularly gratifying for IICA to organize once again the Meeting of the Inter-American Commission on Animal Health, which has been made to coincide with the Conference of the Regional Commission for the Americas of the International Office of Epizootics, and with the Inter-American Meeting on Animal Health at the Ministerial Level, of the Pan American Health Organization.

The fact that these activities are being held at the same time is indeed significant and is indicative of the dynamic and effective institutional action that is taking place in the field of animal health at the hemispheric level, in our American region, particularly over the past two years since the first meeting of the Inter-American Commission on Animal Health was held in Mexico.

During these two years, while problems such as those that the Chairman of COINSA I has referred to were encountered, they were dealt with, and I am happy to report, successfully, since Haiti, the Dominican Republic and Brazil have been rid of African swine fever, a breakthrough for veterinary medicine and animal health in the hemisphere.

Efforts to deal with influenza in poultry in the United States and continuing efforts to eradicate the screwworm in Mexico and progress in that area also are notable examples of the use of technology to rid our countries of these major pests and animal diseases.

For IICA it is a commitment and at the same time a source of satisfaction to be a part of those efforts.

This is as the Inter-American Board of Agriculture recognized when it installed and put into operation the Hemispheric-level Animal Health Program, one of the Institute's larger-scale programs. That program now has eight multinational projects that cover all of the countries in the hemisphere. These have specific projects through agreements with Guatemala, Venezuela, Paraguay, Brazil, Argentina, Haiti and the United States. These benefit from financing from the countries themselves, organizations like the Inter-American Development Bank and the United States Agency for International Development, and IICA, through agreements for the execution of specific activities to solve problems identified by the countries themselves, designated as top priority, and for which the countries have requested international technical cooperation to provide solutions.

We are also involved in the preparation of new projects to face problems as they arise or that erode the productive capacity of our flocks. Among these, because of its scope and importance, mention should be made of the project for the eradication of the screwworm in livestock from the Tehuantepec Isthmus in Mexico, where the barrier now is, all the way to what is known as the Darien Gap between Panama and Colombia, thereby freeing the entire Central American Isthmus. The barrier, furthermore, will thereby be located at a place where operation will be far easier in terms of its maintenance and consequently will also be less risky for the countries that would be rid of this pest.

We have received requests for support in the field of diagnosis and operation of diagnostic and reference laboratories from a number of countries. New projects therefore have focused on meeting those requests. It should be especially noted that the integration of efforts in animal health with the other technical cooperation programs of IICA and with the efforts of the countries themselves, particularly in the areas of planning, preparation of animal health plans, including the animal health plan for the year 2000, and the specific country projects is gaining momentum and becoming increasingly effective. At the multinational level, this meeting will discuss the topic of information with a view to developing and putting into operation an Inter-American information system to further work in existence at the hemispheric and world levels and extend it to make use of institutional capacity, experience gained and new technological instruments for data-processing that would make it possible to proceed in an increasingly more effective manner.

On this occasion, we shall see also progress achieved since the I Meeting of COINSA in Mexico and the new projects that have been an outgrowth of recommendations from that meeting. We are sure that from this all-out examination and thorough knowledge that the participants have of the present-day problem of animal health in our hemisphere will emerge also from this meeting new proposals that will enable us to channel our technical cooperation activities in such a way as to find solutions to those problems.

The setting in which this meeting is being held could hardly be more appropriate or stimulating. In addition to the comfort that this attractive Itamaraty Building affords us, we are blessed with the generous and unqualified support of the Brazilian government and are being given an opportunity to experience first-hand and on the spot technological advances in this country, and particularly, its product at the National Zebu Cattle Show, to take place following this meeting, at Uberaba, the fruit of the efforts of the Brazilian producers, rightfully admired throughout the world because of the extremely high quality that has been achieved in the production of Zebu livestock in Brazil.

We feel very honored by the presence of you all at this meeting, and by the group of renowned scientists that are here with us to share their experiences.

This is why I am sure, and make my best predictions, that this meeting will be most successful.

Once again, I thank the Government, people of Brazil and the Minister for the generous hospitality they have extended. Thank you very much.

ADDRESS BY HIS EXCELLENCY
MINISTER OF AGRICULTURE OF BRAZIL

Dr. Pedro Simón
Brasilia, Brazil

I am honored to take part in events of this kind, particularly at this moment when the facts show us that around the world, we must base our goals, our concerns, our work and our research on the essential political and social issues that are preoccupying all the peoples of the world: health, democracy and employment.

It is salutary, gratifying and comforting to see in this room men and women who are the anonymous soldiers in a task whose success does not make headlines or receive awards, but whose failure leads to tragedy, pain and hunger for the victims, our brothers throughout the world. Then and only then is the work news, by omission, carelessness or neglect.

Caring for the health of animals means caring for the health of humanity.

Animal diseases are not eradicated by improvising they are not eradicated without controls, without planning, without support and without resources. Above all, they are not eradicated without a full exchange of frank and honest information.

We are a continent with an extraordinary potential for the production of food. We are conscious of that fact. But we are also conscious of the realities of hunger, which affects a significantly large sector of our people. This hunger is caused, among other things, by one factor that we should especially recall at this meeting--the lack of red protein in the body.

The satisfaction of preventing death should prevail over the pleasure of killing for profit or power.

We know that without national and international cooperation, without the crucial dedication of professionals--veterinarians, agronomists, ecologists, biologists, animal health experts, without the participation of the workers in the fields, without the support of governments through their own agencies, we shall advance little and shall accomplish less.

We have one example here: the significant assistance provided by the Inter-American Institute for Cooperation on Agriculture and its joint participation with the Ministry of Agriculture of Brazil, in the Plan to Control Parasitoses, which are causing so much damage in our country.

Honoring its previous commitment, the National Defense secretariat of the Ministry of Agriculture drew up a project to control emergency and exotic diseases, which is now in its concluding phase.

It is this joining of forces, through the participation of IICA, the Pan American Health Organization, FAO, IDB, the World Bank, the International Office of Epizootics, the World Health Organization, all the international and national organizations, that makes it possible to develop common programs for the production of food for the world's needy, hungry and troubled peoples.

I am sure that none of us would seek selfish monopoly of knowledge. What we are looking to is the universal transmission of knowledge and understanding.

Likewise, good health is for everyone, and is not the privilege of a few.

In opening this Second Meeting of the Inter-American Commission on Animal Health, I congratulate all who, directly and indirectly, are involved in making it happen, and I pay tribute to the participants, in the conviction that the issues that are to be discussed here will meet the expectations of those who are hoping for so much from us.

It is on their behalf, and on behalf of the new Republic that I say thank you very much for your dedication and for honoring us with your presence.

FINAL REPORT AND RECOMMENDATIONS

The Second Meeting of the Inter-American Commission on Animal Health was held at the Palace of Itamaraty of the Ministry of Foreign Affairs of Brazil, located in the City of Brasilia, D.F., from April 29 to May 1, 1985, in accordance with the convocation made by the Director General of the Inter-American Institute for Cooperation on Agriculture, in completion of Resolution 15 of the Second Special Meeting of the Inter-American Board of Agriculture and in accordance with the recommendations of the First Meeting of the Inter-American Commission on Animal Health in Mexico City, from September 19 to 23, 1983.

BOARD OF DIRECTORS

The Board of Directors of the Meeting unanimously elected the following:

President: Dr. Guilherme de Carvalho Celebrini
Brazil

Rapporteur: Dr. Carlos Franco
Paraguay

Once the order for the Vice-presidency was drawn the following was established: Ecuador, Colombia, Costa Rica, Bolivia, Chile, Saint Lucia, Venezuela, Suriname, Haiti, Panama, Jamaica, Guatemala, Trinidad & Tobago, Honduras, Argentina, Grenada, Mexico, United States, Uruguay, Barbados, Canada, Dominica, Peru and Dominican Republic.

Dr. Héctor Campos López, Director of the Animal Health Program of IICA acted as ex-Officio Secretary.

PARTICIPANTS

The following Member states of the Inter-American Institute for Cooperation on Agriculture were represented at the Meeting: Argentina, Barbados, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Dominica, Dominican Republic, Ecuador, Grenada, Guatemala, Haiti, Honduras, Jamaica, Mexico, Panama, Paraguay, Peru, Saint Lucia, Suriname, Trinidad & Tobago, United States, Uruguay and Venezuela.

Also present were observers from Egypt and Japan and the following international organizations: The Pan American Health Organization, the Food and Agriculture Organization of the United Nations, the International Office of Epizootics, the Inter-American Development Bank, the Cartagena Agreement and the World Veterinary Association. Also present were representatives from the Agency for International Development and the Livestock Conservation Institute of the United States.

AGENDA

The meeting was developed in accordance with the following agenda approved by the Commission in its first plenary session:

1. Inaugural Session.

2. Present and Future Panorama of Production and Animal Health.

3. Report of Activities of IICA's Animal Health Program on 1983-1985 and Working Program for 1986-1987.

4. Accomplishment of Recommendations of COINSA I.

5. Animal Health Plan for the Americas by the Year 2000.

6. Report of Animal Health Sub-Regional Meetings, RESANORTE, RESANTILLAS, RESANDINA and RESASUR.

7. Report of the International Conference on Vesicular Stomatitis held in Mexico, D.F., September 1984.

8. Inter-American Animal Health Information and Surveillance System.

9. Inter-American Veterinary Products Information System.

10. Session of the Advisory Committee on Diagnostic and Research Laboratories in Animal Health.

11. Session of the Advisory Committee on Coordination of the International Cooperation on Animal Health.

12. Session of the Advisory Committee on Control of Ticks and Other External Parasites.

13. Session of the Advisory Committee on International Quarantine and Emergency in Animal Health.

14. Other matters.

15. Closing session.

MEETING DEVELOPMENT

During the development of the Meeting were held an inaugural session, four plenary sessions, ten Committee sessions and a closing session.

COMMITTEES

The commission integrated five committees as follows:

<u>Advisory Committee on Livestock Industry Support to Animal Health Programs</u>

Chairman: Dr. Gordon Dittberner (Canada)
Secretary: Dr. César Lobo (IICA)

Members:
Dr. Paul Doby (USA/LCI)
Ing. Alberto de las Carreras (Argentina)
Dr. Lester Crawford (USA)
Dr. Marcos Herrera (Venezuela)
Dr. Robert Lieuw-a-Joe (Suriname)
Dr. Sergio Hidalgo (Costa Rica)
Ing. Eduardo Lago Bambarén (Perú)
Dr. Carlos Alberto Cavalcanté de Alburquerque (Brazil)
Dr. Juan Manuel Pérez Trujillo (Mexico)
Dr. Jairo Arias (Colombia)
Dr. Raúl Hinojosa (USA/AID)
Dr. Juan Vázquez Marquez (Mexico)

<u>Advisory Committee on Diagnostic and Research Laboratories in Animal Health</u>

Chairman: Dr. Bernardo Carrillo (Argentina)
Secretary: Dr. Dante Castagnino (IICA)

Members:
Dr. Jerry Callis (USA)
Dr. Vaughn Seaton (USA)
Dr. Roberto Joviano (Brazil)
Dr. Luis Meléndez (USA)
Dr. Raúl Casas (OPS/PANAFTOSA)
Dr. Joe Held (OPS/CEPANZO)
Dr. Osvaldo Ibarra (Argentina)
Dr. Galo Izurieta (Ecuador)
Dr. Trevor King (Barbados)
Dr. Benjamín Jara Guillén (Mexico)
Dr. Natanael Ferreira dos Santos (Brazil)
Dr. Eugenio Perdomo (Uruguay)

Observer: Dr. Konrad Bogel (OMS)

Advisory Committee on Control of Ticks and Other External Parasites

Chairman: Dr. Keith Scotland (Saint Lucia)
Secretary: Dr. Franz Alexander (IICA)

Members:
Dr. Carlos C. Arteche (Brazil)
Dr. Gonzalo E. Moya (Brazil)
Dr. Alberto Signorini (Argentina)
Dr. Silvino Carlos Horn (Brazil)
Dr. Linden Bryan (Jamaica)
Dr. Errol Harris (Dominica)
Dr. Fabricio Puerto Oseguera (Honduras)
Dr. Nazario Pineda (Mexico)

Observer: Dr. Frank Peritz (FAO)

Advisory Committee on International Quarantine and Emergency in Animal Health

Chairman: Dr. Julio Cabrera Meza (Guatemala)
Secretary: Dr. José Ferrer (IICA)

Members:
Dr. Norvan L. Meyer (USA)
Dr. Jorge Benavides (Chile)
Dr. William Buisch (USA)
Dr. Jolivert Toussante (Haiti)
Dr. Dileccio Vanderlinder (Dominican Republic)
Dr. Vincent Moe (Trinidad & Tobago)
Dr. Emilio Gimeno (Argentina)
Dr. Decio de Araujo Lyra (Brazil)
Dra. Tania M. de Paula Lyra (Brazil)
Ing. Pablo Quevedo (JUNAC/Lima)
Dr. Carlos Franco (Paraguay)

Advisory Committee on Coordination of the International Cooperation on Animal Health

Chairman: Dr. John K. Atwell (USA)
Secretary: Dr. Germán Gómez (IICA)

Members:
Dr. Guilherme de Carvalho Celebrini (Brazil)
Dr. Arnaldo Colusi (Argentina)
Dr. Sergio Garay Román (Paraguay)
Dr. Bonus Nutor (Grenada)
Dr. Mario Castillo (Panama)
Dr. Nelson Magallanes (Uruguay)

Dr. Walter Agreda Coca (Bolivia)
Dr. José Freire de Faria (Brazil)

Observer: Dr. Yoshiro Ozawa (FAO/Roma)
Dr. Pablo Quevedo (JUNAC/Lima)

In this Meeting, the following recommendations and votes of recognition were adopted:

RECOMMENDATION No. 1

PARTICIPATION OF THE LIVESTOCK SECTOR IN THE PLANNING AND DEVELOPMENT OF ANIMAL HEALTH PROGRAMS

The Second Meeting of the Inter-American Commission on Animal Health,

Taking into consideration that at the First Meeting of the Inter-American Commission on Animal Health -COINSA-, Recommendation VI was drafted aimed at creating mechanisms to institutionalize the representation of livestock producers and related industries in the structures of animal health services,

Whereas the reports received at the convenience of countries who were developing programs of communication on animal health, indicated they were aiming for wider participation of the community in animal health work,

Considering that the present Meeting has heard statements highlighting the existence of private agencies formed by producers, industrialists and businessmen, such as the "Livestock Conservation Institute" -LCI- of the United States and other similar in some countries, which make efforts to encourage animal health programs.

Judging that such agencies have in their respective countries earned significant influence towards the goal of raising the interest of producers and has made useful contributions to the public authorities.

RECOMMENDS:

1. That, without prejudice to the integration of production sectors in the structure of the animal health services, which have demonstrated great effectiveness, it is deemed desirable to establish independent agencies made up of representatives of national producers, industrialists and livestock dealers, whose aim would be similar to the one recommended by COINSA I, to contribute to the same objective from a complementary and different point of view that would enrich the action to be developed for animal health programs.

2. That, as far as possible, IICA, by means of different mechanisms, endeavor to publicize the known experiences for the purpose of encouraging the establishment of similar types of private institutions.

RECOMMENDATION No. 2

MASS COMMUNICATIONS ON ANIMAL HEALTH

The Second Meeting of the Inter-American Commission on Animal Health,

Taking into consideration that according with the Recommendation II of COINSA I, a study was undertaken of the situation of mass communications on animal health in the Americas and as a result of such as such study, it was found that only seven countries have a communication unit as such, while the remainder receive support from Ministries or related institutions. This indicates that there exists an overall organizational deficiency in the communication activities.

RECOMMENDS:

1. Acceptance of the proposals of the study undertaken concerning the situation of mass communications on animal health in the different countries of the American Hemisphere.

2. That IICA implements a coordinating capability on social communication derived from different sources for the benefit of Member Countries and provides these countries with training and assistance to organize their National Information Systems on Animal Health.

3. That Member Countries give major emphasis to communication activities with reference to animal health. That this initiative initially identify and prioritize both long and medium range needs in animal health, and that communication activities become a principal planning component on animal health programs.

RECOMMENDATION No. 3

DIAGNOSTIC AND RESEARCH LABORATORIES IN ANIMAL HEALTH

The Second Meeting of the Inter-American Commission on Animal Health,

Considering the recommendation made by the Advisory Committee on Diagnostic and Research Laboratories in Animal Health during COINSA I which called for the constitution of Committees of Diagnostic and Research Laboratories in those areas established by IICA,

Having seen the reports presented in the LABSUR II and III and LABANDINA I which express the fulfillment of this recommendation,

Considering that in the expositions made by the members of the Advisory Committee on Diagnostic and Research Laboratories in Animal Health, the need to make progress directly at the Diagnostic and Research Laboratory level is emphasized, especially in activities related to training, resource inventory and coordination of functions with private enterprise sectors.

RECOMMENDS:

1. That IICA be solicited to complete the integration of Area Committees composed of the Diagnostic and Research Laboratories Directors of the respective countries, who will in turn establish the operational norms.

2. That the formation of national associations in the countries be encouraged as a complement to the activities which have been programmed in various areas.

3. An increase in personnel training in technical, organizational and general aspects, in order to obtain human resources which are duly qualified. The Area Committees should pay special attention to this aspect within its various modalities, whether it be of national, regional or international resources or consultants and qualifications of professionals at the post-graduate level.

4. That the Area Committee: LABSUR, LABANDINA, LABANTILLAS and RECALDIVE, implement the recommendations of the first report of the Evaluation Commission of Veterinary Diagnostic Laboratories in the Americas. This should include a permanent examination of the

availability of reference biologics, equipment, human resources and training opportunities, as well as resources for diagnosis of exotic diseases. This information should be used to increase cooperation among the countries and to make better use of the available resources.

5. That the Area Committees encourage the actions of the official laboratories of Animal Health in the countries to be geared toward solving problems for the prevention, eradication and control of diseases campaigns, by formulating realistic projects with limited time periods and by carrying out previous studies on the cost/benefit relation; seeking integration with professionals from private enterprise and with the productive sector, thus allowing for a better attainment of the pursued objectives.

RECOMMENDATION No. 4

QUARANTINE AND EMERGENCY PROGRAMS

The Second Meeting of the Inter-American Commission on Animal Health,

Considering that in the last years the International Organizations such as FAO, PAHO, OIRSA and IICA have organized Seminars, test exercises and prepared manuals of procedures to follow for emergencies for exotic diseases; and nevertheless is necessary to continue developing in the countries of the Americas activities for prevention of exotic diseases and emergency preparedness with emphasis in:

a) The definition of a clear policy related to exotic diseases.

b) The maintenance of a surveillance and prevention system aware of the changes in the risk of introduction of exotic agents.

c) Availability of a legal effective instrument to be able to act in an exotic disease sanitary emergency.

RECOMMENDS:

1. That IICA in coordination with other international organizations and with the participation of the countries should make studies by areas on the development of mechanisms of prevention for the introduction of exotic disease and of the emergency response system that should include:

a) A uniform legislation related to the prevention of diseases.

b) Definition of strategies to eradicate exotic disease outbreaks in accordance with the epidemiologic situation of the area and the economic viability.

c) Training of personnel at different levels.

d) Selection and formation of qualified personnel in the different disciplines mainly in the diagnostic techniques.

2. That a mechanism should be established to coordinate among the countries an emergency plan in

animal health at a regional level that can offer an immediate help to the country in need under the auspices and coordination of the international organizations involved in this field.

RECOMMENDATION No. 5

COORDINATION OF TECHNICAL INTERNATIONAL COOPERATION ON ANIMAL HEALTH

The Second Meeting of the Inter-American Commission on Animal Health,

Considering the need for continual improvement in coordination of the activities of international organizations that provide technical cooperation on animal health,

Considering the recommendation from the meetings in Washington sponsored by USDA in January 1984, and in Lima sponsored by FAO in December 1984,

Considering the efforts made by those responsible in the Field of Animal Health from IICA, PAHO, FAO, OIE, OIRSA and JUNAC in order to effect better coordination of these international organizations in the area of technical assistance.

RECOMMENDS:

1. That the international organizations continue their efforts for the further coordination in technical cooperation in animal health and have representatives at each others animal health meetings and planning sessions and establish joint ventures whenever possible.

2. That the international organizations develop their plan of action sufficiently in advance so that these plans can be submitted to the countries for integration into national animal health priorities.

3. That the International Organizations give consideration to the use of the document "Animal Health for the Americas by the Year 2000" developed by IICA in consultation with the countries as a guide to identify and orient the areas of priority for technical international cooperation in animal health.

4. That the Member Countries take advantage of the technical expertise available from other countries in the hemisphere when the need arises for assistance in a specific technical area.

RECOMMENDATION No. 6

TICKS AND OTHER EXTERNAL PARASITES

The Second Meeting of the Inter-American Commission on Animal Health,

Considering the progress made concerning recommendations IX of COINSA I on ticks and other external parasites,

Considering the ecological studies being undertaken in Uruguay, Argentina, Brazil and Colombia.

RECOMMENDS:

That Member Countries and International Organizations:

1. Extend similar studies to Representative Central American and Caribbean Countries such as Mexico, Costa Rica, Jamaica, St. Lucia to support the epidemiological data thereby derived.

2. Develop a mechanism to disseminate information on ticks and tick borne diseases among countries.

3. Adopt legislation in support of tick control programs with respect to livestock movement, quarantine and sanitary measures with the necessary facilities and infra-structure provided to support such legislation.

4. Undertake evaluations of economic losses and cost/benefit studies and inform the general public of the results in order to promote cooperation of the livestock industry.

5. Continue the interchange for research and training among countries.

6. Establish national commissions for tick control or eradication to facilitate implementation of programs.

7. Support the development and implementation of national or sub-regional projects to combat the serious threat posed by the presence of Amblyomma variegatum/heartwater in the Eastern Caribbean.

8. Adopt similar measures as they apply to the control or eradication of Dermatobia hominis especially

in relation to studies of prevalence, distribution and vectors.

9. Conduct research on eradication procedures for Haematobia irritants where present in various countries of South America.

RECOMMENDATION No. 7

SCREWWORM

The Second Meeting of the Inter-American Commission on Animal Health,

Considering the achievement of the United States/Mexico Screwworm Commission in establishing the Tehuantepec isthmus barrier following eradication of screwworm from the northern and central zones of Mexico,

Considering the previous success of eradication projects in Southern United States, Puerto Rico and Curazao.

RECOMMENDS:

That Member Countries and International Organizations:

1. Extend sincere congratulations to the governments of the United States and Mexico on their success on their screwworm program.

2. Endorse the program of screwworm eradication in Central America southward to the Darien gap.

3. Support epidemiological studies to develop similar programs in other countries.

4. Procure the necessary financial resources to implement programs to combat screwworm flies.

RECOMMENDATION No. 8

BLUETONGUE

The Second Meeting of the Inter-American Commission on Animal Health,

Considering Recommendation IV of COINSA I and the Recommendation III of RESANTILLAS III on bluetongue research,

RECOMMENDS:

1. That IICA continues the support in this area for virus isolation and identification of vectors in the antillean zone.

2. That IICA gives support on request to other countries of the hemisphere who are interested in bluetongue studies.

RECOMMENDATION No. 9

INTER-AMERICAN COMPENDIUM OF REGISTERED VETERINARY PRODUCTS

The Second Meeting of the Inter-American Commission on Animal Health,

Considering the inexistence of an Inter-American Compendium of Registered Veterinary Products,

Considering that such a compendium has a great importance for the Veterinary Medicine Profession as well as for the Livestock development programs in the countries,

Considering the IICA's presentation concerning the ongoing activities aimed at the preparation of such a compendium.

RECOMMENDS:

That IICA proceed with the preparation of such a compendium for its publication and distribution among the interested sectors.

RECOMMENDATION No. 10

ANIMAL HEALTH PLAN FOR THE AMERICAS BY THE YEAR 2000 - PLASA 2000 -

The Second Meeting of the Inter-American Commission on Animal Health,

Considering the actions taken by IICA for the accomplishment of Recommendation III of COINSA I which product was a guiding plan on animal health projected to year 2000 (PLASA 2000) prepared by a special working group,

Having examined such document and considered the proposals on policies, strategies and goals for the period 1986-2000 with suggestions for its execution and evaluation,

Considering the convenience that member countries have a consultation to facilitate the adoption of more effective plans on animal health,

RECOMMENDS:

1. Submit to IICA's General Directorate the Animal Health Plan by the Year 2000 (PLASA 2000) for its further presentation before the Executive Committee and the Third Meeting of the Inter-American Board of Agriculture.

2. That the Plan be used by the IICA's Member Countries as a guide for the preparation of more realistic and effective animal health programs.

3. To express its appreciation to the working group and collaborators who prepared the document.

RECOMMENDATION No. 11

INTER-AMERICAN INFORMATION AND EPIDEMIOLOGIC SURVEILLANCE SYSTEM ON ANIMAL HEALTH

The Second Meeting of the Inter-American Commission on Animal Health,

After hearing the presentation on a proposal from IICA to establish an Inter-American Information and Epidemiologic Surveillance System on Animal Health,

Considering that it is of major interest to standardize the criteria among the countries of the hemisphere and the international organizations acting in the field of animal health and to develop a standard system of information and epidemiologic surveillance in animal health,

RECOMMENDS:

1. That IICA promote a meeting with those responsible for the information systems in the interested countries and with the representatives of the international organizations to study the mechanisms for the establishment of a unified system of information in animal health at the hemispheric level, taking into account the systems in use through OIE, PAHO and other agencies.

VOTE OF THANKS
AND EXPRESSION OF APPRECIATION

The Second Meeting of the Inter-American Commission on Animal Health,

Thanks the Government of the Federal Republic of Brazil for its generous support for the organizing and development of the COINSA II and for the cordial hospitality offered to the delegates of the different participating countries and organizations, which was a fundamental contribution to the success of the meeting.

It also acknowledges IICA for its support in exercising the functions of the secretariat of COINSA II.

EXPRESSION OF APPRECIATION

The Second Meeting of the Inter-American Commission on Animal Health,

Considering the excellent work of Dr. Frank J. Mulhern as Director of the Animal Health Program of IICA since its foundation until the month of March of 1984,

Considering that such work has been of great importance to consolidate the actions of IICA in support of the animal health services of the American Hemisphere.

RESOLVES:

Express to Dr. Frank J. Mulhern the appreciation of COINSA for his excellent work in behalf of the animal health of the hemisphere and to wish him great success in his future activities.

EXPRESSION OF APPRECIATION

The Second Meeting of the Inter-American Commission on Animal Health,

Considering the continuous and effective work carried out by Dr. Rubén Lombardo as Animal Health Specialist of IICA in support of the animal health services of the different countries of the southern part of the hemisphere,

Considering that his example has been a great stimulus to reinforce the veterinary services of the countries where he has worked,

RESOLVES:

Express to Dr. Rubén Lombardo its recognition for his outstanding activities in the area of animal health and to wish him success in his future activities.

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REPORT OF ACTIVITIES OF IICA'S ANIMAL HEALTH PROGRAM OF 1983-1985 AND WORKING PROGRAM FOR 1986-1987

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I. REPORT OF ACTIVITIES

It is felt that in its five years of existence, the Animal Health Program has had a very positive impact on the member countries of the Institute.

Technical cooperation activities in the area of animal health have been conducted in almost all the countries, by means of the multinational projects that have been the basis thus far for the promotion and execution of new projects and actions in this field in the member countries.

In general, it is felt that the IICA Animal Health Program has played an important role in policy-making, in defining priorities in the countries, and in reorganizing the animal health services.

In large part, this success has been achieved through the regional and subregional meetings, by the training courses that have been given at various levels, and by the direct support and advice provided by the animal health specialists and consultants, who have worked closely with national authorities.

In general, the countries of Latin America and the Caribbean have identified the following as being of priority for them: strengthening the animal health diagnostic laboratories; reinforcing the inspection and quarantine services for the importing of animals and animal products; preparing emergency systems to deal with exotic animal diseases; and the control and eradication of ectoparasites and the more economically important diseases within a single country, or in a group of neighboring countries.

The countries have made notable advances in these fields, and have either developed programs to deal with them, or are preparing projects designed to provide solutions to priority problems.

One of the most significant examples of progress by the countries was the eradication of African swine fever from Brazil, Haiti and the Dominican Republic, which was one of the most important steps ever made in protecting and developing the hog industry in the Western hemisphere.

Also of major significance was the eradication of foot-and-mouth disease from Chile, and the notable progress made by most of the other South American countries in ending the disease, which is considered to be the principal limitation for these countries in their production and international marketing of animals and animal products.

Another highlight was the success of the screwworm eradication program carried out jointly by the United States of America and Mexico: the screwworm was eliminated from most of Mexican territory, and the control line was established in the Tehuantepec isthmus.

Another successful program was the one conducted by the United States to eradicate avian influenza, one of the diseases posing the highest risk to the hemisphere's poultry industry.

These are but some examples of the progress made by the countries in the field of animal health. There were many other achievements that cannot be quantified, such as success in keeping a country or subregion free of diseases that could devastate its livestock industry.

Nonetheless, the most important achievement was the fact that producers and authorities were made aware of the important role that animal health plays in the production, productivity, industrialization and marketing of animals.

The IICA Animal Health Program has participated directly and indirectly in supporting the governments in carrying out their programs and activities in this field. There follows below a summary of the principal cooperation activities that IICA has conducted:

Area 1 - Central

Efforts continued in the execution of the Screwworm Coordination Project in Central America and Panama, with the support of the Governments of the United States and Mexico. The first phase of the project is scheduled to begin towards the end of 1985.

The Project on Technology Exchange for Animal Production and Animal Health for Mexico, Central America, Panama and the Dominican Republic was prepared, and financing is being sought from the Inter-American Development Bank. Advanced training for professionals from Costa Rica, Honduras and Nicaragua has already begun, with time spent in diagnostic laboratories in Mexico. A status report was prepared on the central diagnostic laboratories of Guatemala, Honduras, Nicaragua, Costa Rica, and El Salvador, as an activity prior to the preparation of the project.

The III Meeting of Directors of Animal Health of the Central Area was held in Guatemala in October. The participants examined the area's main problems in the animal health field, and made recommendations as to how to solve them.

The training project in Central America, Mexico and Panama continued, with the assistance of a Spanish collaborator. The project teaches the different diagnostic techniques for hog cholera and African swine fever. Laboratory and field research in Costa Rica confirmed that the country is free of hog cholera.

Courses were given in Mexico, El Salvador, Honduras, Panama and the Dominican Republic to give training in the prevention, control and eradication of exotic diseases. Emergency Program Action Groups are being formed in the countries, using personnel who received the training, to act immediately in the event of the outbreak of any exotic disease among the animals in the area.

In cooperation with the Government of El Salvador, a project outline was prepared for the Tick and Torsalo Control Project. A similar project profile was prepared in Panama, in cooperation with the Government, for the project on livestock development and animal health.

The MAGA-IDB Animal Health Project is being developed in Guatemala, in cooperation with the Government, while in Honduras, support was given to the Government to prepare the project for the development of bovine livestock and animal health, which has now been submitted to the IDB for financing.

Courses on the use of cold chains in animal health programs were given in Nicaragua and El Salvador, and in Mexico, support was given to the Animal Health Bureau to reorganize the regional central reference laboratories, and to carry out technical cooperation activities in the National Center for Animal Parasitology.

A project financed by USDA-ARS was begun in the United States of America on the structures and molecular biology of the African swine fever virus, in conjunction with the Plum Island Animal Disease Center.

A survey, conducted jointly with the Faculty of Veterinary Medicine and Animal Husbandry to the Autonomous National University of Mexico, was begun to gather technical information from the Veterinary Medicine Schools of the hemisphere, with a view toward setting up a data bank.

Area 2 - Caribbean

The Animal Disease Information System continued to be developed in the Caribbean countries. The system puts out a quarterly publication.

In November 1984, the III Meeting of Directors of Animal Health of the Caribbean countries was held in Trinidad and Tobago. The participants exchanged ideas and information about the current animal health situation in their countries, and discussed future actions to be taken. The first meeting of the Directors of Diagnostic Laboratories of the Caribbean was also held at the same time.

An Epidemiological Surveillance and Animal Health Diagnostic Project financed by USAID-USDA was begun in Haiti, and the country was declared free of African Swine Fever in September 1984.

Construction of a new diagnostic laboratory was completed in Haiti. It is important to note that a USAID project is under way to restock the hog population, and the first pigs were distributed in the country in December 1984.

Support was given to the Jamaican Government to prepare a screwworm eradication project, which is set to begin in 1985. The Mexico-United States Screwworm Commission is being approached for support of this project.

A tick control project is also being prepared in Jamaica. Similar tick control projects were drawn up in Barbados and Saint Lucia, and possible sources of financing for them are being identified.

Dominica was given support in beginning work to eradicate the Amblyomma variegatum tick, which has been identified in the country. In Grenada, cooperation was provided in preparing a project for the development of veterinary services, which is being reviewed by the Ministry of Agriculture.

In Guyana, work began on the livestock fertility and health project, which is geared to milk cattle.

Studies on the epidemiology and identification of the blue tongue virus continued in a number of countries, and particularly in Barbados. The research will continue through 1985.

A seminar-workshop on increasing production and productivity by means of the latest advances in theriogenology was held in Guyana in 1984 for Caribbean veterinarians, under the sponsorship of IICA and PAHO.

A seminar on fowl diseases, conducted jointly with the Ministry of Agriculture, was held in Trinidad and Tobago for poultry farmers, technicians and veterinarians.

Area 3 - Andean

The I Meeting of Directors of Diagnostic Laboratories of the Andean Area was held in Ecuador in September. The participants laid the groundwork for the formation of the Andean Animal Health Laboratory System, which will enable those countries to exchange and pool information on technology.

The III Meeting of Directors of Animal Health of the Andean Region was held in Venezuela in October. The main recommendations of the meeting included support for Peru in its proposal to eradicate foot-and-mouth disease from the country in a short time-frame.

Support was given in Peru to the country's main milk-producing areas of Cajamarca, Lima and Arequipa, to held identify and control the main problems affecting production and productivity. The special Pichis Palcazu project continued to receive support for its work to control bovine rabies in areas affected by the disease. Support was also given to the Board of the Cartagena Agreement, to hold the III Andean Seminar on Bovine Cattle, and the II Congress of the Andean Confederation of Livestock Producers, both of which were held in Arequipa. Joint activities were also carried out in Peru in support of the Pan American Health Organization's work in the area of veterinary public medicine.

A study, financed by USAID, was carried out in Ecuador to determine the status of hog cholera in the country. This research will enable a program of actions to eradicate the disease to be drawn up.

Execution of the IICA-MAG Cooperation Project, financed by the Venezuelan Government to carry out specific animal health activities, became a reality with the start of support activities to control brucellosis, tuberculosis, and in the brucellosis, tuberculosis and bovine rabies control programs.

In Bolivia, general support was given to the National Service for the control of foot-and-mouth disease, bovine rabies and brucellosis.

Support was also given to FAO and the Board of the Cartagena Agreement in holding the First Andean Subregional Course on Animal Health Inspection in Ports, Airports and Border Points, and a seminar on epidemiology and veterinary economics for Latin America.

Area 4 - South

In Brazil, support was given mainly for the preparation of a project on tick and berne control, which will be submitted to the Inter-American Development Bank for financing in 1985. The country continued to receive support for strengthening its National Laboratory System and its Pedro Leopoldo Central Laboratory (LANARA). A preliminary evaluation was done of the possibility of conducting a project to eradicate the *Cochliomyia hominivorax* maggot.

It should be noted that Brazil was declared free of African Swine Fever in December 1984.

In Argentina, the working group responsible for determining residues in meat was strengthened, as part of the Agreement with the National Animal Health Service (SENASA). This enabled Argentina to continue its exports of meat.

The Regional Animal Health Training Center continued to operate in the University of La Plata in Argentina. Support was also given to the programs to control foot-and-mouth disease, brucellosis, tuberculosis, equine infectious anemia, hog cholera and ticks, as well as to the Diagnostic Laboratory Service.

In Chile, the outbreaks of foot-and-mouth disease that occurred at the beginning of 1984 were contained, and the country has again been declared free of the disease. Progress was made in the control of hog cholera and equine infectious anemia, and the diseases may shortly be eradicated from the country.

Activities to control hog cholera, equine infectious anemia and Newcastle disease were markedly strengthened through the IICA-MAG Agreement in Paraguay. Of particular importance have been the improvements made in the quarantine inspection system in airports and border posts.

Cooperation was given to the Government of Uruguay in preparing a project to strengthen the Biologicals and Pharmaceuticals Diagnostic and Control Laboratory. The project is being considered for financing in FONPLATA. IICA also cooperated with Uruguay in the strengthening and forward planning of its health programs, chiefly the tick and tick-borne disease program.

The III Meeting of Directors of Animal Health of the countries of the Southern Cone was held in Chile in October, and the participants were able to exchange broad range of information. The III Meeting of Directors of Diagnostic Laboratories of the countries of the Southern Cone was held in Argentina in November, and the participants were able to increase further their technological exchange.

Regional level activities

The working group recommended by COINSA I to prepare an Animal Health Plan for the Americas for the year 2000 (PLASA 2000) met at IICA headquaters in August. The group prepared a document which, with the comments of the governments of the hemisphere, will be presented to COINSA II in Brasilia in April 1985.

Following another recommendation of COINSA I, the Status Report on Mass Communications for Animal Health in the Hemisphere was prepared, and will be presented to COINSA II.

A proposal to establish an Inter-American Animal and Plant Health Information System was prepared, and after being sent to the countries for consideration, will be implemented in stages.

Publications

The following publications were published as part of the Animal Health Scientific Publications Series:

Publication No. 5.	COINSA I. Proceedings. Spanish and English.
Publication No. 6.	The Fight against Diseases of Swine.
Publication No. 7.	Guide to the Eradication of African swine fever.
Publication No. 8.	Techniques for the Diagnosis of Bovine Babesiosis and Anaplasmosis.
Publication No. 9.	Papers given at LABSUR III.

II. WORKING PROGRAM FOR 1986-1987

The Animal Health Program of IICA will continue its direct support to IICA's member countries through the Program Direction stationed at Washington, D.C. and the eight multinational projects covering 27 countries of Latin America and the Caribbean.

The recommendations of the Second Meeting of COINSA will guide the Program activities for the next biennium, just as the follow up of recommendations of COINSA I and of Sub-Regional Meetings RESANORTE, RESANTILLAS, RESANDINA and RESASUR.

The main areas of cooperation in which the Program action will be concentrated at the hemispheric, subregional, and country levels are as follows:

a) Support to member countries on the control of major external parasites and animal diseases at the country and regional levels.

b) Support for strengthening of the countries infrastructure on veterinary laboratories.

c) Support to reinforce the sanitary inspection and control services for importation of animals and by-products.

d) Support for strengthening the emergency systems for control and eradication of exotic diseases.

e) Support for implementation and development of animal health information systems.

ACCOMPLISHMENT OF RECOMMENDATIONS OF THE FIRST MEETING OF THE INTER-AMERICAN COMMISSION ON ANIMAL HEALTH HELD IN MEXICO, D.F. FROM SEPTEMBER 19-23, 1983

Dr. Héctor Campos López
IICA
Washington, D.C.

Recommendation I - Increase of activities of IICA's Animal Health Program

During the biennium 1984-1985, Animal Health Program activities were considerably increased in Latin America and the Caribbean as stated in the Program report -Document COINSA II/4-. Several countries signed cooperation agreements on animal health with IICA, and some others will be implemented during 1986-1987.

Recommendation II - Public Information on Animal Health

The status report on Mass Communications in Animal Health in the Americas was prepared by Dr. Juan Manuel Pérez Trujillo and Ms. Marie Therese Sebrechts - Document COINSA II/7-.

Recommendation III - 15 Year Master Plan on Animal Health

A working group with representatives from Barbados, Brazil, Costa Rica, United States and Mexico was established and joined in IICA's headquarters from August 29-31, 1984. The group prepared a first draft of the Animal Health Plan for the Americas by the Year 2000 -PLASA 2000- which was sent to all countries for comments. The third draft for COINSA II consideration is presented in Document COINSA II/24.

Recommendation IV - Bluetongue

A project for continuing studies on Bluetongue in the Caribbean was prepared. Financial support has not been possible.

Some studies were made in Barbados with the support of the University of Florida; the disease virus was not isolated.

Epidemiological surveys were made in Costa Rica, supported by the University of Wisconsin, and antibodies prevalence was found, but the virus was not isolated.

Recommendation V - Animal Quarantine and Emergency Programs

In the Caribbean, support was given to CARICOM for adoption and revision of import regulations of animals and by-products of its member countries; also some activities were made to strengthen the emergency systems.

In the Central Area, training activities were developed for implementing a unified emergency system at the sub-regional level. In that area, promotion has been made for prevention and control of Hog Cholera in the Costa Rican and Nicaraguan border.

In the Andean Area, FAO and Cartagena Agreement continued developing the African Swine Fever Prevention Project. Colombia eradicated the Foot and Mouth Disease outbreak from the Chocó area.

In the South Area, Paraguay reinforced its quarantine system for Zoo Sanitary Inspection and Chile eradicated the foot and mouth disease outbreaks presented during 1984.

Recommendation VI - Participation of the Livestock Producers in Animal Health Programs

In most of the countries, there has been a promotion of the participation of cattlemen associations with animal health authorities.

As an example, in Guyana, joint activities were developed among veterinarians and farmers; in Mexico, joint state committees have been established, and in the Dominican Republic, livestock integral projects are developing. Training activities on animal health are in progress for farm managers.

A COINSA II meeting was organized prior to the National Show of Cebú Cattle to be held in Uberaba to propitiate the relations between farmers and animal health authorities of other countries.

Recommendation VII - Animal Health Diagnostic and Research Laboratories

In the Antilles, Andean and Southern Areas during 1984, Laboratory Directors meetings were held for technical exchange and for organization of a coordination system to strengthen the subregional infrastructure.

In the Central Area, a project was prepared on technical exchange on Livestock production and animal health between Mexico, Central America, Panama and the Dominican Republic, which will be presented to IDB for funding. A big component of that project is the strengthening of diagnostic laboratories.

In Haiti, a new laboratory was built with support of USDA/APHIS. Most of the Latin American and Caribbean countries are preparing or implementing projects for veterinary laboratories.

Recommendation VIII - Coordination of International Technical Cooperation in Animal Health

In January of 1984, in Washington, D.C. and in December of 1984, in Lima, two meetings were held by Animal Health Directors of International Organizations acting in the Americas to coordinate their activities and the better use of available resources -Documents COINSA II/17 and COINSA II/18-.

Recommendation IX - Ticks and other external parasites

IICA supported a survey on Amblyomma variegatum, Heartwater and Dermatophilosis in the Caribbean. Through CARICOM, efforts will be made to establish a project for Amblyomma variegatum control. Nevertheless, Saint Lucia and Dominica are developing effective actions to control that tick.

In many Latin American and Caribbean countries, studies and projects have been prepared for tick control and eradication, just as for Dermatobia control; in Jamaica, a project was prepared for screwworm eradication.

It is important to mention that the Mexico-USA Screwworm eradication program accomplished the establishment of the Tehuantepec Isthmus barrier once the screwworm was eradicated from north and central zones of that country. A study has been prepared for continuation of that project to Central America and Panama.

Recommendation X - Institutional Recognition of COINSA

In accordance with that recommendation, IICA's Animal Health Program is in charge of the Executive Secretariat of COINSA.

It was determined by IICA's Executive Committee and the Inter-American Board of Agriculture that COINSA reports should be presented to those groups through the IICA's Director General. Therefore, Chanceries recognition of COINSA is not necessary.

MEAT FOR FOOD IN THE NEXT TEN YEARS

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The topic I have been assigned by the authorities of COINSA is a highly futuristic one, and I confess that it is an issue of more than passing interest to me. Luckily, in this case, it is a relatively short-term future--the nineteen nineties. Although the world is passing through a period of considerable instability and unpredictability, I have undertaken to examine those elements that, in my view, will have the most influence on how large a role meat plays in the world's diet from now until the year 2000.

I used a number of sources in my analysis, including the famous Meadows team study, which is pessimistic about the prospects for increased production of food and which, in many ways, now seems to be outdated. Leontieff prepared a study for the United Nations, and more recently, the Carter Administration published a study entitled "World Report for the Year 2000", which was discussed, along with the report of the Club of Rome, by Herman Kahn's team at the Houston Institute, as reflecting the authors' optimistic approach. Since in general, forecasting is based on the discussion of broad themes, these works did not get down to the sectoral level, as I must do here. The FAO study, called "Agriculture: 2000" was of great help. The remainder was the product of the difficult business of thinking.

The factors that determine the future

I find that the role of meat in the diet of the future will be determined by five main factors:

a) Growth of the world economy, making for an increase in the demand for meat, which is the most expensive form of food because of its proteins of animal origin. This is of particular importance in the developing countries, where the diet is generally deficient, particularly in proteins.

b) The evolution of agricultural protectionism, which keeps the price of food very high in many countries. The cases of the European Common Market and Japan are illustrative of the difficulties that price limitations place on any rise in the consumption of meat.

c) Restrictions that may exist on the supply side in some areas of meat production, particularly bovines and sheep, either because of poor natural resources, or continued low cultural levels in potentially good production areas.

d) Technological progress in certain areas of food, which will mean increasing competition between new forms of protein and meat.

e) Advances in knowledge about health, which influence the recommendations on diet, which are increasingly well-known at all levels of society.

f) The effects of some cultural patterns, which currently limit the consumption of certain types of meat.

We shall give specific consideration to each of these factors, and then at the end, attempt some final observations.

The growth of the world economy

The World Bank has studied the outlook for world economic growth according to broad groups of countries, projecting the growth achieved during the previous period. Its forecast, which is summarized below, covers the period 1985-1995:

Increase in the gross product, by broad groups of countries for the period 1985-1995 as an annual percentage

	1960/73	1980/82	1985/95
Industrialized countries	5.1	0.4	3.7
All developing countries	6	1.9	5.5

Annex No. 1 gives further data and references.

Since meat consumption is related to an increase in the standard of living, particularly in the developing world, the prospect of higher economic growth brings with it a greater demand for meat than there has been in recent years, as a result of the international recession.

For obvious reasons, population growth, which is and will continue to be higher in the developing world, also has an influence. Annexes Nos. 2 and 3 give data on world population growth, which show that between 1980 and 2000, the developed world can expect a population growth of 0.6 per cent per year, while in the developing world, the increase in the population is anticipated to be 1.9 per cent over the same period. A weighted average of the two produces a figure of 1.6 per cent.

Should these patterns of economic growth and population increase continue, the rise in meat consumption would be greater in the less developed nations. This trend would be accentuated by the fact that in the developing countries, there is an unsatisfied demand for meat that is quite unlike the situation in the more developed world. The FAO forecasts a great development in meat production in the developing countries, as shown in Annex No. 4. While it is certainly true that this projection refers to production and not to consumption--which is what is under study here--the concept in this case is comparable.

It may justifiably be felt surprising that with such a high debt burden, the developing countries should experience high rates of economic growth. However, we should remember that fifteen years remain before the year 2000, and that there are countries like China, among others, that continue to grow and that have no debt problem.

<u>The development of agricultural protectionism</u>

The development of agricultural protectionism is important, particularly in the developing countries, because at present, the low level of red meat consumption in the EEC, and of all meats in Japan, is related to prices. This is the result of current farm policies, which guarantee producers very high prices. An intense debate is now being waged within EEC on agricultural protectionism, as the result of the increase in the budget for agriculture, because of the implications it has for international relations, particularly for relations with the United States, and because of the fact that the European countries need to devote more resources to industrial modernization and defense spending. In GATT too, there has been progress in thinking about including farm products in a new round of negotiations to set more precise regulations that would prevent the current discriminations and subsidies. This coincides with the deliberations of the seven major countries that took place in London in June, to discuss the possibility of beginning a new round of trade talks within GATT. Both the Commission formed within GATT as a result of the ministerial meeting in November 1982, and the position of the United States and Japan, have given impetus to these ideas. Although it goes without saying that there will be difficulties in this kind of undertaking, which in any event would be gradual, it would have an impact on any increase in meat consumption in Japan and the EEC (in the latter case, it would have a particular effect on the consumption of beef).

Although the table in Annex No. 5 refers to the ten-year outlook for total world trade, it indicates a rising trend which corresponds to the anticipated growth of the world economy shown in the preceding table.

Limitations on meat production

There are limitations in some areas on an increase in the supply of meat, and in some other areas, the situation is very open. Beef and mutton fall into the first category, while pork and chicken come under the latter. Cattle and sheep can be raised and fattened both in natural and improved pastures, and in farms where the feed is highly concentrated and highly nutritious, with added vitamins, minerals and growth stimulants. Given the anatomical and physiological constitution of the species, the cost of production in the two systems is different: the cost is much lower for cattle raised and fattened in natural pastures. For this reason, the production cost and hence the price of beef is much lower in countries like Australia, Argentina, Uruguay and Brazil, for example, in comparison with Europe, the United States, Canada or Japan. But the land available for expanding cattle raising is not unlimited. It is true that there are possibilities for expansion in Africa and Latin America, but other limitations often arise, such as the excessive subdivision of landholdings, cultural patterns that are not receptive to appropriate technologies, the advancing desertification in Central Africa, and other factors. Latin America has areas with excellent potential for cattle raising, and it is in places such as Brazil, Argentina, in the plains of the Beni in Bolivia, and in Colombia and Venezuela that the greatest expansion of pasture-raised cattle can be expected. In the case of the intensive raising of cattle and sheep, expansion may be unlimited, but since its efficiency in the conversion of concentrated feed into meat is poor, meat produced by this method is expensive and communities with considerable purchasing power are needed to consume it.

In the case of pork and poultry, the situation is different, for there is considerable elasticity in the possibility of expanding the supply. Pork and poultry production increased notably as the result of new technologies introduced in the last few decades, despite the limited amount of land available. It is relatively easy to set up large production complexes, even in culturally less-developed communities, and production costs have become highly competitive with other kinds of meat. It is for this reason that the production of these species has grown much faster than the production of beef and mutton. The table in Annex No. 6 shows that since the base comparison year, 1961, pork production rose by 163.5%, and the production of chicken and other poultry rose even more spectacularly by 255%. On the other hand, the production of beef rose by 74%, while mutton remained at the same level. Demand also had an influence on the latter, because the greater availability of pork and chicken has enabled consumers to opt for these meats, for which they appear to have greater preference.

This trend toward a greater expansion in the supply of pork and chicken will continue in the future. According to the FAO, meat production will continue to grow according to the patterns established in the last few years, i.e., poultry production will grow the most, then hogs, then cattle and finally sheep. Table No. 4 shows estimated production in the 90 developing countries examined by the FAO. In my view, the production of sheep will not increase as forecasted in the table.

The effects of technological progress

The coming decades will see the development of spectacular, and very varied technologies in the production, industrialization and marketing of food, all of which will have a major impact on consumption. Meat production will by then be under the influence of genetic engineering, which may change the current relationships between the different species, and between them and other foods. Other factors such as robots in industry, vertical integration of production and the effects of the computer may change current relations between one type of production and another.

There will undoubtedly be great innovations in the production of other proteins, such as soya and fish. Changes of enormous importance will be seen in the fishing industry, beginning with new laws on the sea, the fishing of new species, improvements in technology, and the introduction of aquaculture, whether in the sea or in inland waters, or in artificial fish-farming businesses, which are felt to have great potential. There will be a new future for soya, either as a complement to animal proteins, or to be used in different forms as a protein food. Technical experts are thinking more and more about generic proteins, independently of their original source. The use of flavoring agents, substances that can introduce flavor and textures different from those of the source protein, may take us in new directions. We should remember that the marketing of food, its forms and modes of consumption are changing very rapidly, and that this will have a decisive influence on economic and productive relations. Algae, the production of proteins from petroleum, the production of animal by-products, and so on, will present meat producers and industrialists with new challenges.

Meat consumption and health care

Consumers in developed countries and some social groups in the developing countries have been cautioned more and more about meat consumption because of its effect on health. Some medical and dietetic centers have pointed to meat as the villain of the dining table, and have assigned it a major responsibility in the development of obesity, cancer, heart attacks, and the ingestion of chemicals alien to the natural composition of foods. The purpose of this paper is not to discuss the truth of these widespread allegations, but to address their importance as an influence on the consumption of meat. And an influence they undoubtedly are, because, in the developed societies at least, ties between consumers, medical services, food advertising and written advice about health maintenance are very close. Associations representing meat producers and industrialists in the United States, particularly those representing hog and cattle producers, are constantly worried by this issue, which is considered to be one of the most influential factors bearing on the no-growth demand for these products. The argument has less weight in the case of poultry meat, which has less of an influence on cholesterol levels and which contains less fat. One example of this concern over U.S. public opinion about the possible harmful effects of meat consumption was the presentation of a paper on the issue at the last World Meat Congress held in Nashville, in the United States. In Europe, Japan and other developed countries, information about this matter is equally widespread, but the consumption of meat is lower because of high prices, and therefore the concerns of the health movement are correspondingly less. In the developing countries, this issue is of concern only in the higher socio-economic levels, because for the rest of the population, meat consumption is, with very few exceptions, non-existent. Therefore, the recommendation is that more meat be consumed.

Cultural influences

Eating habits are deeply ingrained and therefore very difficult to change over the short term. This tends to keep the relative proportions of various foods constant in the diet of a given society. However, experience has shown that meat is highly sought-after throughout the world, and that generally speaking, the limitations are economic ones. There has been an increase in the consumption of beef in the developed world over the last few decades--an indication of the fact that it is a highly preferred product. If it is not eaten more, it is because in most countries, beef is expensive. The consumption of poultry and pork, the supply of which is less restricted than that of beef, has also risen in both developed and developing countries. Limitations for health reasons have arisen in only a few countries over the last few years.

There are other cultural reasons that move consumers towards one kind of meat rather than another and that in general, limit total consumption. This is the case in India, where the restrictions on the consumption of beef are for religious reasons. The Arab community is strongly inclined towards lamb and mutton, while Jews have religious rstrictions on the consumption of pork. From the point of view of worldwide consumption, however, the influence of the habits of these countries is small. It should be recalled that even if they were to disappear, the economic factor limiting consumption would still remain, especially in the case of India, which is the most highly populated country. In general, though, the "internationalization" of the world, through the influence of communications, tourism, business, and so forth, will mean that these influences will decline. In short, I would say that over time, eating habits will change, and the influence of custom and religion on the preferences for certain types of products will become less. Thus meat is in an excellent position to take up the demand created by these changes.

Conclusions

The following conclusions may be derived from what has been said above:

1. Meat production will increase over the next ten years at a rate faster than the rate of population growth, and the diet will therefore be improved, particularly in the developing countries.

2. The greatest increase will be seen in the production of poultry and then, in declining order, hogs, cattle, and sheep.

3. The increase in production will be more significant in the developing countries. Contributing to this will be economic growth, and the need to channel the benefits of growth into improving the diet, which is priority goal. A reduction in agricultural protectionism in the developed world would benefit this trend.

4. In the developed world, the greatest increase in meat consumption can be expected in Japan, and then in Europe, and in the Soviet Union. In the United States, demand is close to being satisfied, and therefore the increase will be slower.

5. Technology will play a very important role, and may work in favor of meat substitutes such as fish, soya, etc.

6. Knowledge about diet may slow the increase in meat consumption in the developed world, as has already ocurred in some places. This will not involve the developing countries, because current consumption is low.

7. The cultural patterns that have slowed the consumption of meat in certain communities will tend to have less influence.

8. Some countries such as Argentina, Australia, and Uruguay, which have based their cattle industries on beef, cattle and sheep will receive many messages to the effect that they should produce more poultry and pork.

9. Following the trend observed in the developed countries, meat will be consumed in increasingly pre-prepared forms, depending, naturally, on the degree of development of the countries concerned.

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TABLE 1

PAST AND PROJECTED GROWTH OF INTERIOR GROSS PRODUCT FROM 1960 Y 1995 (1)

(average percentage of annual change)

	1960/73	1973/80	1980/82	1982/85	1985/95(2)
Industrial Countries	5,1	2,3	0,4	3,0	3,7
Developing Countries	6,0	4,7	1,9	4,4	5,5
Countries of national middle income:					
Oil Importers (3)	6,3	5,2	1,2	4,5	5,7
Oil Exporters (4)	7,0	3,7	1,7	4,0	5,7

1. Prevision made on July, 1983.

2. In this case it is supposed that industrial countries Gross Internal Product will grew at 3.8% until 199; and at 3.5% forward that year. It is supposed also that industrial countries will continue considering inflation as the main problem to be controlled.

3. Countries as Argentina, Brazil, etc. are included.

4. Countries as Venezuela, Nigeria, Lybia, Egypt, etc. are included.

Source: World Bank.

TABLE 2

WORLD POPULATION EVOLUTION

YEAR	MILLIONS OF HABITANTS
1800	1.000
1930	2.000
1960	3.000
1980	4.400
1990	5.300
2000	6.200

Note: The world population has accelerated its growth from middle XX Century. From 1800 to 1930 the increase was grom 1.000 million to 2.000 million people. From 1960 to 1980 the increase rate was higher. At present demographic increase declination is observed.

Source: FAO. Agriculture: Toward 2000.

TABLE 3

GROWTH RATES OF WORLD POPULATION FROM 1980 TO 2000

(annual en %)

Developed countries	0,6
Developing countries (China included)	1,9
World average	1,6

Source: FAO. Agriculture: Toward 2000.

TABLE 4

EXPANSION OF MEAT PRODUCTION IN 90 DEVELOPING COUNTRIES FROM 1980 TO 2000

(million of tons) - A/B: Hypothesis

	1980	2000			
		A	Growth %	B	Growth %
Beef	13	27,7	113	23,8	83
Pork meat	4,3	10,8	151	9,7	126
Poultry	4,7	16,8	257	14,2	202
Ovine-caprine meat	3,2	6,8	113	5,5	72

Source: FAO. Agriculture: Toward 2000.

TABLE 5

PAST AND PROJECTED GROWTH OF EXPORTATIONS FROM 1960 TO 1995

	1965/71	1973/80	Value 1980 (thousand of millions of dollars)	1980/85	1985/95
Industrial countries	8,8	5,5	1.513	2,6	4,8
All developing countries	8,2	4,2	512	4,3	6,8
Countries of national middle income:					
Oil importers	9,6	8,1	272	4,7	8,8
Oil exporters	7,4	-0,6	192	3,7	3,2
Countries of national high income:					
Oil exporters	9,9	0,8	192	-6,5	1,2

Source: World Bank

TABLE 6

EVOLUTION OF BEEF, PORK MEAT AND POULTRY PRODUCTION IN THE WORLD FROM 1961 TO 1981 IN MILLIONS OF TONS CHINA NOT INCLUDED

	1961	1971	Growth % s/1961	1982	Growth % s/1961
Bovine	26,2	38,7	48	45,6	74
Pork	21,2	42,3	99,9	55,8	163,5
Poultry	8,4	16,2	93	29,8	255
Ovine (1)	5,7	6,8	14	5,7	0

1. Source: FAO

Source: UNCTAD.

LIVESTOCK DEVELOPMENT TOWARD THE YEAR 2000 WITH SPECIAL REFERENCES TO DEVELOPING COUNTRIES

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The FAO STUDY "Agriculture: toward 2000" adressed itself. This study was based on a detailed analysis of 90 developing countries, on overall assessment being made of the demands on agriculture in developing countries and of agriculture's ability to respond to them.

This article presents the livestock-related parts of the analysis of developing countries.1/ It deals firstly with the demand for livestock and livestock products and then with the questions of whether, to what degree and how these demands can be met. It is an analysis that identifies the feasible and necessary measures that could lead to the attainment of target levels set for production and consumption.

1. Demands made on the sub-sector

Livestock development can and has to contribute to the achievement of a wide range of development objectives. First and foremost among these is the production and consumption of food products, which because of the high quality protein which they contain, represent one of the most important ways of improving the diet. The second task for livestock production is to contribute to income generated in the economy, especially for rural people. Thirdly, livestock is, and could be even more so, an important source of export earnings.

As will be discussed later, livestock can also make a significant contribution to crop production, through the provision of power and manure, both of which are of growing importance as sources of energy and potential substitutes for fossil fuels.

The relative importance of livestock production in world agriculture can be seen from its contribution to

1. This paper is based on the article prepared by Mr. J.P. Hrabovszky which appeared in World Animal Review No. 40 (1981) FAO. The data have been updated. The detailed analysis does not cover China, but the world aggregates include it.

incomes generated in agriculture: an average of some 20 percent. In developing countries, this contribution ranges from a low of 10 percent of agricultural gross domestic product to a high of 80 percent in semi-arid countries where conditions are more favourable for livestock than crop development. Even in countries where a large share of agricultural income comes from crops, labour on animals may reach as high as 50 percent of total employment in agriculture.

Because of the combined effects of population and income growth, the demand for livestock products is expected to grow at 3.3 percent per annum, thus resulting in a two-fold increase between 1980 and 2000 in the annual combined value of meat, milk and eggs (Table 1). Of this growth in demand, about 2.0 percent comes from population growth, the remaining being the result of growth in per capita incomes.

> The per capita incomes of the agricultural populations in developing countries, excluding major oil exporters, is only about one third of those of people engaged in the non-agricultural sectors of the economies. Therefore, it is very important that development in agriculture ensures that this ratio does not worsen in the future, but that, if possible, it is improved. In addition, it is widely recognized that most of the poorest people in developing countries are in agriculture. If any major improvement is to be achieved in reducing the income gap within countries between the poor and the rich, then the focus will need to be on the poor in agriculture and, among them, the small farmers and the landless for whom income from livestock keeping is often a major component of their livelihood.

Earning or saving foreign exchange through exports or import substitution of livestock commodities should contribute to the improvement of foreign exchange balances, which would help to cover the rapidly rising imports of capital items required for the development of the economy. In the past, livestock exports from developing countries have grown very slowly, and, over some periods, have even declined. This decline of livestock exports has been due to the increased domestic consumption and also due to impact of tariff and non-tariff barriers on the high-priced markets of the developed countries combined with difficulties in raising production growth. "Agriculture: toward 2000" shows that if market opportunities are improved in the coming years, livestock exports could grow about 3 percent per annum. However, rising meat imports into other developing countries as a group into net importers, not only of livestock products in total, but also of meat.

It can be seen that a high growth of the livestock sub-sector is necessary if the demands likely to be made on it are are to be met. Over the 1963-75 1/ period, livestock production in developing countries grew at an annual rate of 2.4 percent, with poultry production (including both meat and eggs) growing at the much higher rate of 6.5 percent per annum. It is clear, therefore, that a satisfactory performance in the future will require a major speeding up of growth in production (Table 2). The ways and means through which this could be accomplished will be considered in the next section.

2. Livestock production, 1980-2000

Livestock production systems of the developing world will have to undergo even more radical changes than crop production if the expectations from this sub-sector are to be fulfilled. Output would need to increase considerably faster than crop production under the impact of rapidly rising demand (see Fig. 1). In some countries, the annual consumption of milk and meat is estimated currently to be rising by 6-7 percent; this high rate of increase is expected to continue. Responding to this growth in demand will call for major changes in the species structure of livestock populations, the organization of production and its links to crop production and in the technologies used. One of the major changes will have to be a greatly increased output per animal. The contribution of breed improvement to increased output will be especially important in the case of poultry and pigs and in dairy production. While production will continue to be based primarily on grasslands and crop by-products, increasing use will have to be made of feedgrains and concentrates. The share of white meats in total meat would rise strongly, indicating the existence of opportunities to build up large-scale commercial poultry and pig production (where relevant) based partly on imported feeds (see Figs. 2 and 3). The dominance of the cow and the buffalo as milk producers would remain, but there would be faster rates of increase in sheep and goat milk production in low-income areas where smallholder production is important. The prices of livestock products would inevitably rise under the pressure of demand on supply.

Another important change would be an increasing "stratification" of the grassland-based beef and mutton industries. Most of the grasslands of the developing world show great seasonal variations in carrying capacity, and their optimal utilization calls for a combination

1. 1961/65 to 1974/76.

of these feed resources with others coming from cultivated agriculture.

In such stratified systems, the basic herd, consisting of breeding animals and their replacements, is maintained on grazing lands. Stock to be slaughtered are taken off the range and fattened on crop production by-products and on limited amounts of feedgrain, so that animals reach heavier slaughter weights. This also provides opportunities gradually to develop the predominantly traditional grazing systems and to supplement these with modern fattening enterprises having high efficiency in feed utilization. The livestock practices of developing countries are thus expected to come more into line with those of developed countries.

3. Production by species of animals

3.1 Beef and veal (including buffalo meat) alone represent 52 percent of all meats produced in 1980, but by 2000 their share would drop to around 45 percent. The main reason for this lies in the biological constraint stemming from the slow reproduction cycle of large bovines compared with other domestic animals. The average age at first calving is usually over three years and coverage intervals between calving range from 14 to 22 months. As Table 3 shows, in order to raise beef and veal output it is proposed to increase the numbers in the herds, and improve the off-take rates and, to a lesser degree, carcass weights. The differences in herd growth rates between the regions reflect mainly the pressure already existing on the availability of roughage feeds. This implies the need for a strategy for increasing the proportion of fodders and feed used for production compared with that used for the maintenance of livestock: this is a crucial element for increasing overall feed efficiency in the sector.

The improvement in the off-take rates 1/ requires a number of programmes. First, it is suggested that where climatic, health and feed conditions permit, major changes toward more productive breeds having a lower age at first calving and higher calving frequency should be made. Wherever possible the age and sex structure of the herd would need to be changed to increase the share of mature females, thus ensuring a maximum calf crop per annum. Given the difficult conditions under which large numbers of the herds of developing countries are held, such as those of nomadic and semi-nomadic tribal owners,

1. Off-take rates are calculated as the number of animals slaughtered in a year divided by the total herd and multiplied by 100.

a major effect could come from a reduction of mortality in all age groups, but especially in young animals. Improvements in range management, water supplies and disease control can also be of the greatest importance.

With such improvements, the average increase in productivity of the herds should increase from an annual output per animal of 15.1 kg of beef in 1980 to 23.2 kg in 2000, an improvement of 51 percent. In parallel, herd numbers should increase by 32 percent. These are both substantial increases compared with actual developments in recent decades, although the emphasis is on acceleration of productivity per animal.

Today draught animal power is still used worldwide for ploughing, hauling carts, water lifting, chaff cutting, oil extraction, logging, etc. In the Third World alone, the energy generated from an estimated population of some 200 million work animals is estimated to be around 100 million horsepower per day. In the industrialized countries, draught animal power was the basis of agricultural progress until recent times and is still used intensively in certain areas. However, in South Asia, the growth proposed for bullocks and draught buffaloes is relatively slow, because of the growing need to use increasing larger amounts of animal fodders and feed for milk and meat. In those parts of Africa where draught animal use is spreading and where there is a large potential for the use of animals in this way, substantially faster growth rates are envisaged. In Latin America and the Near East, the number of draught animals is likely to decline under the impact of rising wages and incomes.

In addition to the provision of motive energy in the form of draught power, cattle and buffalo manure provides considerable under exploited opportunities for biogas production. The already existing examples in Asia show the great scope for this but they also indicate the many social and economic problems that need to be overcome if this technique is to be more widely adopted.

A large part of the presently unutilized grazing resources of Africa could be brought into production by major and successful efforts to control the tsetse fly and the disease of which it is the vector, namely animal trypanosomiasis.

Ultimately some 7 million square kilometers of potentially good grazing land could be brought into cattle production and annual beef output could be raised by as much as 1.5 million tons if the disease were controlled or if trypano-tolerant livestock were introduced in tsetse-infested areas and if the areas freed from trypanosomiasis were used mainly for grazing. The international community and African nations are engaged in a trypanosomiasis control programme that could extend over 30-40 years and will utilize various means, including control of the tsetse, chemotherapy and prophylaxis and the rearing of breeds tolerant to trypanosomiasis.

3.2 Milk production from cows and buffaloes could be increased by raising the number of animals milked and increasing the yield per lactation (see Table 4). The growth in the number of milking animals, at 2.3 percent annually, is higher than the overall herd growth (1.4 percent), partly because of the proposed increase in the share of cows and she-buffaloes in the herd and partly because the proposed breed, health and feed improvements would permit more frequent calvings. Yield per lactating animal could rise from the very low level of 744 kg per year in 1980 by almost 21 percent, but this apparently slow growth is influenced by the very large proportion of cows and buffaloes in traditional and semi-traditional herds, where little or no improvement is foreseen in yield levels. In some countries, however, it is expected that by the year 2000 a large share of total milk production will come from specialized and high-productivity dairy operations. In milk production, the crucial element must be a drastic lifting of the limitations on feed both in quantity and quality and especially in the case of roughages for dairy cows and buffaloes. To accomplish this, there must be very close links between livestock and crop production and in most situations the cultivation of fodder crops, especially for dairying, becomes a necessity. The proposals made in this study fully recognize this need.

It is thus proposed that the quantity of cultivated fodder crops should grow nearly two and a half-fold between 1980 and 2000 in support of the livestock (mainly milk) production targets (see Table 4). Special attention will also need to be paid to breed improvement of buffaloes and to reducing greatly calving intervals and age at first calving.

In general, more attention will have to be paid to improvements in the performance of buffaloes both in meat and milk production and, in selected countries, also with respect to their use as draught animals. In the past, there has been a tendency in many situations to foster a substitution of buffaloes by cattle, but recent evidence suggests that in tropical and semi-tropical areas the buffalo often offers better development potential, especially on small farms, than cattle.

Given the differences between countries in expanding the feed base, the developments proposed would change the relative proportion of livestock numbers between the regions. The main change would be in Latin America, which would increase its share of the total from 33 to 36 percent; Africa's share would remain constant, while the Near East's and the Far East's shares would decline to 6.0 and 42.3 percent respectively, compared with values of 6.9 and 44.3 percent in 1980.

3.3 Sheep and goats (see Table 5) are globally more important as meat than milk producers, although in 1980 in some countries they were providing as much as 25 percent of total milk. The production of wool from sheep and hair from goats provides another 40 percent over the value of milk and meat products, and this forms the basis for widespread cottage industries.

Sheep and goats are more important in areas of low rainfall, mountainous regions and in situations where they can subsist on plots too small to support a large animal. In the near East, where they are the dominant livestock (providing 38 percent of all meat), their numerical growth is severely limited by the damaging effects of overgrazing they are causing, and by the fact that under irrigated conditions dairy production from cattle competes more successfully for fodder production.

Highly divergent views exist with respect to the benefits and costs involved in goat-keeping. Their important role in serving the lower-income population has been taken into account when proposing increases in their numbers, although it must be stressed that in this case strict controls would be required to prevent overgrazing. It is generally accepted that excellent opportunities exist for making goats a more effective source of meat and milk, and research and health support could greatly increase their productivity.

3.4 The production of pork should rise rapidly in those regions where it is a widely accepted food. Such a fast growth rate reflects also some substitution between white meat and red meat, especially in the Far East, where opportunities for increasing red meat production are more limited. (Table 6). Constraints from the reproduction cycle would not check a rapid rise in pig numbers given the necessary feed and improved health control.

A steady growth in traditional pig production is envisaged, roughly in line with the growth of rural populations but additional growth would come from medium- and large-sized commercial operations.

By-products supply much of the feed for existing pig herds, although where commercial large-scale production already exists (e.g., Malaysia and Thailand) increasing use is made of cereal-based concentrates. For the future, cereals and other concentrates will become even more important, although it appears that roots and other starchy commodities, e.g. low quality bananas and plantains, also represent another potentially valuable source of feed.

3.5 Poultry production, including both meat and eggs, is proposed as the most dynamic sector within livestock production (Table 7). This is, in fact, already the case since poultry meat production grew by 7.6 percent annually, compared with only 2 percent for beef and mutton output between 1963 and 1975. The proposals imply a continuation of output growth at the same rate as in the past 20 years, the increase being more than five-fold. Underlying this output growth is a nearly four-fold increase in poultry flocks, a rapid increase in off-take rates and a lesser increase in carcass weight per bird. Most of these changes would require major approaches toward modernization and commercialization of the poultry industry. The technology of large-scale, modern and highly efficient poultry production has proved to be relatively easily transferred to developing countries. However, the income distribution objectives involved in agricultural development would demand that increasing attention be paid to small and middle-sized commercial operations. This, in turn, would require that health services, feed suppliers and extension services should give more effective support to small-scale operations.

Commercialization of egg production generally precedes commercialized poultry meat production. For the 90 developing countries, increase in the number of laying hens is the dominant component (88 percent) of production increases, but large differences exist between regions, reflecting the differences in existing levels of productivity.

It is proposed that poultry meat and egg production grow very rapidly, not only because the biological, physical and economic potential is there, but also because well-run poultry enterprises provide the maximum protein output per unit of feed (with the exception of efficient dairying operations). Poultry production thus provides an opportunity for countries lacking grazing resources to build up a domestic meat industry based partly on domestically produced and partly on imported concentrates instead of importing expensive meat.

3.6 Other sources of meat have been taken into account, namely, offals and "other meat". Offals are calculated in relation to slaughter of cattle, buffalo, sheep, goats and pigs and the amounts of these move in accordance with the meat produced from these animals. "Other meats" include meat of camelidae, equines, rabbits, game animals etc. In nearly all situations, production of these meats is declining or, at best, remains constant. However, it should be mentioned that certain developing countries, including Ghana, Mozambique and Mexico, are showing an increasing interest in the rabbit as a source of meat, and this is likely to spread to those countries experiencing national meat shortages.

Production of wool, hair, hides and skins and other animal by-products have not been covered by the analysis. In 1975, their combined value amounted to 6.4 percent of the value of the output from the livestock sector, and it could be assumed that in the future it would represent a similar share.

4. Inputs for livestock production

Two main inputs will have to increase rapidly to provide for the high growth production targets to be met. The first major input is feed, including both roughages and concentrates, and the second is animal production and health services.

4.1 Roughage feeds. For the ruminant species (cattle, buffaloes, sheep and goats) the bulk of the feed requirements will come from roughages in the form of grazing, crop by-products and fodder crops. Lack of detailed information did not permit estimation of country-by-country feed balances with identified roughage components, but some generalizations can be made. Grazing lands could be extended in parts of Africa, in South America and in certain parts of Southeast Asia. In the Near East, over a large part of South Asia and in certain areas of Africa and South America, pressure on grazing lands is already too high and possibilities of extending such areas are small or non-existent. The competition from crops, partly from extension of cultivated land and partly from rising cropping intensities, resulting in smaller fallow areas, will reduce grazing areas. At the same time, in parts of the Near East and North Africa, some of the low rainfall lands that are used now for marginal grain-growing with accompanying deterioration of soils in these fragile environments would be returned to grazing use.

Much could be done to increase the productivity of grazing lands by changes in technology, such as improved husbandry, reseeding with more productive species and fertilization. Other changes require improved institutions, such as land-use laws and customs to regulate the use of grazing lands. The need is to re-establish a proper balance between carrying capacities and actual livestock numbers within the framework of institutions that do not overlook the merits of the traditional and well-established systems of regulating communal grazing but take into consideration the requirements and technical possibilities offered by modern husbandry systems.

In this study, it is assumed that grazing land carrying capacities will be less than doubled by the year 2000, thus accepting the position that a growing share of feed resources must come from other sources. One such source is the wide range of by-products from crop production, mainly straws and stovers, sugar-cane tops, banana stems and leaves, and other relatively high-fiber materials. Their volume would increase at about the same rate as crop production in general, i.e. at about 3.5 percent annually. Chemical-biological and physical treatment of these roughages to make them more palatable and more nutritious could make a major additional contribution to animal feeding. Already a number of alternative methods are in commercial use in developed countries, and, by the year 2000, a good part of by-product roughages in other developing countries could be similarly treated. The fastest-growing component of roughages would be fodder crops largely grown under irrigation where they would also improve crop rotations (see Table 8). The example of Egypt, with about 26 percent of its irrigated land under berseem (Egyptian clover), shows how important such a contribution can be. It is proposed that the irrigated fodder crops area should grow nearly three times between 1975 and the year 2000.

Fodder production is especially important under extremes of very low or very high rainfall conditions. By substituting a leguminous crop for a natural fallow, fodder output can be raised and the growing conditions for the following crop improved. Much of the future higher cropping intensities under low rainfall conditions would reflect an increased share of short-term fodder crops in the rotations.

4.2 Concentrate feeds. The use of concentrate feeds would increase at about 6.6 percent annually, compared with the current annual total livestock output growth of 4.3 percent. In 1975, milling by-products made up 44 percent of the high-energy feeds, but by the year 2000 their share is expected to rise to over 50 percent.

As a result, feedgrain use in developing countries would rise from about 65 million to 143 million tons over this 20-year period (4.0 percent per annum), and account for 18 percent of their total grain use (see Fig. 4). Milk, poultry meat and pork producers are the most important users of grain for feed, and their share will further increase by the year 2000. The use of fixed concentrate/output ratios in the analysis possibly understates the likely growth in concentrate use for beef and mutton production.

Such a high growth in the use of grains for feeding could raise the objection that this puts additional pressure on human food supplies, and, therefore, more emphasis should be placed on meat production from roughage-fed ruminants. However, the argument could be advanced that higher grain feeding is a result of pressure for rapid production growth rates. Moreover, it could be maintained that a larger share of cereals fed to livestock creates a "safety cushion", which can expand the availability of cereals for food in periods of shortages.

An overwhelming share of the total feed concentrates used is fed in Latin America, but the fastest growth rate is visualized for the Far East region commencing from a very low level.

4.3 Animal health and production and other programmes. The costs of veterinary services can be estimated only roughly 1/. Their total value would rise from US$750 million in 1975 to around US$2000 million by the year 2000 (4 percent annual growth). What is just as important as the quantity is the quality of these services. In many situations, this would mean raising the standard of training of staff and improving the organization and management of the animal health systems. In most developing countries, such services should be concerned primarily with preventive medicine, mainly in the prevention and control of major diseases, and, in many parts of the world, with the control of their carriers, such as the tsetse flies and ticks, and also the treatment of intermediate hosts (including humans) against certain parasites. International control programmes exist for a number of the major epizootic diseases, but greatly expanded programmes are needed for the less spectacular but nevertheless economically often more significant causes of chronic wastage, such as bluetongue, contagious bovine pleuropneumonia, reproductive disorders, tick-borne diseases and helminthiasis.

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1. The coefficients used for roughly estimating these costs were: $2.0, $0.50 and $0.25 per head of livestock unit under high, medium and low productivity levels, and applied to Latin America at high level, Near East at medium level, and Africa and the Far East at low level.

Simultaneously, with improvement of disease control, there should be a development of feed and water resources and marketing systems and generally an improvement of animal husbandry; disease control alone can lead to overgrazing and starvation.

In the field of animal breeding, steps need to be taken to ensure that breeds of livestock in any given area are in harmony with their environment. High-producing breeds from temperate countries deteriorate rapidly in areas having severe environmental conditions.

In such areas, there is a need to study indigenous breeds that, while generally unimproved, are excellently adapted to local environmental conditions. In many cases, such adapted indigenous breeds have been put in jeopardy by the introduction of large numbers of high-performance breeds from temperate countries. There is a need, therefore, to conserve indigenous breeds and to ensure that these are not swamped by exotic breeds or their crosses before the latter are carefully evaluated against the former in the environment in which the offspring must be raised.

International and national action would be required to expand the use and geographic coverage of artificial insemination in suitable areas, thus enabling superior sires and dams to accelerate the upgrading of breeds in selected areas where disease control, feeding and management made such development desirable.

In the low rainfall areas of the developing world, a major improvement in supplies of stock drinking-water is essential. Simultaneously with an increase in the number of watering points, their management and rules for their utilization must be improved to solve the present serious problems of local overgrazing and resulting desertification. Solutions must carefully integrate local decision-making and the policies exercised at higher levels.

Investments for livestock production include increases in breeding animals, in grazing land improvement and development, in housing for pigs and poultry, and overall investments to cover building and fences for meat and milk production and off-farm investments, and for transport, marketing and slaughter/processing facilities (see Table 9). Rough estimates indicate that in the commercial sector of the livestock industry, an investment of about US$4 000 is required for one ton of additional meat and US$ 300 per ton of additional milk.

It is assumed that as much as two thirds of total meat production increases would come from projects for investiment and technical improvements, the rest coming from slowly increasing livestock output without formal investment. The total investments for livestock would amount to US$ 9 315 million in 1980 and US$ 21 639 million in the year 2000.

5. Institutional support for livestock development

Many of the service-support institutions needed for livestock development, such as animal health and production services, were referred to in relation to the production programmes. Emphasis here is placed on three specific aspects of such institutions: the need to reorient livestock support institutions toward the needs of the less well-off in agriculture, i.e. the small farmers and landless, the absolute necessity of strengthening institutional support in defense of natural resources, mainly the grazing lands, and the research needed to enable improvements to be made in livestock production and health technologies.

The majority of the present systems of institutional support for livestock production either ignore the small farmer and landless people or pay inadequate attention to their needs. Nor do such systems seize the opportunities available for fostering livestock development and for achieving development objectives such as a more just income distribution by making better use of existing resources in this neglected segment of livestock production. It is necessary to aim for a major reorientation of livestock development programmes in order to focus more precisely on servicing small farmers and the landless. This also necessitates a greatly increased and improved effort in the training of livestock producers and the staff of the institutions serving them. Nevertheless, in certain countries and for selected classes of livestock, large-scale modern systems of production will be the most appropriate solution.

The efficiency with which livestock owners use the grazing and other resources available to them depends very often on the institutional arrangements governing their use. In many parts of the developing world, the growing pressure from human population and from the large animal numbers has created a growing imbalance between the need for preservation and optimal use of grazing resources on the one hand, and the institutions which successfully regulated their use in the historic past on the other. The denuded hills and the enlarged deserts of the world testify that a serious imbalance exists here and that major action is urgently needed. Such action will be concerned mainly with reducing the pressure on grazing resources by offering alternative livelihoods to a high proportion of the people who now depend on these resources. Parallel to this, a thorough reform, while still having to rely to a great extent on the proved benefits of time-honoured traditional systems of control, would have to bring these systems into line with the conditions and demands of the present day and of the future. These changes will be neither easy nor rapid, but they are urgent if the world is to save much of its endangered grasslands.

An equally important conservation task is the need tó conserve, safeguard and manage the animal genetic resources represented by many indigenous breeds of livestock. Attempts to improve genetic stock often result in a decline in genetic variability and the permanent loss of potentially valuable breeding material. The need for such genetic resource conservation is recognized, but it will need additional support in the future.

6. Future trends in the Latin American and Caribbean Region

According to "Agriculture: toward 2000", two alternative prospective trends were considered: (1) continuation of past trends (1965 to 1979) in agricultural growth and development, and, (2) normative targets for accelerated growth.

The historial and normative trends of beef production and demand in the Region are shown in Table 10. It is predicted that if past trends continue, the Region as a whole will have a deficit in respect to demand by 1985 and that the deficit will increase several-fold by 2000. This deficit will be particularly serious from 1985 onward in the Caribbean, Andean and north-eastern Atlantic sub-regions of which many countries are already importers of beef. However, Mexico and Central America, according to the analysis, will not be in deficit until 2000 and the southern countries will still have some surpluses at that time enabling them to remain in the international trade of beef. The situation is somewhat brighter for the Region as a whole, but not for some sub-regions, when analysed from the normative target point of view. The Caribbean and Andean countries are still predicted to have considerable deficits by 1985, but the other subregions and the Region as a whole will have some surplus up to and beyond 2000.

Similar trends are expected regarding mutton and pork. According to predictions, none of the sub-regions will have a deficit in poultry meat under normative growth by 2000 and only the Caribbean will have a deficit if past trends should continue. On the other hand, the predicted future regarding milk supplies can only be considered as bad. All sub-regions are predicted to have a high milk deficit by 2000 even if the normative targets should be met. The predicted deficit by 2000 for the Region is 14.4 million tons if historical trends continue and 6.0 million tons if normative targets are met.

There is no reason to believe that the projected levels of production under the normative analysis cannot be met in some countries, but it will take a greater effort than in the past on the part of all concerned: planners and policymakers, scientists, technicians and producers. Moreover, a passive attitude cannot be taken in that meat and milk deficits can be filled with food crops because deficits are predicted for many of these as well. Therefore, the Region must take full advantage of its livestock resources in order to meet the challenge with which it is faced.

The greatest potential for increasing beef production lies with the improvement of reproductive efficiency and annual extraction rates and reduction of death losses. A 1975 FAO 1/ study in Chile, Peru, Venezuela, Argentina, Brazil and Colombia showed that grazing pressures on both native and artificial pastures were close to or exceeding carrying capacity and that little progress could be made in future through a simple increase in livestock numbers which would likely decrease production rather than increase it. It was calculated that with an average extraction rate of 12 percent the total cattle population for these countries would produce around 19 million head for slaughter. Increasing extraction rates through improved management by one percent each year, while maintaining herd numbers equal, would give an increase of 1,654,000 head for slaughter and an eventual extraction rate of 18 percent would yield 9,927,000 more head for slaughter.

The time required for cattle to reach slaughter weights can be reduced through fattening facilities which would also increase extraction rates. Such facilities can be established adjacent to or within the cropland areas utilizing agricultural and industrial by-products. Specialized pastures can also be established for fattening with the use of industrial by-products for supplementation. The establishment of fattening facilities would permit the establishment of a stratified land use system in which the rangelands would be used as breeding grounds only. The number of growing or fattening males on rangelands could be reduced and

1. Informe regional, Evaluación de Praderas, RLA/72/026.

replaced with breeding cows, which would lead to further increases in calves for fattening.

Full exploitation of the Region's feedstuffs would reduce the use of grains, especially imported grains, by the cattle, poultry and pig industries. This is particularly important in that forecasts indicate reductions in world feed supplies owing to an increasing demand for cereals for food. Feed costs are also likely to increase because of increasing energy costs. Therefore, greater consideration must be given to animal utilization of materials and resources unsuitable for human consumption. Since there is a serious lack of statistics on the available feedstuffs in the Region, appropriate inventories should be compiled to facilitate the better formulation of overall livestock development plans. There is also a need for feasibility studies to determine how these resources can best be used and made available to livestock producers.

White meat will play an increasing role in filling the gap between red meat production and total meat demand, although the cost of the industrial production of poultry will probably increase. Also the future rate of growth of the poultry industry will likely be less than in the past unless local feedstuffs can be incorporated at lower processed cost into poultry feed. Pig production could be increased by the same token.

The small animal species previously mentioned can contribute significantly to meat and milk supplies. Such species are conducive for small farm rearing without being in competition with man for their sustenance. The possibilities of rearing such animals deserve greater attention and there is a need for the development of appropriate technologies and programmes for their adoption.

Due to a steady increase in international trade in livestock and its products animal diseases will continue to plague the livestock industry in Latin America and the Caribbean unless greater efforts are made to control or eradicate them. Foot-and-mouth disease has profoundly upset the foreign trade of those countries where it is prevalent because of import restrictions imposed by importing countries. Looking toward the future, if a solution is not found to this problem, further difficulties and tighter restrictions could very well arise. There is an urgent need for strengthening animal health services, particularly veterinary diagnostic laboratories at country level and specialized reference laboratories at the regional level, to allow the implementation of economic and effective disease prevention or control programmes.

7. Conclusions

Throughout this article, frequent mention has been made of the important role that technological improvements will have to play in bringing about a more productive livestock industry. Applied research in the past has already contributed much to such improvements but, given the urgent need for major improvements in the livestock sector, the call for more research effort, to cover all major areas, ranging from disease control, breeding, feeding and husbandry, and for the early dissemination of its results to potential users becomes a central issue in livestock development.

Figure 1. Demand for agricultural commodities separated into livestock, food and non-food components in 90 developing countries (1980 total - US$ 281 560 million; 2 000 total - US$ 583 813 million)

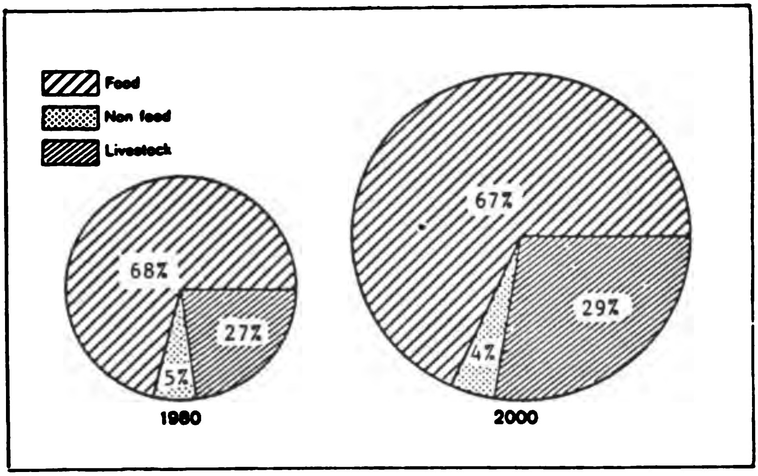
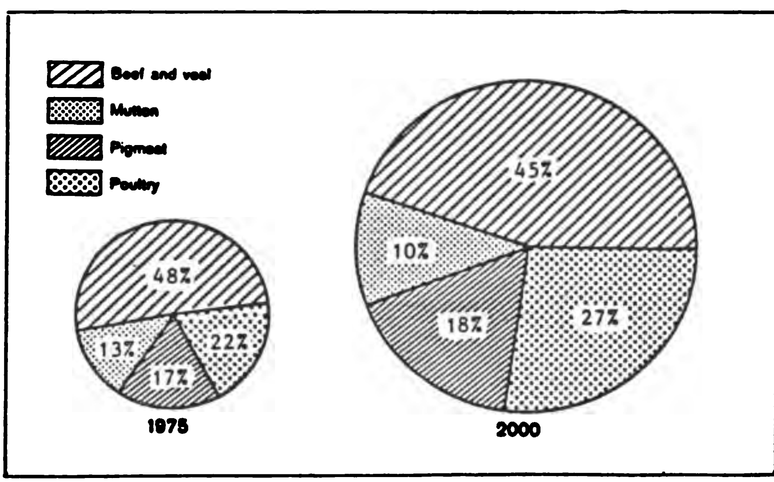


Figure 2. Composition of meat production in 90 developing countries (1975 total - 21 402 000 tons; 2 000 total - 69 468 000 tons)



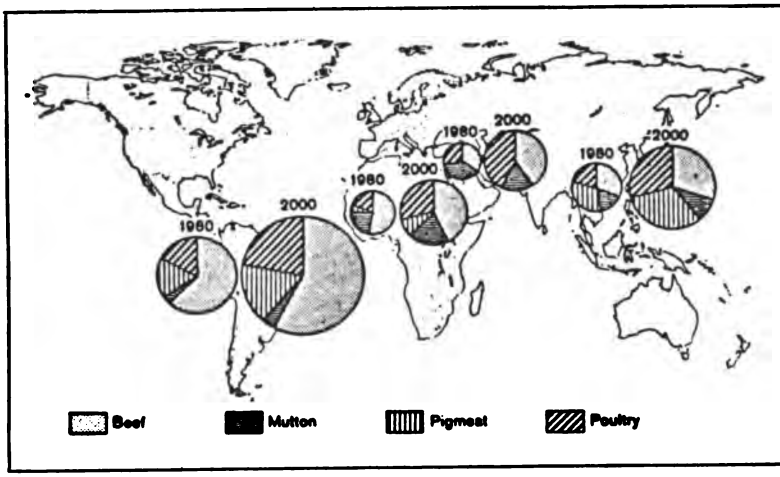


Figure 3. Meat production in developing regions.

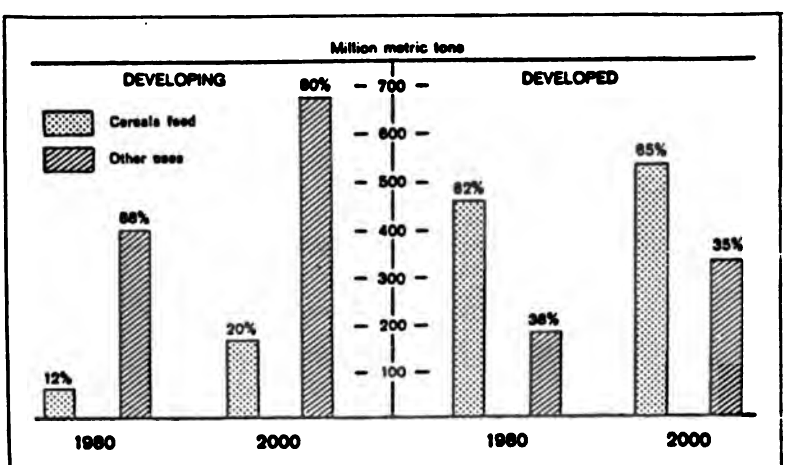


Figure 4. Cereal feeding in 90 developing countries.

TABLE 1. Gross value of livestock production (US$ thousand millions)

Region	1967	1975 1/	1980	1990	2000
90 developing countries	57.9	72.9	87.5	119.5	171.3
Africa	7.2	8.3	9.9	13.2	19.1
Far East	16.7	21.4	26.3	34.4	50.5
Latin America	26.9	34.1	40.3	57.6	81.3
Near East	7.2	9.1	11.1	14.2	20.4
Low-income countries 2/	21.2	25.7	30.4	38.6	54.8

1/ Average of the years 1961-65 and 1974-76

2/ with per capita GDP below $300 in 1975

TABLE 2. Changes in the volume and structure of meat and milk production, 1975-2000

	Red beef + mutton meat prod	Pork and poultry prod	White meat as share of total	Milk cows buffs	Other 1/ milk	Other milk as share of total
	(million tons)		(%)	(million tons)		(%)
90 developing countries						
1975	14.1	7.2	34	79.1	7.6	8.9
2000	29.3	23.8	45	172.5	12.1	6.6
Africa						
1975	2.3	0.7	23	4.8	1.6	25.0
2000	4.5	2.7	38	11.4	2.6	18.6
Far East						
1975	2.1	2.2	51	35.3	1.4	3.8
2000	4.9	7.9	62	66.6	3.2	4.6
Latin America						
1975	7.7	3.8	33	30.1	0.4	1.3
2000	16.1	10.4	39	77.9	0.09	0.1
Near East						
1975	1.9	0.5	20	9.0	4.2	31.3
2000	3.9	2.8	42	16.7	6.1	26.8
Low-income countries						
1975	4.0	1.6	29	41.3	3.6	8.0
2000	8.2	5.5	40	78.8	6.6	7.7

1/ including camel milk

TABLE 3. Cattle and buffalo meat production structure, 1980 and 2000

Region	Animals (mills)	Off-take (%)	Carcass weight (Kg/animal)	Production ('000 tons)	Growth rate 1980-2000 Animal nos. (% per annum)	Growth rate 1980-2000 Production (% per annum)
	....	....	1980	....		
90 developing countries	817	9.6	162	12671		
Africa	129	11.4	125	1836		
Far East	362	3.6	126	1656		
Latin America	269	15.4	196	8102		
Near East	56	16.0	120	1078		
Low-income countries	472	5.3	121	3011		
	....	....	2000	....		
90 developing countries	1079	12.6	174	23753	1.4	3.2
Africa	165	13.5	133	2962	1.2	2.4
Far East	456	5.8	131	3450	1.2	3.7
Latin America	393	18.8	207	15319	1.9	3.2
Near East	65	21.0	148	2023	0.8	3.2
Low-income countries	577	7.2	128	5295	1.0	2.9

TABLE 4. Cattle and buffalo milk production structure, 1980 and 2000

Region	Animals milking (millions)	Yield (kg/animal)	Production (million tons)	Growth rate 1980-2000: Animal numbers	Growth rate 1980-2000: Production
				(percent per annum)	
	..............1980				
90 developing countries	122.4	744	91.0		
Africa	16.3	339	5.5		
Far East	55.4	510	28.3		
Latin America	35.1	949	33.3		
Near East	15.5	684	10.6		
Low-income countries	73	655	47.8		
	.... 2000				
90 developing countries	191.9	899	172.5	2.3	3.3
Africa	26.4	431	11.4	2.4	3.7
Far East	94.1	707	66.6	2.7	2.4
Latin America	54.0	1442	77.9	2.2	4.3
Near East	17.4	965	16.7	0.6	2.3
Low-income countries	121.2	651	78.8	2.6	2.5

TABLE 5. Sheep and goat meat production structure, 1980 and 2000

	Animals (million)	Off-take (%)	Carcass weight (kg/animal)	Meat production ('000 tons)	Growth rate 1980–2000: Animal numbers (% per annum)	Growth rate 1980–2000: Production (% per annum)
	.... 1980					
90 developing countries	808.0	33.1	12.6	3357		
Africa	238.6	31.6	11.6	874		
Far East	203.2	41.5	10.0	844		
Latin America	144.1	19.5	13.4	377		
Near East	222.1	35.7	15.9	1261		
Low-income countries	419.2	36.4	11.3	1724		
	................2000					
90 developing countries	1062.8	36.5	14.3	5549	1.4	2.5
Africa	316.6	35.8	13.1	1480	1.4	2.7
Far East	271.6	43.2	12.3	1448	1.5	2.7
Latin America	190.3	25.7	15.7	766	1.4	3.6
Near East	284.3	38.2	17.1	1854	1.2	2.0
Low-income countries	558.6	38.0	13.5	2862	1.5	2.6

TABLE 6. Pork production structure

Region	Animals (mills)	Off-take (%)	Carcass weight (kg/ animal)	Production ('000 tons)	Growth rate 1980–2000 Animal numbers (% per annum)	Production
			1980			
90 developing countries	128.8	62.4	55.3	4440		
Africa	8.0	71.2	43.8	249		
Far East	44.0	88.0	46.9	1814		
Latin America	76.5	46.6	66.1	2356		
Near East	0.3	118.0	67.0	21		
Low-income countries	34.0	58.1	45.3	893		
			2000			
90 developing countries	205.5	76.3	61.6	9664	2.4	4.0
Africa	12.0	95.8	54.5	626	2.1	4.7
Far East	82.8	92.9	55.6	4280	3.2	4.4
Latin America	110.3	61.5	69.7	4726	1.9	3.5
Near East	0.5	105.4	64.8	32	2.6	2.1
Low-income countries	56.3	75.2	55.1	2334	2.6	4.9

TABLE 7. Poultry meat and egg production structure, 1980 and 2000

(a) Poultry meat

Region	Birds (mills)	Off-take (%)	Carcass weight (kg/animal)	Production ('000 tons)	Growth rate 1980-2000 Animal numbers	Production
					(% per annum)	
1980						
90 developing countries	2528	200	1.1	5729		
Africa	482	156	1.0	739		
Far East	805	149	1.0	1177		
Latin America	954	250	1.3	3029		
Near East	286	249	1.1	784		
Low-income countries	895	115	0.9	953		
2000						
90 developing countries	5537	206	1.2	14138	4.0	4.6
Africa	1137	166	1.1	2116	4.4	5.4
Far East	2007	158	1.1	3552	4.7	5.7
Latin America	1572	246	1.4	5738	2.5	3.3
Near East	820	270	1.2	2732	5.4	6.4
Low-income countries	2096	141	1.1	3238	4.4	6.3

(b) Eggs

Region	Laying hens (mills)	Egg weight (kg/laying hen)	Egg Production ('000)	Growth rate 1980-2000 Animal numbers	Production
				(percent per annum)	
1980					
90 developing countries	936	6.5	6062		
Africa	216	2.9	621		
Far East	281	7.8	2194		
Latin America	332	7.7	2549		
Near East	107	6.5	698		
Low-income countries	307	5.8	1786		
2000					
90 developing countries	1799	7.0	12680	3.3	3.8
Africa	382	3.8	1453	2.9	4.3
Far East	667	6.6	4396	4.4	3.5
Latin America	508	9.9	5038	2.2	3.5
Near East	242	7.4	1794	4.2	4.8
Low-income countries	663	4.4	2903	3.9	2.5

TABLE 8. Fodder production, 1980 and 2000 *

Region	1980				20000			
	Area (mill ha)	Yield (tons/ ha)	Production (mill tons)	%	Area (mill ha)	Yield (tons/ ha)	Production (mill tons)	%
90 developing countries	27.2	4.8	131.4	100.0	46.8	6.6	307.0	100.0
Africa	1.1	4.7	5.1	3.9	3.0	5.6	17.0	5.5
Far East	10.8	4.9	53.3	40.6	19.5	7.4	145.0	47.2
Latin America	12.6	4.2	53.3	40.5	18.8	5.0	93.5	30.5
Near East	2.7	7.3	19.7	15.0	5.5	9.4	51.5	16.8
Low-income countries	11.0	4.9	54.3	41.3	20.2	7.4	149.0	48.6

* Green fodder in dry matter equivalent

TABLE 9. Annual investment for livestock, 2000 (US$ millions)

Region	Livestock herd increase	Meat prod.	Milk prod.	Pig and poultry housing	Grazing land develmt	Total invest.
90 developing countries						
Net investment	10 665	8 970	1 628	183	42	21 488
Gross investment	10 665	8 970	1 628	334	42	21 639
Gross foreign exchange cost	41	1 161	194	40	3	1 440
Percentage 1/	49.3	41.5	7.5	1.5	0.2	100.0
Africa						
Net investment	1 224	1 429	141	8	12	2 814
Gross investment	1 224	1 429	141	15	12	2 814
Gross foreign exchange cost	5	222	22	3	0.1	253
Percentage 1/	43.4	50.7	5.0	0.5	0.4	100.0
Latin America						
Net investment	5 966	3 551	642	83	29	10 271
Gross investment	5 966	3 551	642	138	29	10 356
Gross foreign exchange cost	23	414	75	20	2	534
Percentage 1/	57.6	34.3	6.2	1.6	0.3	100.0
Near East						
Net investment	600	1 374	205	—	—	2 179
Gross investment	600	1 374	205	1	—	2 180
Gross foreign exchange cost	2	321	48	—	—	371
Percentage 1/	27.5	63.0	9.4	0.1	—	100.0
Far East						
Net investment	2 875	2 616	641	91	1	6 224
Gross investment	2 875	2 616	641	150	1	6 283
Gross foreign exchange cost	11	203	50	17	—	282
Percentage 1/	45.8	41.6	10.6	20.2	2.4	100.0
Low-income countries						
Net investment	2 849	2 495	795	46	9	6 195
Gross investment	2 849	2 495	795	78	9	6 226
Gross foreign exchange cost	11	317	81	10	1	420
Percentage 1/	45.8	40.1	12.8	1.2	0.1	100.0

1/ Gross investment

TABLE 10: Beef balance projections between production and demand for the Latin America and Caribbean Region up to the Year 2000

	HISTORICAL TRENDS 1/			
	1980	1985	1990	2000
Production	8 102*	9 027	10 017	12 409
Demand	7 731	9 043	10 436	13 731
Balance	+401	-15	-419	-1 322
	NORMATIVE TRENDS 2/			
	1980	1985	1990	2000
Production	--	--	11 400	15 300
Demand	--	--	10 309	13 952
Balance	--	--	+1 091	+1 348

* Thousand metric tons

1/ Continuation of past trends (1961-1979)

2/ Accelerated growth with a gradual and possible upgrading of the utilization of resources through appropriate technologies.

PROSPECTS FOR ANIMAL DISEASE CONTROL IN THE AMERICAS

Dr. Jerry Callis
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United States

INTRODUCTION

The Americas North and South, comprise two continents which stretch from the Antarctic to the Arctic, separated by the Isthmus of Panama. They are the third and fourth largest continents respectively. There are wide differences in the landscapes which range from subpolar to tropical to polar with all stages in between. The rainfall is equally diverse varying between no rainfall in the deserts to 250 centimeters annually in the tropical rain forest of Northern Colombia. Both continents have extensive low-lands in the center. The human population in North America is 266 million and in South America 160 million. North America comprises 16% of the earth's land area and South America 13%. Combined, the two continents comprise 29% of the earth's land area and are inhabited by 426 million cattle or approximately a 1 to 1 ration of man to bovine, 125 million swine, 122 million sheep, 31 million goats, 38 million horses. In addition, there are almost 3 million alpacas, 3 1/2 million llamas, 2 hundred thousand water buffalo and approximately 16 thousand bison. Estimates for the hemisphere of deer and wild swine are difficult but it has been stated there are 8 million deer in the southeastern states of the United States alone and over 400 thousand feral swine in the state of Florida. Other regions of the hemisphere are inhabited with these and other species of wildlife such as javelina, capybara, mountain goats and wild horses. Many of these species of wildlife are susceptible to the same animal diseases as are the livestock, and on occasion serve as carriers, thus becoming important in relation to animal disease control programs. The ratio of livestock to the human population in the Americas is among the most favorable in the world.

From the earliest times known to historians, food, draft and game animals have prospered in the Americas. In North America, deer out-number some domestic animals and it is reported that more venison than mutton is eaten in North America. The feeding of grain to livestock in some countries is common, however ruminants can be raised on marginal land which still abounds in the Americas. Livestock are a major economical resource of the Americas. In 1980, the estimated value of livestock in meat products in the United States alone amounted to 90 billion dollars (1).

The job for the future of man is the provision of food. It is being argued increasingly that the most efficient use of land is for crop production. A single minded approach in this connection ignores the importance of animal production with regards to the ability of ruminants to thrive on vegetable matter indigestible by man. The problem confronting man is to provide food for a human population that is likely to increase from 4 billion to 6.5 billion by the end of this century. By increasing our knowledge, losses by animal diseases can be lessened, and in the process a major contribution will be made towards feeding the world's increasing population (2).

The first opportunity of detection of an animal disease is usually by the owner or livestock worker. This individual must have a national animal health system in place so that the disease may be reported, following which inspection and diagnosis usually follows. If a disease is diagnosed in a country for the first time, the services of several institutes may be required. The national authority must then pass this information into international organizations which have the capability to alert all countries at risk to this particular hazard. There can be no disagreement with this animal disease surveillance practice. Many organizations are available for this purpose and include International Office of Epizootics (OIE), with headquarters in Paris, France, the Food and Agriculture Organization (FAO) of the United Nations, and in the Americas, the Inter-American Institute for Cooperation on Agriculture (IICA). Diplomatic channels of the respective countries assist with this effort. There must be international awareness of animal diseases and for effective control measures, there must be international cooperation in diagnosis, notification, surveillance, eradication and control measures (3).

ANIMAL DISEASE CONTROL AND ERADICATION

It's a bold attractive idea that we should eliminate or eradicate any disease. It is important to clarify what is meant by eradication. The word implies, take out the roots of something, and it means that disease is no longer found and no longer being transmitted in a geographical area so that no further measures are needed to prevent infection. Some may say it is impossible but that objective has been achieved for smallpox in man and in the United States, vesicular exanthema of swine. In the case of the latter disease which is caused by a calicivirus, other caliciviruses have been found in several species of marine and terrestrial animals which when inoculated into swine produce vesicles. However, the fact remains that the disease vesicular exanthema of swine, as it was first described, has been eradicated from the face of the earth. These diseases were both excellent candidates for eradication. In the case of smallpox it was a disease that caused a high mortality and those affected were often badly scarred. There was an effective, stable and thoroughly tested vaccine and the immune population was generally identifiable. There was no known animal host nor was there a carrier state. The disease had been shown to be controllable by vaccine in many countries. There are other human diseases in which the technology is available for eradication and these include poliomyelitis, and measles. In the case of animal diseases, many individual countries rid themselves from certain diseases and in the United States this has included foot-and-mouth disease, hog cholera, contagious bovine pleuropneumonia and exotic Newcastle disease. Examples of eradication in other countries are for Mexico and Chile, foot-and-mouth disease; and for Brazil, rinderpest when it was imported through a shipment of Zebu from India which were brought in for breeding purposes.

When a disease is eradicated on a continental basis this has a profound effect, since once the disease is eradicated counter measures can be discontinued. For example the trouble and expense of vaccination against smallpox is over. Eradication of foot-and-mouth disease from Mexico in 1954 and Canada 1952 meant that counter measures could be discontinued. In order to maintain that state, however, a coordinate set of other measures are needed. Foremost is restrictions on the import of animals and animal products from countries which have the disease, quarantine facilities and diagnostic laboratories. Generally eradication is much less expensive than the alternative of control of the disease which means substantial reduction of the disease incidence. For instance, foot-and-mouth disease is controlled in Western Europe through applications of vaccines, controlled movement of animals and prompt actions when the disease is diagnosed. In this case the price of freedom from this disease includes vaccination, and all of its attendant costs plus the significant chance that virus may still exist in the vaccine or escape from the production or diagnostic laboratory (4).

There has been considerable debate on the possibility of eradication of many more animal's diseases. Perhaps this organization can construct a list of diseases, which can be attacked by individual countries, regions, or hopefully on a continental basis. Some diseases clearly cannot be eradicated. We simply do not know enough about them to know where to begin. One disease which falls in this category and which is a Western Hemisphere problem is vesicular stomatitis. We do not know enough about the disease to consider its eradication. We do not know all of the places where the virus persists nor all of the means whereby the virus is transmitted. Such situations dictate continued research to develop methods for control and eradication.

The prospects for eradication of many animal diseases on a global or even continental basis are not bright. This prospect then leaves us with only the choice of control through quarantine, isolation, and vaccination so as to build up immune populations. Nevertheless, many countries will continue to give consideration to eradication of individual diseases. For a successful eradication program, there are some pre-conditions which are essential for success. 1. The disease should have recognizable features for detection and surveillance especially in the advanced stages of the program. 2. The disease must be of recognized social and economical importance at the national or international level. 3. There should be specific reasons for eradication rather than control of the disease. 4. There should be adequate finances for administrative staff and control measures. 5. The owners of the livestock must give their wholehearted support for eradication in order for the authorities to mount and carry out an effective program (4).

The reasons or needs for animal disease control are probably well recognized by most attending this conference. They have been well defined by staff of the animal health activities of IICA. Three major objectives are: 1. To prevent devastating disease from entering a country. 2. Stamp out any major disease that is introduced. 3. Increase animal products by reducing losses through diseased animals.

It has been stated that in the 1960's animal diseases accounted for approximately 1/3 of the livestock losses in Latin America. The diseases which accounted for most of this area foot-and-mouth disease, hog cholera, Babesia, and Newcastle disease, all of which have been eradicated from individual countries. This type of evidence and the effects animal diseases have in developing trade barriers between countries caused the governing board of IICA to amend its chapter to include an animal health program. This philosophy has been very well summarized by Dr. Mulhern, the first Director of IICA Animal Health Program. In the short time the Animal Health Program of IICA has been in existence it can look with pride to eradication of African swine fever from Haiti (5). This act eliminated that infection in this hemisphere; for Cuba, Dominican Republic and Brazil have just completed eradication programs. Which animal diseases are next to be controlled or hopefully eradicated from our countries? It is hoped that such a listing can be developed at this conference and preliminary plans made for accomplishment.

RESEARCH FACILITIES

The location of facilities for research is an important consideration. The site should be affordable, services readily available, close proximity of facilities for staff, including schools, close to a transportation center, and nearby colleges, and especially libraries.

In design of laboratory facilities, the most important consideration is safety. Safety for the workers, methods for prevention of cross contamination and methods to protect surrounding people and animals. Productivity of a laboratory is determined largely by the staff, its training, motivation and dedication to the mission. High standards must be established for the workers. Their peers play this role. There must be a creative atmosphere, good logistics, good support and opportunity to interact with other scientists. Judgement of one's peers will determine an investigator's continued access to research facilities and funds. An institution is judged on productivity, and the standing of the staff in the eyes of peers. The same holds true for diagnostic as well as research laboratories (6).

At present, there are many laboratory buildings in this hemisphere which are underutilized. (The one where I am employed, Plum Island Animal Disease Center, may be included among these). The problem is lack of funds to employ the staff to fully utilize the facilities. There is hardly an animal disease or parasite laboratory which I have visited in recent years where these same conditions do not prevail. Except in isolated cases, it is time to call a moratorium on construction of new facilities until effective utilization of those already built is achieved. The above statements apply equally to the national and international centers of the hemisphere. It is true that many facilities are in need of upgrading, but this can be done at less cost than new facilities. One answer to effective utilization of facilities is more collaboration on mutual problems; a pooling of resources.

ROLE OF RESEARCH IN ANIMAL HEALTH

The role of research in animal health and production is to supply the tools or techniques to assist animal producers. It is important not to overwhelm them with technology. Activities should include better diagnostic methods, better diagnostic products and better methods for control of diseases including more effective and safer vaccines.

Research has given us an understanding of the spread and development of diseases as well as the knowledge to intervene in the process. In all parts of the world, governments have established laboratories to conduct research on problems that must be understood to control diseases. Missions of such facilities should be clearly defined and possibly redefined frequently. Investigators generate ideas which are researchable. Ideas are also obtained from field staff if the research and field staff have opportunity to have dialogue. Researchers should look at what they are doing frequently. They should also have user groups look at what they are doing to see if it is useful. Reviews should be made periodically by outside review groups.

When considering prospects for control of animal diseases it is interesting to review several areas of research and to speculate how these developments will influence control and/or eradication of animal diseases. In recent years advances in research, notably molecular biology, have resulted in different approaches to the development of vaccines. These advances are in genetic engineering or biotechnology, as the science is being called. Just 10 years ago, only a few scientists used the technique of recombinant DNA. Gene splicing was a term new to most of us. Now 10 years later recombinant DNA technology has revolutionized research in plant and animal sciences. This science is gradually spreading to industry and the marketplace.

While considerable progress has been made over the last decade, much remains to be learned.. The individual genes for some simple forms of life such as viruses have been separated and studied, but the genes for example for man are far more complex and only the surface has been scratched. The big question still remains, "how are the genes switched on or off, and how are they regulated". What determines whether a cell becomes a liver cell or one for the eye? What causes cells to become cancerous? Answers to these questions occupy many scientists.

The new developments in genetic engineering did not happen overnight. The first big discovery was the one by Watson and Crick on the molecular structure of DNA. This gave us a chemical basis for genes. The second development occurred with the description of plasmids, extra chromosomal DNA contained in bacteria. The plasmids of the bacteria *E. coli* have become the workhorses of genetic engineering. They can be removed from bacteria, cut with enzymes, have other genes spliced into them, sealed with enzymes and returned to bacteria. If the plasmid has been properly programmed it will cause the bacteria to produce the product of the inserted gene. The third important discovery necessary to allow gene splicing to proceed was the finding that some enzymes can cut strands of DNA at predetermined places. These are referred to as restriction enzymes. This background of information formed the basis of the new science (7).

PUBLIC CONCERNS ABOUT GENETIC ENGINEERING

In the United States the public became concerned when they learned what was about to take place. Fortunately, scientists themselves were already concerned and at a meeting held for review of the subject recommended a policing group. The Director of the National Institute of Health has responsibility for this activity, and before gene splicing can take place it must have approval of a committee. Not as much fear exists today as 10 years ago because none of the fears originally envisioned have materialized.

Some fears still prevail. Recently in the United States scientists were prevented from releasing an engineered bacteria into the environment which had been devised to prevent ice crystals from forming on tomato plants until the temperature reached 29 F or -2 C. This issue was eventually given to the courts who ruled that following filing of a negative environmental impact statement release should be allowed to proceed. The same concerns have been expressed relative to gene insertion into sheep and swine embryos. At present an environmental impact study is being prepared on this issue.

The potential for genetically engineered human and animal vaccines or products remains high. The science offers great opportunity to produce vaccines against diseases for which there have heretofore been no vaccines or those of poor quality.

SUB-UNIT VACCINES

Individual proteins or in the case of some organisms glycoproteins can be separated from some viruses and bacteria. Such products have been shown to stimulate neutralizing antibodies that protect against challenge with the infectious agent. A sub-unit vaccine produced from influenza virus has been available for many years. Sub-units, or pieces of several other organisms have been shown to stimulate antibody and in some instances afford protection. A glycoprotein from vesicular stomatitis virus has been shown to protect cattle from challenge, and a sub-unit glycoprotein from herpes simplex virus type 1 protected guinea pigs from challenge with the virus. This particular glycoprotein was produced in a genetically engineered mammalian cell line, clearly demonstrating that immunization with a purified viral protein can provide protection against genital infection by herpes simplex virus 2 in guinea pigs, justifying consideration of the sub-unit as a vaccine for prevention of herpes infection in man. This same technology has been applied for production of a sub-unit which offers promise as a vaccine against hepatitis in man (8).

Sub-unit proteins can be produced by separation from the organism as is done with influenza or as in the case of herpes simplex 1 and 2 the gene could be transferred into cells of the Chinese hamster ovary. The construction of the plasmid was in such a way that the glycoprotein was secreted from the cell system. In other instances such as in the case of sub-unit from foot-and-mouth disease virus the gene was constructed into E. coli plasmids which are then returned to E. coli for expression. In this case the protein remains inside the bacterial cell until released by fracture of the bacterial cell wall.

Gene cloning has enabled the nucleotide sequence and thus the amino acid sequence of several sub-unit proteins to be determined. Some short amino acid polypeptide sequences (6 to 30 amino acids) have been chemically synthesized. Such polypeptides when attached to carriers have been shown to have potential as vaccines. A peptide, 20 amino acids long, has been used to protect guinea pigs against infection by FMD virus when vaccinated. While these organically synthesized polypeptides have been shown to produce antibody in cattle, when the immunity of such animals was challenged they were not protected. It is likely that another or several additional epitopes of the viral protein are required to afford protection. These and other ideas are being explored (9). McKercher et al. have published the results of immunization with a cloned and expressed fusion protein of FMDV. In one test 9 of 9 cattle were protected when their immunity was challenged with virus. These cattle were given two doses of vaccine within the 9 month period. The same technology applied to other immunologic types of FMDV have not yet afforded the same results, indicating that the proteins of different viruses may develop different shapes which has a distinct influence on the epitopes which are exposed or are recognized by antibody producing cells (10).

VIRUSES AS VECTORS

In addition to the production of sub-unit products from the agent or biosynthesis or organic synthesis another novel approach being investigated is the use of viruses as a vector. Smallpox vaccine virus (vaccinia) is being used as a carrier of the genes which code for the protection inducing proteins of unrelated viruses and perhaps other organisms such as protozoa. This technology involves incorporation of the gene into a cloning vehicle such as a plasmid so that recombination takes place and the end product is vaccinia virus which has in it a foreign gene which causes the virus to produce the immunogen. The potential of this technology offers to be cheaper and safer than existing vaccines. I think this has great possibilities as a means of immunizing animals. Several immunogens can be inserted into a single virus and the immunogens appear to be produced normally. Vaccinia has proven to be an effective vaccine and it has a wide host range. This technology is experimental but immunogens have been produced for vesicular stomatitis, influenza, hepatitis B, herpes simplex, and rabies virus. It is especially exciting that mice immunized by this method against influenza and rabies were protected as were cattle against vesicular stomatitis.

In addition to vaccinia, other viruses being investigated include, SV40, adenovirus, bovine papilloma virus, herpes virus, retroviruses and fowl pox virus. Some of the above are oncogenic while vaccinia is not. The use of vaccinia as a vector for the immunogen of another agent may not be enthusiastically supported from all public health and animal disease officials; however, the benefits of such a product may outweigh the hazards (11).

MONOCLONAL ANTIBODY

Monoclonal antibodies are derived by fusion of two distinct cells, one a lymphocyte obtained from immunized laboratory animals, mice and special strains of mouse myeloma cells maintained in tissue cultures. The resulting fusion will produce a specific antibody. These cells are immortal and can be maintained indefinitely through passage or storage in a freezer. The ability to produce the antibody is obtained from the immunized mouse and the immortality from the myeloma cell. The fused cells produce highly specific antibody derived from a single cell.

Monoclonal antibodies are highly specific, making the antibody a powerful research tool to study immunogenic components of a wide variety of organisms. The use of monoclonal antibody leads to more accurate diagnosis of disease.

Conventionally produced antibodies are mixtures of immunoglobulin classes and subclasses, whereas monoclonal represent a single type of immunoglobulin. In addition, to usefulness in study of antigens, they are useful in immune studies. In diagnosis, monoclonal antibodies have been produced for heartworms in dogs, Babesia bovis, feline leukemia virus, bovine leukemia, and rotovirus. In some cases these highly specific monoclonal antibody will result in highly specific safe vaccines when their anti-idiotypes are prepared.

One disadvantage of monoclonal antibody include their inability to cross-link when binding with an antigen, thus they are not as useful in diagnostic tests which depend on precipitation reactions, such as agar-gel.

In the area of treatments, a monoclonal antibody preparation has been marketed which is specific for the K99 pilus antigen of enterotoxigenic E. coli. The antibody given orally during the first 24 hours after birth blocks adherence and colonization in the small intestines of E. coli, thus reducing the signs of illness. This product has been licensed for use in the United States and Canada (12).

DNA PROBES

Small pieces of DNA that recognize specific genes make it possible to identify and isolate the genetic information of any organism. This technology was developed for use in research but it is beginning to be used for diagnostic purposes. The probes are synthesized organically or can be cloned into organisms and produced biosynthetically. Many diagnostic tests for viruses involve culturing the organisms which may take days or weeks. Antibody or DNA probe assays can be performed in minutes. In addition, they may be useful for detection of latency. They could be extremely useful in looking for viruses in semen and embryo.

DNA probes are versatile and they recognize the inherent genetic information of an organism. A sample to be tested is dissolved with detergents and enzymes to remove non DNA components. Treatment with acid, denatures the DNA separating the two strands of the helix. A solid background such as filter paper binds the single strands of DNA which is then exposed to the probes, which seek out complementary DNA to hybridize to them (13).

DIAGNOSIS OF ANIMAL DISEASES

The diagnostic laboratory performs an indispensable role for animal health programs. Without information on the magnitude of a particular animal disease, a control program cannot be planned. Development of a network of animal diagnostic laboratories is one of the objectives of IICA animal health program.

New strides are being made at rapid rates in diagnostic technology for animal diseases. These new tests take advantage of information being developed in molecular biology. Techniques using antibodies or antigen labeled with different markers have been introduced in the last few decades and they include radio-immuno-assays and enzyme immunoassays. They are highly sensitive and can be carried out in laboratories equipped with basic instruments such as gamma counters and ultra-violet microscopes (13).

FINGERPRINTING VIRUS

The viral genome of RNA or DNA viruses can be treated with specific enzymes which breaks the genome at specific places. The fragments are separated electrophoretically onto paper and are then stained so they can be visualized. The genomes arrange themselves according to shape and size of the fragment and these patterns can be used to identify differences in viral genomes or for viral classification purposes (14). This technology is being used at the Pan American FMD Center in Brazil as a means of keeping track of antigenic variation in the virus.

NEW DEVELOPMENT IN PARASITOLOGY

Studies of parasites at the molecular level trailed those of viruses and bacteria. In recent years, however, significant progress has been made with anaplasma (15) in the United States and *Theileria parva* in Kenya (16). In each instance through the production and use of monoclonal antibody, antigens have been located which neutralize the organism, thus offering promise of effective sub-unit vaccines. In both instances, investigators are searching for the gene that codes for the antigen and when located it will be cloned into a vector for expression purposes. Similar studies are underway on trypanosomes but the problem is more difficult with these organisms, however this technology may be applied to Babesia and rickettsia both of which cause severe losses in livestock in many areas of the world.

New serological tests for trichinosis detects antibody in the blood of infected swine. In the ELISA test the antigen is obtained from the larvae which secrete about 20 different antigens when they burrow into cells lining the small intestine. The trick was to isolate this antigen from the hundred to thousands of Trichinella proteins. It was accomplished by the immunization of rabbits with trichina and then use of the antibodies to trap the trichina antigens. The test is now being field tested and if effective it may be used to test pork products prior to sale (12).

CARRIERS, ADJUVANTS AND SLOW RELEASE MECHANISMS

Small peptides which are chemically synthesized are weakly antigenic and stimulate activity that is short lived. They therefore must be coupled to other proteins which serve as carriers and then adjuvanted with oils to improve their immunogenicity.

Controlled release or slow release for drug delivery offers another method for increasing the usefulness of polypeptides. Polyletic acid and various other polymers breakdown chemically on the surface but also in the center and allow the drug to erode. Some polymers are hydrophobic and do not allow water to enter the polymers' interior, thus it degrades only at the surface. If a drug is incorporated into these products the release is gradual. New drug delivery systems have been made for man. These will be applied to drugs for animals at a rapid rate and advances will only depend upon the imagination and skills of the scientists (18).

ANIMAL GROWTH HORMONES

The genes for growth hormones from at least man, swine, cattle, and chickens have been cloned into *E. coli* and sufficient product produced to evaluate in the respective species. Studies have been underway the longest in dairy animals and the reports are that milk production increases 15 to 25% without increasing the food intake and thus far, no untoward development in the cow. Due to the recent report that natural human growth hormone may have been responsible for three recent cases of Jacob-Creutzfeldt, a slow virus disease in man, efforts to obtain licensure of the genetically engineered product will likely increase.

The introduction of DNA molecules of the structural gene of rat growth hormone by micro injection into the pronuclei of fertilized mouse eggs, followed by insertion of the eggs into the reproduction tract of foster mothers established the feasibility of such a feat. The data suggests that the transgenic animals develop and incorporate the foreign DNA into one of the host chromosomes at an early stage of development. The foreign gene is expressed throughout the germ line and resulted in a significant percentage of the mice achieving a much larger size than litter mates. This approach offers value not only as a method of accelerating farm animal growth and size, but as a means of correcting genetic disease. The fact that there is a continuing high level of growth hormone in the animal will need to be evaluated (19).

EMBRYO TRANSFER

Methods for transfer of animal embryos are developing at a rapid rate, including the technology for the freezing of embryo. The best successes with foreign embryos have been achieved with bovine embryos. It is estimated there were 500,000 bovine transfers in North America last year. Embryo transfer offers many advantages especially in moving germ plasm from one continent to another. Were it not for the lack of information about the possibility of disease transmissions via embryos it would be used more frequently to move germ plasm from one continent to another. This subject is being investigated at several laboratories around the world, but there needs to be better coordination of it on an international basis. Regulatory and research officials from exporting and importing countries need to discuss their concerns, discuss and assign priorities for research.

The advantages of embryo transfer will be large if assurances can be given that diseases will not be transmitted in this process. Specific advantages in addition to providing a basis for inexpensively moving germ plasm from one continent to another include methods for eradicating diseases from herds without loss of valuable blood lines and promise of introducing other diseases. The early results of the research in the bovine leads one to conclude that virus does not penetrate the intact zona pellucida, and if there is virus attachment in some cases it can be washed off, if one of the rinses contains trypsin.

An analysis of the information currently available is summarized below for the bovine.

BOVINE EMBRYOS

AGENT	RESULTS
Bovine leukemia virus (BLV)	Virus not associated with egg or zone intact embryo and not transmitted from BLV donors to health recipient.
Bluetongue (BT)	Embryos not infected in BT positive donors and not transmitted to negative recipient.
Infectious bovine rhinotrachitis	Virus sticks to zone but may be washed off with trypsin--not transmitted by embryo to healthy recipient.

Bovine virus diarrhea (BVD)	Embryo not infected in BVD positive donor.
Parvovirus	Embryo exposed *in vitro* not infected.
Brucella abortus	Organism not isolated from embryo from positive donor.

These observations are not final, but if they hold, the prospects of using transfer technology to move embryos internationally appears promising.

Other developments in embryo technology include splitting and sexing. The embryo core already may be divided into four with good successes on a regular basis and the accuracy of sexing is improving. As specific genes are identified one can expect to see efforts made to insert them into fertilized ova (20).

These are exciting times in laboratories. Genes are being extracted from all sorts of organisms and are being inserted into others to express products or to use as recombinant live vaccines. Progress is being made at a fast pace. Some products are produced by biosynthesis, while others, primarily shorter peptides are organically synthesized. Thus far, not many new products have reached the marketplace and additional time will be required to effect superior vaccines, but when accomplished, they should be safer and longer lasting. Genetic engineering perhaps offers the greatest promise for producing vaccines for those diseases for which, thus far, there have been no products or those which immunize poorly. This includes such things as malaria in man and in animals, anaplasma, Babesia, heartwater and trypanosomes.

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PROSPECTS OF THE VETERINARY PUBLIC HEALTH PROGRAM OF THE PAN AMERICAN HEALTH ORGANIZATION

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Introduction

The Pan American Health Organization has been restructured in an effort to provide the member countries with more effective and scientific technical cooperation to achieve optimum balance between the goals of the Organization and the mandates of its governing bodies.

The two broad sectors for scientific and technical cooperation at PAHO are: 1. Health Systems Infrastructure, and 2. Health Programs Development. Under the former are four specific programs, namely: Health Systems Development; Health Systems Delivery; Health Manpower, and Health Technology Development. The Health Programs Development sector consists of eight specific programs: Environmental Health; Veterinary Public Health; Food and Nutrition; Tropical Diseases; Maternal and Child Care; Health of Adults; Workers' Health, and Epidemiology.

As regards operations, the structure of PAHO covers the entire region of the Americas. In addition to the headquarters in Washington, D.C., PAHO has a network of field offices in almost all of the countries in the Hemisphere. Each country office is headed by a PAHO representative who derives his authority directly from the Director of the Organization. He has additional administrative and technical staff. Technical cooperation in the specific sectors is directly accessible to the member governments of PAHO through the country offices, and receives technical and administrative support from headquarters.

In addition, PAHO has various specialized international centers that contribute technical cooperation to the various programs in the areas of training, research and operational services. Among these are the Pan American Zoonoses Center in Argentina and the Pan American Foot-and-Mouth Center in Brazil, which are part of the Program's resources.

The Veterinary Public Health Program of PAHO

The Veterinary Public Health Program belongs to the Health Programs Development sector. That sector's activities consist of the application of theoretical and practical knowledge as well as the resources of veterinary medicine to the protection and improvement of human health.

Scientific and technical cooperation activities under the Program are intended to be a response to the needs of the member governments of PAHO to enable them to achieve self-reliance, through the use of appropriate technology, and active community participation. This also involves recourse to the effective use of intersectoral resources and an exchange in terms of technical cooperation.

On the basis of the primary health care method, the Program has promised to prepare a strategy and plan of action as a contribution to the goal set for the year 2000, that all people in the Americas might be able to lead a socially satisfying and economically productive life.

As stipulated in the Plan of Action for the implementation of regional health strategies for all by the year 2000, approved by the governing bodies of PAHO, the Program consists of: Zoonosis; Foot-and-Mouth Disease; Food Protection; Laboratories; Animal Medicine; Education and Training in Veterinary Public Health; Contribution of Veterinary Medicine to the Quality of the Environment; and Veterinary Public Health Support to Human Health Services. These components may be broken down as follows:

1. Zoonosis:

    - Diagnosis
    - Epidemiological surveillance
    - Control/eradication operations

2. Foot-and-Mouth Disease and other vesicular diseases:

    - Preparation and control of the quality of vaccines
    - Epidemiological surveillance

3. Food safety:

    - Policy and organization
    - Food inspection and analysis
    - Standards, uniform codes nutritional guidelines
    - Medicines for animals and hormone residues
    - Control and eradication

4. Animal medicine laboratory:

    - Nonhuman Primates

- Laboratory animals
- Animal models of human diseases

5. Education and training in veterinary public health:

   - Training of veterinarians
   - Training of veterinary assistants
   - Advanced training and academic exchange program

6. Contribution of veterinary medicine to the quality of the environment:

   - Pesticides
   - Evaluation of wastes of animal origin
   - Control of urban dogs and animals
   - Control of rodents
   - Control of medicines for animals

7. Veterinary public health activities in direct support of human health services:

   - Preparation for disasters and relief operations
   - Promotion of primary health care practices in rural areas, especially community participation
   - Laboratories for the diagnosis of animal diseases in support of medical services.

The Program's professional staff resources consist of a total of 57 advisers, for the most part, veterinarians with various specialties and broad experience in epidemiology, preventive medicine and veterinary public health, planning and administration, food protection, virology, bacteriology, pathology, immunology, etc. Those advisors are posted in various countries of the region where they work directly with the member governments of PAHO in the following areas: planning, execution and coordination of national animal health and veterinary public health programs; preparation and execution of international and bilateral finance projects; regular and advanced personnel training; and the promotion of applied research. In addition, they assist in the obtention and effective use of the Program's resources and technical cooperation services.

Among the Program's resources for technical cooperation in the control and eradication of zoonoses and foot-and-mouth disease are two international specialized centers. These are namely the Pan American Zoonosis Center, established in Argentina in 1959, and the Pan American Foot-and-Mouth Disease Center, established in Brazil in 1951. More than 50% of the Program's technical resources are to be found in those two centers, which are equipped with laboratory facilities for the delivery of referral, research and training services.

Given the interdependence of animal and human health, in 1967, a structured mechanism for coordination at the ministerial level for cooperation between the health and agriculture sectors was established. Every two years (annually up to 1980), PAHO calls a meeting of ministers of agriculture of the Americas. At that meeting, known as the Inter-American Meeting, at the ministerial level, on Animal Health (RIMSA), hitherto known as the Inter-American Meeting, at the ministerial level on Foot-and-Mouth Disease and Zoonoses Control (RICAZ), the ministers of agriculture recommend policies, evaluate the programs and examine the budget for technical cooperation provided by the Organization in the areas of animal health, veterinary public health. Also, they ensure the effective coordination of activities with the international organizations involved in animal health in the region, for example, FAO, IICA, OIRSA and OIE and also the appropriate use of resources. Decisions taken at those meetings are submitted to the governing bodies of PAHO for final approval and implementation.

The activities of the two centers referred to above are examined every two years by an Advisory Scientific Committee (CCA) made up of specialists and experts of international renown, who evaluate the work of the centers and advise the Director of PAHO on the pertinent technical aspects. In addition, PANAFTOSA serves as a Secretariat of the South American Commission for the Control of Foot-and-Mouth Disease (COSALFA) established in 1973, which meets every year to evaluate the progress of campaigns against foot-and-mouth disease in the region and to make recommendations.

Objectives and strategies of the Program

The overall objectives of the Program are:

- to reduce human morbidity and mortality from zoonoses;

- to combat human malnutrition through the increased availability or proteins of animal origin;

- to prevent traumatism and disease in man by protecting and ensuring the safety of foods of animal origin;

- to promote social and economic development through a reduction in losses brought about by major zoonoses and foot-and-mouth disease.

The specific spheres of action include scientific and technical cooperation in the preparation, development and implementation of programs for the control of zoonoses and foot-and-mouth disease, the expansion of areas now exempt from those diseases and the application of veterinary public health methods to the improvement of human health.

Special attention will be given to the specific needs of vulnerable groups in rural and urban underprivileged groups.

General strategies that will be applied in those specific spheres of action are:

- strengthening of insectoral cooperation, especially between agriculture and health, in the control of zoonoses;

- establishment of insectoral cooperation among countries;

- promotion, insofar as possible, of community participation in the solving of animal health and veterinary public health problems;

- application of appropriate technology to solve pending veterinary public health problems.

As a response to the needs of groups of population that are without adequate care, the activities will be based on the following:

- improvement in systems already in existence, instead of establishing totally new infrastructure and facilities;

- improved use of available human, technical and material resources in each country and community;

- research geared towards the achievement and application of technology that is appropriate for each situation, based on pre-existing methodology.

The specific strategies will be:

- regular and advanced personnel training;

- expansion and strengthening of auxiliary diagnostic services;

- strengthening of operations services;

- development of food protection programs;

- development of information and epidemiological surveillance systems.

The training strategy will be based on the following: organization of local, national, subregional and regional courses as well as seminars and workshops and on-the-job individual training in laboratory diagnostic methods; preparation and control of vaccines; preparation and standardization of biological substances and diagnostic reagents; preventive methods with respect to exotic diseases in animals; control of dogs, rodents and other urban animals; epidemiological information and surveillance and food protection and control.

The expansion and strengthening of auxiliary diagnostic laboratory services will include scientific and technical cooperation in the following: outfitting and upgrading of diagnostic laboratory instruments; creation and improvement of laboratories for the preparation and control of vaccines; expansion and strengthening of laboratories for the preparation and standardization of diagnostic reagents; and expansion and strengthening of auxiliary laboratory services for food protection programs (quality control, microbiology of foods and observation of harmful residues, such as hormones, medicines for animals, pesticides, cancerigenic substances, heavy metals, etc.).

The strengthening of operations services will be based on scientific cooperation in the following: planning, organization, community participation and the use of local resources in support of control activities in the field; and establishment of national, subregional and regional preparatory plans against exotic diseases in animals.

The development of food protection programs will include the following: organization of multisectoral programs that are general in scope in the countries; establishment of policies and promulgation of the corresponding laws on food protection; promotion of community participation and establishment of guidelines for appropriate technology food protection; and installation and strengthening of facilities for the hygienic preparation and handling of foods.

With regard to the development of epidemiological information and surveillance systems, the program will extend cooperation to the member countries in the organization of a basic network, the promotion of the proper use of valid and reliable information to prepare and evaluate control and eradication programs, and in the establishment of systems for the reporting of diseases rooted in the community.

With regard to the conducting of operational and applied research, the program will contribute scientific and technical cooperation in studies for the evaluation of economic losses caused by zoonoses and foot-and-mouth disease, in the evaluation of new techniques and methods for the control and eradication of zoonoses and foot-and-mouth disease under prevailing conditions in the countries, in the study of socio-cultural determining factors that bear upon diseases in animals, with a view to bringing about effective community participation in the control of zoonoses and foot-and-mouth disease, and in the solving of problems that thwart national programs to combat zoonoses and foot-and-mouth disease.

The Directors of PANAFTOSA and CEPANZO will explain in detail the activities and budgets of the two centers for 1984-1985 as an integral part of the general scientific and technical cooperation plan of PAHO's Veterinary Public Health Program.

New orientation and minimum goals for 1990

In accordance with PAHO's Veterinary Public Health Program, participation in the Organization's mission will be active, contributing to the promotion and protection of human health. In this, the focus will be on experience gained and technical specialization achieved in the control and eradication of zoonoses and foot-and-mouth disease, food protection and the application of veterinary public health methods. A contribution will thereby be made to the achievement of the goal that all people of the Americas be able to lead a socially satisfying and economically productive life by the year 2000.

In light of the new organization of PAHO and the primary health care strategy, and on the basis of a new focus to activities at all levels (regional, national, community, family and individual), support will be provided to priority programs of the member governments that have the following purposes:

- mitigation of human suffering and a decline in mortality rates caused by major zoonoses;

- alleviation of hunger and malnutrition, contributing to a more adequate supply of proteins of animal origin through an improvement in animal health and the prevention of economic losses caused by foot-and-mouth disease and zoonoses;

- prevention of traumatism and disease in humans, and reduction in economic losses, and protection and ensurance of the safety of food supplies;

- promotion of human health and welfare in general through the application of appropriate theoretical and practical knowledge in the area of veterinary public health.

The Program will hence make it possible to implement the principle and mandate of the Organization, which is to cooperate fully with the member governments to enable them to achieve self-reliance through the application of appropriate technology and active community participation and the use of intersectoral resources and reciprocal technical cooperation in the areas of veterinary public health, zoonoses and foot-and-mouth disease.

For the purposes of this decade, cooperation will have been extended to the countries towards achievement of the following goals:

- Rabies. Eradication of the urban disease in the Americas.

- Foot-and-mouth disease. Eradication of 80% of the disease in South America and maintenance of exempt areas.

- Food protection. Establishment of programs in at least 80% of the member countries.

- Training in veterinary public health. A minimum of ninety per cent of veterinarians and aids should have received basic training in public health aspects.

- Tuberculosis/brucellosis. Eradication of these two zoonoses in at least 90% of the region.

- Hydatidosis. One per cent decline in the incidence in endemic areas.

INTERNATIONAL CONFERENCE ON VESICULAR STOMATITIS

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The International Conference on Vesicular Stomatitis was held in Mexico City on September 24-27, 1984 under the auspices of the Mexican-American Commission for the Prevention of Foot-and-Mouth Disease, the Animal Health Bureau (DGSA), the Plum Island Disease Center, and the Pan American Health Organization. The Conference was attended by 70 researchers and DGSA staff whose work is related to the disease.

The meeting was in part a follow-up to a major outbreak of vesicular stomatitis in the west of the United States in 1982-83. The participants made an attempt to clear up some of the mysterious aspects of the disease, such as the reservoires, forms of transmission, the appearance of sudden outbreaks, and the dissemination of the disease. A number of factors were taken into account, such as the particular geographical distribution of vesicular stomatitis, apparently related ecologically to specific places; a possible relationship with rainfall and the different seasons; the cyclical nature of the appearance of vesicular stomatitis; the isolation of the viruses of possible biological vectors, such as phlebotomine flies, mosquitoes and gnats; the infection of sentinel animals such as pigs and caged monkeys; the dissemination by contact within a single herd, and from herd to herd. Other factors considered were the infection of humans in circumstances that do not include transmission by vectors; stress as a factor in the appearance of lesions in selected animals or groups of animals; the difficulty of finding a host animal with sufficient proven viruses to serve as reservoires for the possible arthropod vectors; the difficulty of isolating sufficient viruses in some outbreaks to be able to identify the vectors; the difficulty in understanding how the bite of the vector can cause a vesicular lesion in the mouth, if scarification of the epithelium is necessary to produce lesions and if subcutaneous or intravenous innoculations do not normally produce vesicular lesions; the variations in the severity of the attack from farm to farm; the complete disappearance of the disease and of the virus from an area between cyclical outbreaks, etc.

One of the most important features of the Conference was the presence of specialists in molecular biology who had done extensive research on the basic characteristics of the vesicular stomatitis virus, and it was felt that some answers to the apparent contradictions in the behavior of the virus might lie in that direction.

The agenda included discussions on the characteristics of vesicular stomatitis in various countries of the Americas. The meeting also heard the report of a long-term field study of vesicular stomatitis in Ossabaw Island, Georgia, U.S.A., where there is clearly an endemic focus of the disease.

There was discussion of the new molecular virology techniques, such as mapping of oligonucleotids, RNA diagnostic tests, the use of monoclonal antibodies and liquid chromatography, and their application to research on vesicular stomatitis, as well as the possible significance of abnormal interference particles and temperature-sensitive mutants.

As far as laboratory procedures were concerned, the meeting addressed the question of standardizing the diagnostic techniques of the various government laboratories. Also described were the different serotypes of vesicular viruses, including some strains recently isolated in Brazil and Asia.

The use of live and non-live vesicular stomatitis vaccines was discussed: a number of licenses for the production of vesicular stomatitis vaccine were issued in the United States but, due to a marked decline in the number of cases reported in the U.S. in late 1982 and early 1983, the vaccines could not be used very widely.

The meeting also discussed points such as the economic impact of vesicular stomatitis, particularly on milk herds, and the problems the disease has posed for U.S. cattle exports.

The meeting closed on September 27, 1984 after a successful discussion of the major issues surrounding the question of vesicular stomatitis.

INTER-AMERICAN SYSTEM FOR ANIMAL DISEASE SURVEILLANCE

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It has been stated by persons and institutions involved with animal production, the necessity of an information system that permits or allows economic and social importances in the various forms of animal diseases. A system that fulfills all of these characteristics would be the basis of the decision making process with respect to:

- The development of prevention, control, and eradication programs.
- The development of integral programs of animal health and management programs.
- The development of education, research activities, veterinary practice, and public health.
- The development of national and international norms and rules designated to prevent the introduction of exotic diseases.
- The development of quality norms for biologics and medicines used in animal treatment and animal disease control.

Many countries are developing animal pest and disease surveillance systems, with different economic and technological resources. The most frequent are those based on laboratory disease reports and are focused on one specific disease. The information of these systems cannot give us reliable information about the global picture of animal health and the economic impact that this represents.

Those cases which are reported to the diagnostic laboratories are from the producers who have already tried to resolve an animal health problem or veterinarians that are looking for a confirmation of a clinical diagnosis. These cases do not represent all animal health problems. With the information from these systems, it is not possible to have frequent evaluations of control and eradication programs. The alternative is the development of expensive studies.

For these and other reasons, this project was presented on July 1984 to the Interamerican Institute for Cooperation on Agriculture (IICA). This system is called the "Sistema Interamericano de Información y Vigilancia Epizootiológica (SIIVE)" or Inter-American System for Animal Disease Surveillance. This system is based on the Minnesota collecting, reporting, and interpreting system. (Known as the Minnesota Animal Disease Reporting System.) This was developed from 1970 to 1980.

This Minnesota system was selected in 1981 by the U.S. Department of Agriculture, APHIS, VS to be the model for the National Animal Disease Surveillance (NADS) System. From 1983 until the present, pilot projects of NADS have been implemented in six states of the USA and have obtained excellent results.

SIIVE CHARACTERISTICS

SIIVE is a system of active surveillance in which the Production Unit (PU) (farm, herd, etc) is the basic information unit. The PUs involved in the system are selected by random sampling and have been previously stratified. This method insures that the information obtained from these PUs can be extrapolated to a livestock population with similar forms of production. The producer or responsible person in each PU will be motivated and trained for the recognition of animal health problems and recording the economic impact (losses and expenses) while developing a permanent surveillance. The continuous participation of producers is obtained when it is demonstrated to them that the information compiled is a worthy tool for making decisions that will improve the health and productivity of their animals and his welfare. This data recorded at the PU in supervised and validated periodically by veterinarians working with the information system.

The selected PUs constitute a direct source of information and an excellent reference to design and carry out a system of questionnaires directed to increase information about production and the problems of animal health. Thus one can avoid deviations and excessive expenses that other systems offer.

Other information sources that the SIIVE can use as support are previously established information systems. These could include compulsory animal disease reporting systems, specific control and eradication programs, slaughterhouse information, and information from diagnostic laboratories, research institutes, veterinarian clinics and hospitals; and information from public health institutions for zoonosis purposes.

SIIVE COORDINATION

By its very nature, IICA has willful participation from the majority of its member countries. This organization has its own juridical personality and acts as a coordinating agency for animal and plant health activities in the continent of America. By virtue of these characteristics, we are proposing this organization as coordinator of the "Sistema Interamericano de Información y Vigilancia Epizootiológica (SIIVE)."

NATIONAL AND INTERNATIONAL WORK STRATEGIES

The integration of SIIVE will require the broad participation of member countries of IICA - based on a reciprocal responsibility among the producers of each country, the veterinary practioners, and the national and international organizations entrusted with animal health programs.

In the short term, the implementation and development of the program can be accomplished in three stages.

- The first stage is to inquire into what information is now being generated, how it is integrated, and how it is disseminated.

- The second stage is to evaluate the information systems by sectors (I.E. agricultural and livestock census, production and marketing surveillance, etc.)

- The third stage is to develop the pilot plan of SIIVE. The responsibilities of IICA as coordinator of the SIIVE, will consist of selecting and organizing the countries which will be involved in the pilot SIIVE plan. This pilot plan should demonstrate the advantages of the system.

In order to obtain permanent collaboration between the producers and the national animal health programs, it will be advisable to make bilateral collaboration agreements that guarantee that the producer will provide data and the program will contribute technical assistance to improve animal health and increase production.

A medium term goal is to have all member countries with their own information systems of animal surveillance, operating at maximum efficiency and efficacy under the SIIVE coordination.

After reaching this step it will be possible to start editing bulletins which report outbreaks, distributions, trends, and the economic importance of animal disease. In summary, the target is to arrive at an information system decentralized in its actions and standardized in its norms.

This will allow us to make a scheme permitting the integration of the "Sistema Interamericano de Información y Vigilancia Epizootilógica (SIIVE)." We can determine the international politics that establish the canals through which information flows. We can generate basic information about the animal health problems and their economic impact. Knowing and defining these problems will make it possible to correct them. This will permit positive transformations in livestock practices.

The long term goal is to maintain and improve the system in order to provide all the member countries with valid, reliable, and timely information.

STRATEGIES FOR DEVELOPMENT OF THE SIIVE PILOT PLAN

For the implementation of the first steps in this system it will be necessary to select countries:

- Which have established animal health programs and with directors that are interested in obtaining reliable information for their decision making processes.

- With enthusiastic producers which are organized into associations and have demonstrated their interest in cooperating with official animal health programs.

- Which have sufficient veterinarians interested in this zoosanitary information and who can use it to their advantage in professional practice at the government or private sectors.

- Which have basic agricultural information such as livestock census, records of production units, etc.

- Which have data about the Physical/Geographic aspects of their countries and data about their direct influence on animal production.

- Which can consciously respect the importance of animal production as a social and economic development factor.

- Which can implement a national campaign addressed to all the participants of the system, showing the advantages of SIIVE.

EXPECTED OUTCOMES FROM SIIVE

The SIIVE development, which is expected to be in the next three years, will allow us to obtain very useful information for determining livestock politics.

It will give us the opportunity to update data over the global picture of animal health. In the long term, it will permit us to obtain a broad and panoramic respect of animal health problems, both at the national and the continental levels. This panorama will consist of:

- Information about the economic impact of husbandry techniques and habits, by countries and by regions.

- Data for the fast identification and reporting of high-risk animal diseases.

- True and current information from specialized sources about the zoosanitary situation at the continental level.

- Basic information with respect to the efficiency of the emergency plans of various countries.

- Concise and current information about the regions and sub-regions affected by enzootic and epizootic diseases, in addition to disease-free zones.

USES FOR THE INFORMATION PRODUCED BY THE SIIVE

- This information will permit one to measure the positive effects of prevention and control campaigns.

- It will be possible to evaluate all environmental factors that interact in the appearance and distribution of diseases.

- It will permit the evaluation of genetic susceptibility or resistance to diseases.

- It will be possible to make retrospective analyzes of diseases and the effects on production.

- It will be possible to make prospective analyzes or show developing trends.

THE ADVANTAGES OF IICA COORDINATION OF SIIVE

1. Once the system is established, the need for valid and timely information at the Inter-American level could be satisfied, in that referring to the presence and/or absence of diseases afflicting the cattle herd of each country.

2. It would unify the Inter-American model for gathering, analyzing and processing data.

3. Immediate epizootiologic information would be available among the directors of Animal Health of the member states through the minicomputer network.

4. The assistance of highly specialized personnel in the tasks of epizootiologic surveillance would be available.

ACTIVITIES DEVELOPED BY IICA TO ESTABLISH THE STATUS OF REPORTING DISEASES IN THE MEMBER STATES

At the end of 1984, Dr. Frank Mulhern drew up and sent questionnaires to all the Member states of IICA in order to assess the need for an information system at the continental level and the degree of interest in participating, as well as the existing capacity for setting up a surveillance system. It also sought to determine those agencies, institutions or groups which could provide information, as will as give their opinion on the advantages and disadvantages of an information system on the continental level.

The results of the following surveys showed that favorable acceptance exists for the development of an information and surveillance system. Particular interest on the part of personnel was noted for establishing the system. A positive attitude was observed to purchase computer equipment (microcomputers) for use in the program. The need to train technicians in gathering and processing data as well as minicomputer operators was recognized.

The idea to develop a system was considered an excellent one, and only a small group of the surveyed was opposed to the need for technical assistance.

QUESTIONNAIRE ON AN ANIMAL DISEASES AND PESTS REPORTING SYSTEM AT HEMISPHERIC LEVEL

Of a total of 29 countries surveyed, 15, or 52%, answered.

PART I. INTEREST IN PARTICIPATION

1. Would you like IICA to develop a hemispherical system for reporting on outbreaks or infestations of exotic or economically important diseases and pests of animals and plants?

   100% agrees with the development of an information system by IICA.

2. Would you participate in such a system if it is developed, including advising other countries of disease and pest occurrences?

   100% would participate in the system.

3. Are you interested in participating in a pilot program that may lead to the establishment of such a hemispherical system?

   100% would be interested in participating in a pilot program.

4. Would you commit support to a system in the form of,

   Data would be provided on:

   a) 100% on exotic diseases and pests.
   b) 100% on endemic diseases and pests.
   c) 53% would provide personnel.
   d) Equipment would be provided as follows:
      26% computers.
      53% vehicles.
      13% funds.
      80% diagnostic equipment.

5. Does your country have authority to always collect and submit this kind of data to/from other countries?

   93% has the authority to collect and submit this data to other countries.

6. Is your country currently participating in any animal disease and pest collection and reporting system?

   93% is participating in some information system.

7. Do you currently provide disease and pest data to other international organizations? If, so, please list the organization(s) and type of data supplied.

   100% is providing data to international organizations such as PAHO, WHO, FAO, IICA, OIRSA, OIE.

8. What other organizations, institutions, agencies, or groups in your country would be interested or should participate in an animal and plant pest and disease reporting system?

   80% universities.
   86% farmers/ranchers.
   53% chemical/pharmaceutical Co's.
   93% veterinarians/veterinarian Assistants.
   86% laboratories.

PART II. NEEDS AND CAPABILITIES

9. Do you currently have personnel collecting data animal and plant diseases and pests?

   80% has personnel collecting data on animal and plant diseases and pests.
   6% has none.
   14% did not answer

10. What other agencies, organizations, institutions, or groups could provide data?

    73% universities.
    93% farmers/ranchers.
    35% chemical/pharmaceutical Co's.
    80% veterinarians/veterinarian assistants.
    80% laboratories.

11. Do you have computer equipment available that could be used in this program? If yes, please provide the following:

    13% has computer equipment.
    87% has no computer equipment.

12. If you do not have computer equipment, would you be willing to obtain equipment such as a microcomputer to participate in the program?

    73% is willing to obtain microcomputer equipment.

13. Does your country have the capability to accurately diagnose and identify diseases and pests as follows:

    100% has the capability to diagnose and identify diseases and pests.

14. Would training be needed for personnel in your country?

 30% data collectors.
100% data handlers/processors.
 86% identifiers/diagnosticians.
 86% computer operators.

15. What additional resources will your country need to participate in this program?

46% personnel.
73% equipment.
53% supplies.
46% funding.

16. Please list the disease and pests of animals and plants of importance for which emergency regulatory actions would be warranted or for which you would like information reported from other countries.

The most frequently mentioned were: African swine fever

Viral diseases	foot and mouth disease stomatitis hog cholera Venezuelan encephalitis rabies
Bacterial diseases	salmonelosis aviar brucellosis scabies ticks

17. What kind of information or reports on these or similar diseases and pest would you like to receive from such a system?

Incidence.
Prevalence.
Economic aspects.
Outbreaks of exotic diseases.
Control and eradication programs.
National and international movement of livestock.

18. What benefits or barriers, in your opinion, would result from an international disease and pest reporting system?

Development of preventive measures for the import of animals, products and byproducts.

Development of control measures in coordination with other affected countries.

19. Please provide any additional comments you feel are appropriate.

86% state that is an excellent idea.
14% would participate in the system, whenever assistance would be lended to them.

INTER-AMERICAN COMPENDIUM OF REGISTERED VETERINARY PRODUCTS

Dr. Luis V. Meléndez - IICA
Dr. Richard B. Talbot - VPI
Dr. Hector Campos López - IICA

1. INTRODUCTION

1.1 The need for an International Drug Compendium of Registered Veterinary Drugs or Products have been expressed by several countries at meetings of international organizations more than once.

1.2 Documented is the expressed interest of forty-two member countries of the International Office of Epizootics for the preparation of such a compendium during the 51st General Session of that organization, held in Paris during May 1983 (1).

1.3 The same need was expressed at the First International Consultation on Veterinary Drug Registration held in Columbia, Maryland, U.S.A. during January 1983 (2). Fourteen countries and four international organizations participated in this consultation.

1.4. This need was also discussed at the Second International Consultation on Veterinary Products Registration held in Oslo, Norway during June 1984. Twenty-six countries and six international organizations attended this second Consultation (3,4,5).

1.5 A regional effort for the implementation of such a need has been undertaken by the Member Countries of the Inter-American Institute for Cooperation in Agriculture (IICA) in the countries of the American Continent.

1.6 IICA has begun with the implementation of this project following the mandate of its Member Countries. This mandate is derived from Resolution 32 of the Inter-American Board on Agriculture.

1.7 This document deals with the activities developed by the Member Countries and the Central and Field Offices of IICA to proceed with implementation of the early phase to prepare an Inter-American Compendium of Registered Veterinary Products.

2. SPECIFIC OBJECTIVE

Implementation and development of a system to interchange information among the countries of the hemisphere concerning authorized veterinary products, the advantages and disadvantages of their use and to try to harmonize the legislation among the different countries concerning the approval of the use of these products.

3. REASONS TO UNDERTAKE THE PREPARATION OF AN INTER-AMERICAN COMPENDIUM OF REGISTERED VETERINARY PRODUCTS

3.1 Information sharing between most countries of the world in the areas of drug regulation, drug approval, animal feed additive registration, and drug and chemical residues of animal origin that represent a risk to the public health is not as well developed as information sharing in other scientific aspects of veterinary medicine.

3.2 Lack of an organized expert system to collect and manage the data and to assist with the decision analyses. Currently, each country in the world has its own system of registering drugs and feed additives. Moreover, conditions of use, dosages, and species in which use of a compound is approved vary from drug to drug among countries. Critical parameters such as withdrawal times, detection methodology, and allowable drug combinations also vary among countries.

3.3 Need to compile and manage a comprehensive international data base of drug information.

3.4 Lack of harmonization in the regulations among the different countries of the hemisphere concerning authorization and registration of veterinary products.

3.5 Limited up-to-date available information concerning authorized veterinary products in each country.

3.6 Limited interchange of information among the countries of the hemisphere concerning residues of veterinary products of animal origin and the adverse effects they can produce.

3.7 Minimum interchange of information concerning the advantages and disadvantages of the products in use in the countries.

4. GENERAL OBJECTIVES

The overall objectives of this project are:

4.1 To study the official country structures for the authorization and control of veterinary products.

4.2 To develop a system for receiving and sending back country information.

4.3 To define the data elements and standardization of nomenclature for the information base.

4.4 To evaluate currently available expert systems and other medical data base management systems and thus to develop a system for use in this project.

4.5 To publish a compendium of registered veterinary products.

4.6 To stablish mechanisms to update the data base and to explore means to make the project self-supporting financially.

4.7 To investigate means to provide immediate access to the data base and logic systems for its analysis by member countries and international organizations.

5. FAVORABLE RESULTS TO BE OBTAINED WITH THE PREPARATION OF AN INTER-AMERICAN COMPENDIUM

5.1 To facilitate studies for the approval or disapproval of veterinary products in the different countries.

5.2 Harmonization among the countries of procedures for the approval of veterinary products thus facilitating international trade.

5.3 Up-to-date information concerning veterinary products which residues in foods of animal origin could represent a risk to human and animal health.

5.4 Availability for livestock and agricultural professionals of up-to-date information concerning the use of veterinary products in the different countries.

5.5 Provision to the Animal Health Industry of information on veterinary products with harmful effects, not previously detected, for human and animal health.

5.6 The information about the residual effects of different veterinary products will enable to limit the use of such products that pose a risk to public health.

5.7 A greater information network about veterinary products among the countries will enable a greater access, distribution, and availability of these products.

5.8 Manufacturers of drugs, biologics, and other veterinary products will have a larger data base regarding their market potential and will benefit from shared data useful in speeding up the approval process for registration and approval for use of a product in participating countries.

5.9 A Compendium of registered veterinary products will be published. This compendium will mainly contain the following information provided by the national regulatory agencies of the Countries of the Inter-American System on approved veterinary drugs:

- Generic name
- Chemical name
- Trade name
- Registration or other identification number
- Dosage form(s)
- Route(s) of administration
- Species approved for
- Approved claims or indications for use
- Contra-indications
- Side effects
- Withdrawal period
- Manufacturer

6. PLAN OF OPERATIONS

This plan will be developed in three phases.

PHASE ONE

6.1 A survey to determine which are the official country structures for the registration of veterinary products will be conducted by means of questionnaires especially prepared for this purpose.

6.2 A system for receiving and sending back country information will be developed.

6.3 The activities to develop this Phase One will last approximately 12 months.

PHASE TWO

6.4 A survey to determine which are the veterinary drugs and biologicals officially registered by the Countries will be conducted.

6.5 Data elements and standardization of nomenclature to prepare the base information will be defined.

6.6 Special questionnaires will be prepared to conduct the above mentioned survey.

6.7 The information obtained will be analyzed and evaluated.

6.8 The first edition of the Compendium will be published.

6.9 The activities to be undertaken during this Phase Two will last approximately one year.

PHASE THREE

6.10 All activities mentioned in previous phases will be updated.

6.11 The survey for drugs and biologicals will be extended to include feed additives.

6.12 Questionnaires will be designed to obtain information on registered feed additives.

6.13 The second edition of the Compendium will be published.

6.14 Mechanisms to update the data base will be established.

6.15 Means to make the project self-supporting financially will be explored.

7. HUMAN RESOURCES

7.1 The professional officers of the IICA Animal Health Program will undertake the collection of the information required from the respective services of its Member Countries.

7.2 The collaboration of the national officers in charge of the registration of veterinary products will be requested to accomplish this goal.

7.3 IICA has requested the collaboration of the Virginia-Maryland Regional College of Veterinary Medicine, of the Virginia Polytechnic Institute and State University (Virginia Tech) to prepare the Compendium.

7.3.1 The specific collaboration of the Virginia Tech consists in the following:

7.3.2 Design and preparation of the necessary questionnaires.

7.3.3 Definition of data elements and standardization of nomenclature for the information base to develop a data base management system for use in the project.

7.3.4 To publish a Compendium of Registered Veterinary Products.

7.3.5 To stablish mechanisms to update the data base, and

7.3.6 To investigate means to provide immediate access to the data base and logic systems for its analysis to all Member Countries and International Organizations.

These activities have been summarized in Table 1.

8. FUNDING

The Phase One of the project has been financed by IICA, and by two government agencies of the U.S.A: the U.S.D.A. and the F.D.A.

The College of Veterinary Medicine of Virginia Tech has been granted US$93,000.00 by the two last mentioned agencies to collaborate with IICA in the preparation of the Inter-American Compendium of Registered Veterinary Products.

TABLE 1

INTER-AMERICAN COMPENDIUM OF REGISTERED VETERINARY PRODUCTS

CHRONOGRAM OF ACTIVITIES

Working questionnaires for:	1984	1985	1986	1987
1. Organizational structure of national registration services.				
2. Legal and practical requirements for registration and control.				
3. List of registered vet. drugs.				
4. List of registered vet. biologics.				
5. List of food additives.				
6. List of registered vet. products.				
7. Publications.				

9. PREPARATION OF QUESTIONNAIRES

The questionnaires have been designed as to obtain information in the following aspects of veterinary products registration:

9.1. Organization structure of the country public services in charge of registration and authorization.

9.2 Procedures for registration and control (Legal and Practical Requirements).

9.3 List of registered veterinary products.

Drugs
Biologicals
Food additives

9.4 List of authorized and/or registered veterinary products manufacturers.

10. CONCLUSIONS

10.1 IICA was established by the governments of the Americas, as part of the Inter-American System that specializes in Agriculture, to stimulate, promote and support the efforts of the Member States to bring about agricultural development and enhance well-being in the rural sector.

10.2 The preparation of an Inter-American Compendium of Registered Veterinary products is a task that cannot be delayed as the most complete knowledge of the Veterinary Products being used by the Countries of the Region is of paramount importance for adequate animal production and health.

10.3 The regional scope of this project must soon extend to a global one, as the international trade of food animals, their products and the veterinary products clearly demands that an International Compendium of Registered Veterinary Products soon be made available.

11. REFERENCES

11.1 Document 51 SG/14, OIE, Paris, May 1983.

11.2 Proceedings of the First International Consultation on Veterinary Drugs Registration, Columbia, MD, U.S.A., January, 1983.

11.3 Proceedings of the Second International Consultation on Veterinary Products Registration. Oslo, Norway, 1984, in press.

11.4 Views of the O.I.E. on an International Compendium for Registered Veterinary Drugs, L.V. Melendez and L. Blajan. Proceedings of the 2nd International Consultation on Veterinary Products Organization, 1984, in press.

11.5 Role of the O.I.E. in the Standardization of Veterinary Products - L.V. Melendez and L. Blajan - Proc. of the 2nd International Consultation on Vet. Prod. Reg., 1984, in press.

11.6 The Role and Scope of International Agencies Providing Technical Cooperation on Animal Health in Latin America and the Caribbean, G.C. Poppensiek and P.N. Acha, IICA-RECOSA I/2, Panama, April, 1982.

REPORT OF THE
III MEETING OF DIRECTORS OF ANIMAL HEALTH FROM THE NORTHERN REGION

- RESANORTE III -

RESANORTE III was held at Hotel Villa Española of Guatemala City, October 2-3, 1984.

Participants

Representatives from Costa Rica, the Dominican Republic, El Salvador, Guatemala, Honduras, Mexico, Nicaragua and Panamá participated in the meeting. Also attending were observers from the U.S. Department of Agriculture and of the Regional Farming Sanitation Organization -OIRSA-.

IICA was in charge of the Meeting Secretariat.

Officers

Chairman: Dr. Julio Germán Cabrera Meza (Guatemala)
Rapporteur: Dr. Dileccio Vanderlinder Payamps (Dominican Republic)

The following recommendations were adopted:

RECOMMENDATION I

INFORMATION SYSTEMS

THE III MEETING OF DIRECTORS OF ANIMAL HEALTH FROM THE NORTHERN REGION,

CONSIDERING:

That in the decision-making process within the cattle administration sector it is essential to count on continuous, reliable and prompt information services on health and animal production;

That the Central region countries, with cooperation from PAHO and other international and specialized agencies (USDA, OIRSA), have introduced information systems on health and animal production, currently at different stages of implementation; and

That information exchanges among countries of the region are important pre-conditions for setting common policies;

RECOMMENDS:

That the development of information systems on health and animal production be supported having in mind the development, through them, of an information system at the hemispheric level on animal diseases.

That the efforts in that direction being conducted by the Animal Health Program of IICA be supported by drafting a proposal aimed at the introduction of an information system on animal and plant diseases and plagues at the hemispheric level.

RECOMMENDATION II

PROJECT OF TECHNOLOGICAL EXCHANGE BETWEEN MEXICO, CENTRAL AMERICA, PANAMA AND DOMINICAN REPUBLIC

THE III MEETING OF DIRECTORS OF ANIMAL HEALTH FROM THE NORTHERN REGION,

CONSIDERING:

The need for improvements in technological capabilities in animal health and cattle production within Central Region IICA member countries;

That Mexico has at the present time the infrastructure to offer its support in the above mentioned areas;

RECOMMENDS:

That IICA draft as soon as possible the project on technical and economic feasibility, taking into consideration training of technicians from the countries in the fields of animal health and cattle production, and making use of technological exchange methods, as well as infrastructure currently available in some countries of the region.

The countries give all their support to IICA in order to facilitate the negotiation and coordination processes leading to the technological exchange program.

That participating countries make local offices of the IDB aware of their interest in taking part in the above described program.

RECOMMENDATION III

15 YEAR ANIMAL HEALTH ACTION PLAN

THE III MEETING OF DIRECTORS OF ANIMAL HEALTH FROM THE NORTHERN REGION,

CONSIDERING:

That animal health is an essential component of the process of cattle production;

That it is necessary to preserve human health through the promotion of animal health;

That it has been fully demonstrated that animal diseases are one of the most important factors slowing down the development of cattle in the Americas, affecting both production and productivity;

That in order to promote regional integration it is necessary to prevent the introduction of foreign diseases;

That the management of animal health problems, however, cannot be isolated nor separated from the productive process; and

That in order to rationalize the use of resources for animal health in the countries, they must have a document with guidelines to identify and regulate the essential components of national animal health programs;

RECOMMENDS:

That the preliminary report identifying actions and priorities within a general framework of strategies adapted to the diverse regions of the hemisphere in the field of animal health be supported.

That IICA promote the drafting of a Hemispheric Livestock Development Plan, harmonizing criteria for production and animal health.

That observations submitted by Directors of Animal Health at the respective session be added to the document in the specific section dealing with objectives and strategies, and also included in the proceedings of the meeting.

REPORT OF THE
THIRD MEETING OF DIRECTORS OF ANIMAL HEALTH
OF THE ANTILLES AREA

- RESANTILLAS III -

RESANTILLAS III was held in Port of Spain, Trinidad and Tobago from November 21-23, 1984.

Participants

The following countries were represented at the Meeting: Barbados, Dominica, Grenada, Guyana, Haiti, Jamaica, St. Lucia, Suriname and Trinidad and Tobago and an observer of the United States Department of Agriculture.

IICA was in charge of the Meeting Secretariat.

Officers

Chairman:	Dr. Ernest R. Caesar (Trinidad and Tobago)
Rapporteur:	Dr. V. Stephen St. John (Barbados)

The following recommendations were adopted:

RECOMMENDATION I

SANITARY DEFENSE SYSTEMS

THE III MEETING OF DIRECTORS OF ANIMAL HEALTH OF THE ANTILLES AREA,

CONSIDERING:

The Recommendations made at the COINSA I Meeting of the Inter-American Commission on Animal Health;

RECOMMENDS:

That IICA assist Member countries to:

1. Enforce the legal framework for the institutions and implementation of sanitary

regulations to govern the movement of animals and animal products in the Caribbean Region as outlined in the draft document prepared by the CARICOM Agreement.

2. Consider the upgrading of epidemiological surveillance systems where these exist and establish systems for rapid recognition and control of exotic diseases as a matter of urgency in countries without such systems.

3. Consider animal quarantine systems as a speciality area that must be manned by well trained staff for rapid diagnosis of important exotic diseases.

4. Encourage the establishment of National Emergency Disease Preparedness Plans with the necessary components to implement emergency operations.

RECOMMENDATION II

ERADICATION OF AMBLYOMMA VARIEGATUM FROM THE REGION

THE III MEETING OF DIRECTORS OF ANIMAL HEALTH OF THE ANTILLES AREA,

CONSIDERING:

The devastating effects of the presence of the Tick, Amblyomma variegatum, and its role in the transmission of Heartwater and Dermatophilosis;

That this is recognized as the greatest threat to ruminant production in the Caribbean at the present time;

That there is evidence that during the last 3 years there has been a marked spread of Amblyomma variegatum throughout the Caribbean - a trend which can be expected to continue;

That there are new technological developments that could have great impact on the control and eradication of this parasite;

RECOMMENDS:

That the Directors of Veterinary Services of their respective countries recommend that their Ministers:

i) Support the most cost-effective strategy for eradication of this dangerous tick vector from the Caribbean Region; and

ii) Give their full and united support to the development of a Regional Eradication Project.

RECOMMENDATION III

BLUETONGUE

THE III MEETING OF DIRECTORS OF ANIMAL HEALTH OF THE ANTILLES AREA,

CONSIDERING:

That at the First Meeting of the Inter-American Commission for Animal Health, COINSA I, Recommendation IV on Bluetongue was approved and in view of the successful work already done and published:

RECOMMENDS:

That further efforts be made by IICA to implement RECOMMENDATION IV.

That IICA seek additional funds to support virus isolation studies and identification of the vectors.

That supplies of antigen be made available to the Veterinary Diagnostic Laboratory, the Pine, Barbados, in order to support serological diagnostic capability for the region.

RECOMMENDATION IV

INFORMATION SYSTEMS

THE III MEETING OF DIRECTORS OF ANIMAL HEALTH OF THE ANTILLES AREA,

CONSIDERING:

The need for the development of adequate information systems on a national, regional and hemispheric level; and considering the recognition of this need by COINSA;

That IICA has already initiated the exchange of information in the Antilles Zone;

RECOMMENDED:

That this meeting gives full support to IICA in the development of this information system to be utilized on a national, regional and hemispheric basis.

That IICA continue to collect, systematize and redistribute this information on a quarterly basis, and that IICA recommends to Member countries that:

a) Together with those diseases classified under A of the OIE including Anthrax, Avian Influenza, Hog Cholera, Newcastle disease, the following diseases/conditions be classified as notifiable for the Antilles Zone necessitating immediate notification by Member states to the IICA Regional Animal Health Office:

- Heartwater	- Acute outbreak of Dermatophilosis
- Chlamydiosis	- Amblyomma infestation
- Pseudo rabies	- Trypanosoma vivax infection

or any other disease of recent or unusual occurrence.

b) There is regular monthly reporting of:

i) diseases of economic or epidemiological significance;
ii) information from private and other non-governmental agencies;
iii) information on export and import activities

c) To make submission of interesting cases and activities for inclusion in the Quarterly Report.

RECOMMENDATION V

AFRICAN SWINE FEVER - HAITI

THE III MEETING OF DIRECTORS OF ANIMAL HEALTH OF THE ANTILLES AREA,

CONSIDERING:

That the Government of Haiti undertook the enormous task of swine depopulation throughbut the entire country in order to eradicate African Swine Fever (ASF); and

This project has been successfully concluded with the support of Mexico, USA, Canada, FAO and IICA;

Because of their efforts in October, 1984, Haiti was able to declare the country free from ASF;

RECOMMENDS:

That the Animal Health Authorities of each of the Member Countries of IICA recommend to their respective governments to express their congratulations and gratitude to the Government of Haiti and, in particular, to those Haitian Veterinarians who successfully managed the project.

RECOGNITION

GRATITUDE TO THE GOVERNMENT OF TRINIDAD & TOBAGO

THE III MEETING OF DIRECTORS OF ANIMAL HEALTH OF THE ANTILLES AREA,

CONSIDERING:

That the Government of Trinidad & Tobago kindly hosted the RESANTILLAS III Meeting of the Directors of Animal Health and the First Meeting of the Regional Committee of Veterinary Laboratory Diagnostic Services of the Antilles Zone;

RECOMMENDS:

That the Member Countries express their sincere appreciation and gratitude to the Government of Trinidad & Tobago in general, and the Ministry of Agriculture's Veterinary Services in particular, for the hosting of this Meeting and their generous hospitality in a most cordial atmosphere.

REPORT OF THE III MEETING OF DIRECTORS OF ANIMAL HEALTH FROM THE ANDEAN REGION

RESANDINA III

RESANDINA III was held in the Conference Hall of the Animal Health Research Institute of Maracay, Venezuela, October 15-17, 1984.

Participants

The following countries were represented at the Meeting: Bolivia, Peru and Venezuela, as well as observers from the Pan American Health Organization, the Faculty of Animal Health Sciences of the Central University of Venezuela and the College of Veterinarian Physicians of the State of Aragua.

IICA was in charge of the Meeting Secretariat.

Officers

Chairman: Dr. Marcos Herrera (Venezuela)
Rapporteur: Dr. Ignacio Chávez (Bolivia)

The following recommendations were adopted during the meeting.

RECOMMENDATION I

EPIDEMIOLOGICAL SURVEILLANCE SYSTEM

THE III MEETING OF THE DIRECTORS OF ANIMAL HEALTH FROM THE ANDEAN REGION,

CONSIDERING:

That the report submitted on Epidemiological Surveillance Systems implemented in Central America and Panama calls for:

- The convenience of having updated information in each Member country on production and productivity pertaining to cattle, as well as reports on the prevailing conditions and consequences of diseases and other sanitary problems, both for an alert system and to determine economic losses to disease and death.

- That international technical cooperation organizations in the field of animal health with activities in the Americas both at the regional and sub-regional levels, are preparing, implementing and developing projects for the introduction of information systems and of epidemiological surveillance in the area of animal diseases.

RECOMMENDS:

That the countries of the Andean region develop and strengthen their infrastructure for information in the fields of production and productivity pertaining to cattle with the epidemiological surveillance system in the area of animal diseases.

That IICA join efforts by PAHO, FAO and JUNAC (Board of the Agreement of Cartagena), to draft a proposal for the introduction of a uniform system as indicated above, which may eventually be utilized for the establishment of a data bank for the countries.

RECOMMENDATION II

DIAGNOSTIC LABORATORIES

THE III MEETING OF THE DIRECTORS OF ANIMAL HEALTH FROM THE ANDEAN REGION,

CONSIDERING:

The recommendations made by the First Meeting of Diagnostic Laboratories from the Andean Region (LABANDINA I) contain the adequate strategies for the development of national networks of diagnostic laboratories in the countries of the Andean Region, which is a basic support instrument to the functioning of programs aimed at curbing animal diseases.

That it is necessary that countries put into practice as soon as possible these national networks as a first step towards the consolidation of animal health laboratory services.

RECOMMENDS:

To adopt as its own recommendations of the First Meeting of Directors of Diagnostic Laboratories from the Andean Region (LABANDINA I) because they provide adequate guidelines for the development of national networks of Veterinarian Diagnostic Laboratories, and for the structuring of a network at the regional level.

That diagnostic performances in the countries of the Andean Region lead to the provision of adequate resources for the correct use and maintenance of equipment and laboratory instruments, in order to ensure fast and accurate diagnosis of animal diseases.

RECOMMENDATION III

LEGISLATION ON ANIMAL HEALTH

THE III MEETING OF THE DIRECTORS OF ANIMAL HEALTH FROM THE ANDEAN REGION,

CONSIDERING:

That legislation on animal health requires a continuous process of revision and updating in order to prevent it from becoming an obstacle to actions which must be undertaken by health organizations, the same case being true for a summary of health regulations which are being enforced in each country.

That it is necessary that the summary of laws contain not only sanitary legislation, but also those laws pertaining to cattle production which are related to health regulations.

That JUNAC has published a document that can be used as a reference source for future actions.

RECOMMENDS:

That entities responsible for animal health in member countries establish a technical committee which would be charged with making a review of sanitary regulations in the country in order to introduce changes or update those legal documents.

That IICA be requested to support efforts by the countries aimed at updating the summary of laws on animal health.

That other international technical cooperation agencies with programs in the subregion cooperate with the countries in the area of exchange of information on legislation, as well as in drafting the document.

RECOMMENDATION IV

SUPPORT TO THE FOOT-AND-MOUTH DISEASE PROGRAM IN THE REPUBLIC OF PERU

THE III MEETING OF THE DIRECTORS OF ANIMAL HEALTH FROM THE ANDEAN REGION,

CONSIDERING:

The outstanding progress achieved by Peru in curbing the effects of foot-and-mouth disease within its territory, which after an absence of cases of the disease for over 13 months, is about to complete its eradication from the country.

That in order to reach that objective the country must implement a series of technical and administrative measures which should ensure complete elimination and that no new cases be reported later.

RECOMMENDS:

The PAHO, IICA and JUNAC join efforts in order to support Peru in its technical and administrative measures aimed at complete elimination of foot-and-mouth disease from its territory, and in securing external funding which would reinforce the programs to be implemented.

RECOMMENDATION V

EXOTIC DISEASES

THE III MEETING OF THE DIRECTORS OF ANIMAL HEALTH FROM THE ANDEAN REGION,

CONSIDERING:

The importance of protecting domestic livestock from diseases coming from outside the country.

That the economic and social impact of foreign diseases not previously known in the country is well known.

The situation of importers that predominates in the countries of the Andean region, that places them in a situation of higher risk for the entrance of exotic diseases and of the responsibility that the Institutions represented here have, in preventing the entrance of these diseases in their respective countries.

RECOMMENDS:

That member countries from the Andean region update their listings of foreign diseases and of those considered to be of enforceable reporting.

That member countries hold meetings to study their particular problems in this field and seek joint actions to solve those which are common to the area.

RECOMMENDATION VI

EDUCATION AND TRAINING IN VETERINARY MEDICINE

THE III MEETING OF THE DIRECTORS OF ANIMAL HEALTH FROM THE ANDEAN REGION,

CONSIDERING:

The importance of continuous training of human resources required for adequate compliance with the objectives of animal health programs.

Having been informed that in the Andean region there are veterinary medicine schools which have offered their cooperation to efforts aimed at training human resources in the field of animal health.

That it is necessary that those schools be aware of the government programs being implemented in the fields of animal health, zoonosis, food control and those related to other areas of cattle development and health.

RECOMMENDS:

That coordination at the institutional level be promoted between veterinary medicine schools and ministries of agriculture and health in the Andean region in order to ensure the proper training of human resources required to comply with the needs of programs being implemented by those ministries.

REPORT OF THE
III MEETING OF DIRECTORS OF ANIMAL HEALTH FROM THE SOUTHERN REGION

RESASUR III

RESASUR III was held at the Holiday Inn-Crown Plaza, Santiago, Chile, October 8-10, 1984.

Participants

The following countries were represented at the Meeting: Argentina, Brazil, Chile, Paraguay and Uruguay, and by special invitation, a delegate from Bolivia. Also, observers from the U.S. Department of Agriculture, the Pan American Foot-and-Mouth Disease Center and the Pan American Zoonosis Center.

IICA was in charge of the Meeting Secretariat.

Officers

Chairman	Dr. Jorge Benavides Muñoz (Chile)
Vice President:	Dr. Alberto Pecker (Argentina)
Rappofteur:	Dr. Sergio Garay (Paraguay)

The following recommendations were adopted during the meeting:

RECOMMENDATION I

POULTRY AND BY-PRODUCTS' IMPORTS FROM THE UNITED STATES

THE III MEETING OF DIRECTORS OF ANIMAL HEALTH FROM THE SOUTHERN REGION,

CONSIDERING:

The presentation made at a plenary session by Dr. Norvan Meyer on the present conditions of Avian flu in the United States.

RECOMMENDS:

That animal health services in the countries of the region agree on the adoption of joint measures through their departments responsible for this specific area, within international law, with regard to poultry and by-products' imports from the United States of America as well as from other countries.

That in view of the present conditions of Avian flu, it would be very useful if the U.S. Animal Health Services continue to make available to the countries updated and prompt information on sanitary conditions in this specific field.

RECOMMENDATION II

WILD FOWL CONTROL

THE III MEETING OF DIRECTORS OF ANIMAL HEALTH FROM THE SOUTHERN REGION,

CONSIDERING:

The need for better knowledge on the possible spread of diseases among domestic animals through wild fowl and other members of these species.

RECOMMENDS:

That animal health services promote studies aimed at achieving a better knowledge of fowl migrating patterns which would in turn help in determining risks of spread of diseases which could be detrimental to poultry.

That it would be of great interest to perform serological studies of wild fowl found in areas of poultry production, and specifically with regard to Avian Flu, Newcastle and Psittacosis.

RECOMMENDATION III

QUARANTINE CONTROLS OVER WILD ANIMALS AND FOWL FOR EXPORTATION

THE III MEETING OF DIRECTORS OF ANIMAL HEALTH FROM THE SOUTHERN REGION,

CONSIDERING:

The risks of spread of diseases among domestic animals due to international trade of wild animals and fowl.

RECOMMENDS:

That IICA be requested to act before the higher officials of national veterinary services so that nations exporting wild animals and fowl establish quarantine controls with observations of at least 30 days allowing for the implementation of serological studies for the diagnosis of diseases and their agents.

RECOMMENDATION IV

PARTICIPATION BY VETERINARIANS IN ANIMAL WILDLIFE CONTROL SERVICES

THE III MEETING OF DIRECTORS OF ANIMAL HEALTH FROM THE SOUTHERN REGION,

CONSIDERING:

The convenience and need to harmonize sanitary programs in the field of animal wildlife.

RECOMMENDS:

That IICA be requested to act before the ministries of agriculture in order to obtain that services responsible for protection of animal wildlife be staffed with professional veterinarians and that they coordinate their activities with those of government veterinarian services in the field of species conservation.

That those veterinarian services participate in and oversee the implementation of sanitary regulations pertaining to animal wildlife.

RECOMMENDATION V

INTERNATIONAL TRANSPORT OF ANIMALS AND PRODUCTS OF ANIMAL ORIGIN

THE III MEETING OF DIRECTORS OF ANIMAL HEALTH FROM THE SOUTHERN REGION,

CONSIDERING:

Deficiencies observed in the field of international transport of animals and of products of animal origin from the time of loading until they reach their destination.

RECOMMENDS:

That government veterinarian services take all necessary measures to ensure that animals and products of animal origin being exported through different transportation media, be availed of the best possible environmental conditions for travel and that these sanitary conditions be maintained until they reach their final destination.

RECOMMENDATION VI

EPIDEMIOLOGICAL AND ECONOMIC ASPECTS OF ANIMAL HEALTH PROGRAMS

THE III MEETING OF DIRECTORS OF ANIMAL HEALTH FROM THE SOUTHERN REGION,

CONSIDERING:

That data on the damages caused by diseases in South America and the rest of the world is insufficient.

That there is increasing interest on the part of the countries in the usage of economic science techniques in this field.

That the development of epidemiology makes available a greater flow of information and data for the development of strategies and for the study of sanitary movements through model experimentation.

RECOMMENDS:

That countries favor closer relations between research centers, training institutes, govenment animal health services, livestock associations and veterinarians in private practice in order to:

a) Ensure that all agencies seeking solutions to animal health problems have the same order of priorities.

b) Secure from the higher officials all possible support for training programs for veterinarians in the field of planning.

c) Request that IICA sponsor research and data exchanges on epidemiological and economic models which would allow for the development of improved strategies to curb diseases.

RECOMMENDATION VII

STRENGTHENING OF INFORMATION SERVICES ON ANIMAL HEALTH

THE III MEETING OF DIRECTORS OF ANIMAL HEALTH FROM THE SOUTHERN REGION,

CONSIDERING:

That problems related to prompt processing of data are due to the great amount, diversity and widespread availability of information and to the slow collecting, reception and evaluation of data due to manual processing methods.

That, as a result, it would be very useful to introduce that available data in computer systems which would allow for fast and prompt response, and for better organization and management of data necessary in the decision making process and in setting policies.

RECOMMENDS:

That IICA support efforts aimed at implementing a diagnostic of animal health information now available at national animal health services in order to evaluate data processing resources for future improvement.

That the countries initiate training, updating and advanced education programs for their technical and administrative support staff in the field of information in order to achieve a higher level of performance in their professional activity.

That criteria, methods and procedures for data collection and distribution be harmonized in order to promote integration and homogenization of data processing systems among countries and to make possible future exchanges of information on animal health.

That short, medium and long-term information programs be developed with emphasis on economic and sanitary aspects.

That IICA be requested to draft a guideline for diagnosis on animal health information, with data provided by each country, for final drafting of a regional diagnostic.

RECOMMENDATION VIII

TRANSFER OF TECHNOLOGY APPLIED TO ANIMAL HEALTH

THE III MEETING OF DIRECTORS OF ANIMAL HEALTH FROM THE SOUTHERN REGION,

CONSIDERING:

The interest shown by RESASUR member countries in more exchange of information, data and experience in order to seek the best possible solutions to common sanitary data and experience in order to seek the best possible solutions to common sanitary problems.

Achievements in other areas as those detailed in the presentation at a plenary session on a cooperative agricultural research program for the Southern Cone.

PROCISUR:

The valuable experience contributed in their specific areas of activities by the Pan American Centers for Foot-and-Mouth Disease and Zoonosis.

The need to establish a dynamic instrument for cooperation and reciprocal support among countries aimed at speeding-up the process of technological change in the area of animal health.

That technologies developed by some countries may be totally or partially introduced in other countries, with considerable savings in money and time.

That training of human resources for animal health programs, is of utmost importance to the advancement of programs aimed at curbing disease and at the improvement of animal production.

RECOMMENDS:

That IICA be requested to study the possibility of developing jointly with the countries a project for the transfer of technology in animal health programs with participation by Southern Cone countries and specifically for those diseases or sanitary issues not included in technical training programs of other international agencies. That for these purposes, experience obtained in the project IICA-BID/Cono Sur be taken into account.

That this project lead to the establishment of a program funded with resources from international sources and/or by the participating countries. The platform for this program must give highest priority to the import and development of technologies which would be adequate to the needs of Southern Cone countries and to the transfer of these technologies between those countries.

SUPPORT BY THE LIVESTOCK CONSERVATION INSTITUTE OF ANIMAL HEALTH PROGRAMS IN THE UNITED STADES

Dr. Paul B. Doby
Illinois Department of Agriculture
Springfield, Illinois
United States

The Livestock Conservation Institute is an example of how an entire livestock industry can cooperate with state and federal regulatory officials to achieve goals of livestock disease control and eradication which benefit both the industry and consumers of livestock products.

The disease which prompted formation of the forerunner organization of LCI was bovine tuberculosis. By 1917, the future of the U.S. Livestock industry was seriously threatened by the disease as a result of extensive losses,both to slaughterers of cattle and cattle producers, not ot mention the threat to human health.

In 1916, Thomas E. Wilson, president of Wilson & Company, one of the major livestock slaughterers, organized the Livestock Sanitary Committee of the Chicago Livestock Exchange in cooperation with the other major meat packing companies of the day. The committee was founded by the member meat packing companies. Its purpose was to stimulate eradication of bovine tuberculosis. To accomplish that goal, the committee employed Howard R. Smith, who had served as chairman of the Department of Animal Husbandry at the University of Minnesota for several years and was then livestock specialist for the First National Bank of St. Paul, in which position he prepared literature on livestock production and was a frequent speaker at conventions of bankers in the area.

Mr. Smith's appointment as Livestock Commissioner of the Livestock Sanitary Committee was subject to approval by the United States Secretary of Agriculture. His assignment was to work full time on the eradication of bovine TB. He stimulated passage of state legislation where needed, promoted the use of the tuberculin test, coordinated the work of livestock commissions in states across the U.S. and helped secure state and federal appropriations for indemnity payments for herds infected with the disease. One technique he used in promoting the eradication effort, which is still used frequently by LCI today, was the sponsorship of conferences at which regulatory officials discussed progress and problems and representatives from industry groups joined in searching for solutions and methods of stimulating enthusiasm for the program.

While this campaign was in progress, railroads bringing cattle from the west to Chicago joined in helping fund the effort, prompted by their large losses of TB weakened cattle during transit.

During this period, Mr. Smith stimulated the formation of similar committees at other major terminal markets, patterned after the Chicago committee. Those groups expanded the efforts on TB eradication.

Those organizations at the major terminal markets, funded by the marketing agencies on each market, continued as branches of LCI, until the importance of the terminal markets declined. The last of those branch offices was closed in the mid-70's and LCI has operated from one national office since.

The committees, under Smith's leadership, helped to establish criteria for determining a herd free of TB. They also worked to reduce the prevalence of Avian TB in poultry and swine.

Testing of cattle for TB became routine and by 1957, just 40 years after the campaign for eradication was begun, the incidence of bovine TB was reduced by more than 99 percent. The human death rate from non-respiratory TB also fell 97 percent in that time, primarily due to the reduction of bovine TB.

That early TB campaign established precedents for LCI cooperative effort which are valid today. They include:

1. Emphasis on problems which cause major losses to the livestock industry.

2. Cooperative efforts between all segments of the industry and governmental agencies to reduce those losses.

3. Broad industry funding of its organization. Initial funding by meat packers has been expanded to include many other segments of the industry: farmers and farm organizations, veterinary organizations, marketing agencies and markets, the meat packing industry, state departments of agriculture, manufacturers of products for the livestock industry, and the transportation industry.

4. Stimulation of research, promotion of industry support for solutions and organization for implementation of solutions.

5. Use of conferences to bring regulatory officials, research scientists and representatives of farm organizations and farmers themselves together to discuss specific issues with regard to disease control and eradication programs.

The cooperative effort between the markets and the railroads on the tuberculosis eradication program resulted in formation of the National Livestock Loss Prevention Board in 1934. An outgrowth of the Chicago Committee and the committees formed at the terminal markets, this organization's objectives were to reduce losses from disease and the bruising of animals in the marketing process. At that time most animals were shipped from farms to terminal markets by rail and the slaughter houses were located adjacent to the markets.

The work of the Loss Prevention Board continued under the leadership of Mr. Smith until his retirement in 1951, when it was renamed Livestock Conservation Incorporated, later changed to Livestock Conservation Institute.

LCI continues to be the U.S. organization involved in developing basic data and producing educational material for the improvement of the handling of livestock in transit and in markets. As livestock transportation changed from rail to trucks, LCI revised its materials to conform. Through one of its major committees, the Committee on Livestock Handling, it makes available two slide-tape cassette sets on cattle and swine handling, plus pamphlets on truck transportation, bruise prevention and veal transportation.

After working closely with a National Brucellosis Committee for many years, LCI merged with that group and it became one of the LCI standing committees. The brucellosis committee continues as a major factor in organizing industry support for eradication of that disease.

Two examples of problems that have been solved through cooperative efforts illustrate LCI's effectiveness with regard to diseases that were not of regulatory concern. They were cattle grubs and jowl abscesses of swine.

In both of those cases, LCI gathered the data to substantiate the cost of these problems to the industry, primarily from its meat packer members. That data was used to justify allocation of research funds by government to discover solutions to the problems. Those research efforts were successful and LCI then helped stimulate implementation of the solutions by livestock producers. Almost universal use of the solutions has resulted in reduction of losses from those two conditions to very low levels.

An example of a successful effort with regard to a disease of regulatory interest is hog cholera. After scientific groups had determined that sufficient tools were available to attempt eradication of that disease, LCI organized the effort to obtain support from hog farmers. The hog cholera committee of LCI continued to exercise leadership in promoting industry support as the eradication campaign began and throughout the effort. When opposition surfaced to program measures or when problems arose, LCI meetings and conferences brought together authorities on the subject, supporters and opponents to debate the issues and attempt to reach consensus. As a result of LCI efforts, hog producers, practicing veterinarians, vaccine producers and other affected segments of the industry worked closely with state and federal regulatory veterinarians to achieve the final eradication of that disease from the U.S.

When pseudorabies (Aujeszky's disease) became a major cause of losses in the swine industry, swine farmers turned to LCI to form a committee to begin discussion of potential solutions. Those discussions continue, with LCI providing the forum that has resulted in pilot projects now under way to test eradication schemes, to stimulate research on the disease and development of new diagnostic tests and improved vaccines. The Pseudorabies Committee of LCI has produced basic educational material both on the disease and on plans for elimination of the disease from a herd. Those pamphlets are being used by nearly every state with active control or eradication programs as the basic educational material for distribution to swine producers and veterinarians.

LCI's Emergency Disease Committee was the first to alert the swine industry to the potential threat of African swine fever when it invaded the Caribbean. That committee organized support within the swine industry for the U.S. to assist in eradicating the disease from the Dominican Republic and Haiti. LCI has worked closely with and supported the efforts of Dr. Frank Mulhern, who deserves a great deal of credit for leading that effort in his role with IICA. The swine industry of the U.S. owes a great debt to Dr. Mulhern and IICA for the role they played in removing this threat to our swine industry.

Another example of joint efforts is the cooperative effort of the Swine Dysentery Committee of LCI and the American Association of Swine Practitioners to produce a set of educational materials on plans for elimination of that disease from swine herds. One of the pamphlets in the set is intended for swine raisers and is distributed by LCI. The other is written for practicing veterinarians and is distributed by ASSP.

Other committees of LCI are involved with TB and swine mycobacteriosis, trichinosis, cattle health, parasites, chemicals, additives and residues, and livestock identification.

The organization of LCI is funcional, designed to further its major contributions of communications, education and discussions aimed at reaching consensus on industry problems.

The 220 organizations, companies and state government agencies which are LCI members name representatives to as many of the committees as they are interested in. Those committee members receive communications as developments warrant on research results, regulatory changes, progress in eradication or control efforts and any other items of interest to that committee. Each of the 220 members pays dues based on its size. The dues finance the activities of the organization in the communications and education fields.

Each of the 12 standing committees of the organization meets during the annual meeting to discuss developments and problems, reach consensus, and write educational materials as needed to inform livestock producers or other segments of the industry. The committee, or sub-committees, sometimes meet at other times between annual meetings of the organization.

LCI also collects information on a continuous basis from its meat packer members on diseases or other conditions found at slaughter, as an aid in determining research needs, developing educational efforts or implementing programs to reduce such losses.

The affairs of LCI, a non-profit corporation, are managed by a board of directors selected by the members, and by officers and an executive committee selected by the board. The professional staff includes an executive officer who has a broad background in agricultural journalism, a director of information and a secretary.

LCI's long record of achievement in reducing livestock losses through cooperative efforts of its members has resulted in a well-deserved reputation as a reliable source of information and educational materials, as well as a leader in sponsorship of efforts to reach consensus on solution of livestock problems that result in losses to the industry.

REPORT OF THE

II MEETING OF DIRECTORS OF ANIMAL HEALTH LABORATORIES IN THE SOUTHERN AREA

- LABSUR II -

LABSUR II was held in the Auditorium of the School of Veterinary Studies of the University of Uruguay (Universidad de la República Oriental del Uruguay) in Montevideo, Uruguay from October 15 through 19, 1983.

Participants

Representatives from Argentina, Brazil, Chile, Paraguay and Uruguay and Observers from the Pan American Health Organization of the Food and Agricultural Organization of the United Nations and the International Office of Epizootic Disease participated.

IICA was in charge of The Secretariat of the Meeting.

Chairman: Dr. Eugenio Perdomo (Uruguay)
Vice Chairman: Dr. Eduardo Charles (Argentina)
Rapporteur: Dr. Jorge Baltar (Uruguay)

During the Meeting, the following recommendations were adopted:

GENERAL RECOMMENDATIONS

1. The countries shall present written reports on the situation regarding the respective veterinary diagnostic and research laboratòries at the meetings and oral statements shall be eliminated.

   To stardardize these reports, the Secretariat shall propose a minimum amount of information that should be included.

2. To stress observance of recommendations 1, 2, and 4 of the Meeting -LABSUR I-, giving June 30, 1984 as a maximum deadline. The information requested should include data on the following matters:

   a) Research on development
   b) Diagnostic methods used
   c) Capacity and conditions for the supply of biological reagents
   d) Possibilities for serving as a reference laboratory

e) On-the-job training capacity
f) Refresher courses
g) Possibility of international use of advisory services anticipated
h) Diagnostic capacity for exotic diseases, and
i) Availability of vaccine supplies.

3. To give the LABSUR meetings preference as a forum for the exchange of scientific and technical information, based on the activities of the laboratories, and propose that the following topics be proposed for the third meeting: neonatal diarrhea in cattle and pigs, Aujeszky's disease, leucosis in cattle, infectious anemia in horses, respiratory disease in cattle and biological control for disease in birds.

   The Secretariat of LABSUR will be responsible for consulting the countries in due course for the purpose of preparing the agenda.

4. To propose that the Secretariat make the necessary consultation and take the necessary steps to ensure that the meeting of LABSUR-3 is held in Argentina and to consider the possibility that it coincide with similar events, such as laboratory meetings on vesicular diseases and other animal diseases.

5. To request IICA to continue to give priority to development of the project of the New "Miguel C. Rubino" Veterinary Research Center, and to inform possible sources of international financial aid of the importance to the region of this laboratory and the desire to establish it as soon as possible.

6. To thank the Ministry of Agriculture and Fisheries of Uruguay, the School of Veterinary Studies and the Inter-American Institute for Cooperation on Agriculture for their extreme hospitality, and for organizing and holding the meeting LABSUR-II.

RECOMMENDATIONS ON BABESIOSIS AND ANAPLASMOSIS IN CATTLE

1. <u>Diagnosis</u>

   a) It is recommended that a working group be formed to prepare a document on standardized techniques for diagnosis for use in the countries of LABSUR.

      That group would be composed of: Dr. Clara Galleto (Argentina), Dr. Roberto Pauli (Argentina), Dr. Claudio Madruga (Brazil), Dr.

Joaquín Patarroyo (Brazil), Dr. Oscar Osorio (Paraguay) and Dr. María Angélica Solari (Uruguay).

To request IICA to effect the necessary coordination to facilitate the meetings of this group and prepare the respective document.

The document is expected to be completed by July 1984. It will be submitted to the Laboratory Directors for consideration at the next meeting of LABSUR.

2. Antigens

a) To recommend that each country develop the necessary production of standardized antigens for the diagnosis of babesiosis and anaplasmosis.

b) The "Miguel C. Rubino" Veterinary Research Center is asked to cooperate in the standardization of antigens to be produced and used by the countries of LABSUR by distributing sample serum to any persons so requesting.

3. Vaccines

a) It is recommended that the production of and research on vaccines to control hemoparasites in cattle.

b) The testing of these vaccines in the various areas of the countries is recommended to confirm their effectiveness.

c) The importance of the official exchange of stock among the various countries to produce vaccines or for related studies is recognized.

4. Research

a) It is recommended that epidemiological and veterinary economics studies be continued and expanded to improve knowledge of the present situation. This would involve ecological studies, studies on the distribution of babesia and anaplasma and the determination of economic losses caused to livestock and related industries.

b) The promotion of studies to improve knowledge of relations between host and parasite, vectors, transmitting mechanisms, biology and immunology of babesia and anaplasma is considered necessary.

5. Training

a) It is recommended that training courses be promoted in field and laboratory diagnostic techniques, the delivery of materials, etc. mainly for local or regional field and laboratory veterinarians.

b) IICA is asked to explore the possibility of assisting in the organization of refresher and advanced courses for professionals working in central or specialized laboratories in the field of ticks and the diseases they transmit.

6. Cooperation among Countries

The promotion of cooperative activities among the various diagnostic and research centers in the countries belonging to LABSUR is recommended.

7. Specialized Technical Information

It is suggested that IICA, in coordination with other international organizations, cooperate with the countries in establishing a system that will make possible the distribution of technical specialized information for the various diagnostic and research centers now existing in the countries belonging to LABSUR.

8. Financial support to activities on biological research and production in the field of hematozoa

Considering:

The importance of promoting and expanding studies on the problems caused by hemoparasites in cattle-raising to the countries of LABSUR in order to bring about biological improvements for animal protection;

That this is essential to the conclusion and observance of commitments made in the livestock trade through prevention and control programs and for facilitating the trading of livestock in the region and international commitments in this area.

Recommends:

a) That the sanitary authorities of the countries seek to obtain sufficient and permanent sources of financing of activities in the area of hemoparasites and hemotropical diseases.

b) To ask IICA to cooperate with the sanitary authorities, when requested, to secure sources of international and national financing and enlist the necessary financial support for programmed activities.

9. <u>Possible choice of a reference laboratory</u>

The choice of one reference laboratory or more for the countries of LABSUR in the area of ticks and the hemoparasites they transmit is considered necessary.

REPORT OF THE III MEETING OF DIRECTORS OF ANIMAL HEALTH LABORATORIES IN THE SOUTHERN AREA

LABSUR III

LABSUR III was held at the facilities of the Grain Exchange in Buenos Aires, Argentina from November 21 through 23, 1984.

Participants

Representatives from Argentina, Brazil, Chile, Paraguay and Uruguay as well as observers to the Pan American Zoonosis Center participated in the meeting.

IICA was in charge of The Secretariat of the Meeting.

Officers of the Meeting

Chairman:	Dr. Osvaldo Ibarra (Argentina)
Vice Chairman:	Dr. Jepherson Johnston Cárcamo (Chile)
Rapporteur:	Dr. Antonio Ibañez Aquino (Paraguay)

During the meeting, the following recommendations were adopted:

RECOMMENDATION I

ASSOCIATIONS OF VETERINARIANS OF DIAGNOSTIC LABORATORIES

THE III MEETING OF DIRECTORS OF ANIMAL HEALTH LABORATORIES IN THE SOUTHERN AREA,

CONSIDERING:

The importance of the establishment of Associations of Specialists in Diagnostic Laboratories as a basic support to animal health programs in the various countries of the hemisphere;

That the various meetings organized by the Animal Health Program of IICA, such as LABSUR I, COINSA I and LABSUR II, underscored the need for the organization, in the countries and at a regional level, of Associations affiliated with the World Association of Veterinarians of Diagnostic Laboratories, and for such Associations to pursue similar purposes;

That these Associations circulate information on diagnostics and contribute to the coordination of the activities of the official and/or private laboratories and to the standardization, improvement of and research on diagnostic techniques and quality control. They also define standards for the organization and outfitting of, and biosecurity measures to be instituted in, laboratories and facilitate staff training and specialization;

That they serve as organizations for consultation in the definition of criteria and standards relative to the classification and assessment of laboratories and on various aspects concerning their participation in programs for the prevention, control and eradication of animal disease;

That at that meeting, the Argentine Delegations announced the establishment of the Argentina Association of Veterinarians of Diagnostic Laboratories, under the Society of Veterinary Medicine and affiliated with the World Association of Veterinarians of Diagnostic Laboratories;

RECOMMENDS:

To request the laboratory specialists of the member countries of LABSUR to explore the possibility of forming their own National Associations of Veterinarians of Diagnostic Laboratories. Should this not be possible for some countries at this time, it is suggested that they consider joining the Argentine Association.

To request IICA to support the efforts of the countries, and under the Animal Health Program, to help promote the establishment of these Associations and their coordination. It is also asked to extend economic and technical assistance for regional meetings to consolidate and ensure regional operations and coordination.

RECOMMENDATION II

SUBREGIONAL COMMITTEE ON DIAGNOSTIC LABORATORIES IN THE SOUTHERN AREA OF IICA

THE III MEETING OF DIRECTORS OF ANIMAL HEALTH LABORATORIES IN THE SOUTHERN AREA,

CONSIDERING:

That the I Meeting of the Inter-American Commission on Animal Health (COINSA) recommended the establishment of Regional Veterinary Diagnostic Committees, based on the geographical areas into which IICA has divided the region, and that those Committees should be formed in organizations promoting the development of veterinary diagnostic laboratories at the level of the individual countries and the southern area.

RECOMMENDS:

The establishment of the Subregional Committee of Diagnostic Laboratories for the southern area of IICA, which will be formed by the directors of the laboratories in the respective countries and with the ex-officio Secretariat in charge of IICA specialists in animal health, which has headquarters in this area.

That IICA explores the possibility of organizing the regular meetings of this Committee to make them coincide with any future LABSUR meetings.

RECOMMENDATION III

NEONATAL DIARRHEAL DISEASE IN FOOD-PRODUCING SPECIES

THE III MEETING OF DIRECTORS OF ANIMAL HEALTH LABORATORIES IN THE SOUTHERN AREA,

CONSIDERING:

The presentation on this subject at LABSUR III and the conclusions reached after the exchange of views that took place during the meeting and in the respective working group;

The growing importance of animal production and the need to institute measures to fight the most prevalent diseases that reduce the supply of essential foods for the human population;

That neonatal diarrheal disease in food-producing species, particularly in pigs and cattle, requires a substantial improvement in available knowledge of the causes of and reasons for its prevalence throughout the countries of the southern region;

That it is essential that economic losses suffered as a result of the various forms of neonatal diarrhea be quantified in order to gain the support of the producers;

That more thorough knowledge of the factors (in terms of management, the environment and facilities) that encourage the incidence and spreading of these diseases is required;

That it is essential that techniques, methods, procedures and criteria for diagnosis, including the production of reagents, the build-up and maintenance of reference strains be standardized:

That the transfer of technology to veterinarians working in the private sector and the sanitary education of producers are determining factors in the prevention and control of these diseases;

HAVING SEEN:

The imperative need for diagnostic and research laboratories in the countries that make up the southern area of IICA to exchange experience and knowledge among one another;

RECOMMENDS:

1. To request IICA to form a working group to prepare a manual of reference techniques for the diagnosis of neonatal diarrheal diseases, including the compilation and dispatch of materials to laboratories. It is recommended that that manual be circulated as widely as possible.

2. That that working group referred to in the previous paragraph further identify the reference laboratories for the various types of agents of these diseases.

3. To request IICA to effect the appropriate and necessary coordination to facilitate the meetings of the working group and to prepare the respective document, which should be presented at LABSUR IV at the latest, if not before.

4. That activities in the countries to promote better information on the topic to producers and veterinarians working in the private sector be intensified.

5. That the frequent exchange of information among diagnostic and research laboratories in the countries of LABSUR be promoted.

6. That travel for professionals working in laboratories to study be promoted in an effort to encourage and support the necessary transfer and exchange of technology.

7. To ask IICA to cooperate with the sanitary authorities, when requested, to secure national sources of financing or international financing from credit agencies, to improve the infrastructure of laboratories as well as the horizontal and vertical transfer of technology.

RECOMMENDATION IV

VIRAL RESPIRATORY DISEASES IN CATTLE

THE III MEETING OF DIRECTORS OF ANIMAL HEALTH LABORATORIES IN THE SOUTHERN AREA,

CONSIDERING:

The presentations and the exchange of views on the subject at LABSUR III;

That in the participating countries, there is evidence or a suspicion that viral respiratory diseases exist in cattle and that more accurate information on the present state of these diseases, their epidemiological characteristics and the economic damage they cause is needed;

That more complete information on the multiple etiology of this respiratory syndrome is also needed;

That there is a permanent risk that exotic diseases having a similar syndrome may occur and it is therefore necessary to have all possible means to make a differential diagnosis.

RECOMMENDS:

1. That the countries of LABSUR promote studies designed to gain better knowledge of the present state of viral pneumonia, with special reference to the incidence, prevalence and economic repercussions, and an emphasis on differential diagnosis.

2. That epidemiological studies be conducted to gain more specific knowledge of those respiratory diseases known to exist and that

have a high incidence, and that each country evaluate the most suitable diagnostic techniques so that standardization may be discussed at a forthcoming meeting.

3. That professionals working in central and regional laboratories as well as veterinarians in the private sector be trained.
4. That a detailed study be conducted on the various alternatives and possibilities of preventing and controlling the spread of viral respiratory diseases in cattle.

5. To request the cooperation of IICA, which is considered essential and of incalculable value for the achievement of the foregoing.

RECOMMENDATION V

CONTROL OF BIOLOGICAL PRODUCTS FOR USE IN FOWL

THE III MEETING OF DIRECTORS OF ANIMAL HEALTH LABORATORIES IN THE SOUTHERN AREA,

CONSIDERING:

The importance of the development of the poultry industry to the countries of LABSUR, and the huge volume of biological products used for the sanitary protection of poultry as well as the yearly increase taking place in this heading;

The decisive role that official laboratories for diagnosis and the control of biological products are called in to play in order to safeguard the quality, potency, effectiveness and harmlessness of vaccines used in the poultry industry.

The recognized need for the standardization of techniques, procedures and criteria for the control of vaccines used in poultry in the countries of the southern area in light of the active and growing exchange of biological products and products of the poultry industry, which is creating increasing sanitary interdependence.

RECOMMENDS:

1. To ask IICA to form a committee of experts from the southern area to conduct, as soon as possible, a study of systems for the control

of biological products used in the poultry industry and to make appropriate recommendations and define the best recommended technical standards, methods and procedures, in accordance with available information.

2. To ask IICA to effect the necessary appropriate coordination to facilitate the meetings of the Committee of Experts and to prepare the respective document.

3. That the countries of LABSUR institute the necessary measures to improve, as soon as possible, the infrastructure for the control of biological products for use in poultry, and to extend the necessary facilities for the continuing and extensive training of staff responsible for control tasks.

4. That also the necessary economic resources be facilitated so that pathogenic-free embryos and other materials essential to control tests to ensure the internationally required level are available in sufficient amounts and on a regular basis.

5. That an ongoing and reciprocal exchange among technicians from official control organizations be promoted so that criteria, methods and procedures may be unified and standardized.

VOTE OF THANKS

THE III MEETING OF DIRECTORS OF ANIMAL HEALTH LABORATORIES IN THE SOUTHERN AREA,

CONSIDERING:

The important topics discussed at LABSUR III and the beneficial results of the broad exchange of views that took place at this Third Meeting of Directors of Animal Health Laboratories in the southern area of IICA;

That this was made possible by Argentina's offer to serve as host to LABSUR III in response to its deep understanding of the need for international scientific cooperation and exchange;

RECOMMENDS:

To thank the Secretariat of Agriculture and Livestock of Argentina, the Grain Exchange of Buenos

Aires and the Inter-American Institute for Cooperation on Agriculture for their extreme hospitality and for organizing and holding the Third Meeting of Directors of Animal Health Laboratories in the southern area.

ACKNOWLEDGMENT

THE III MEETING OF DIRECTORS OF ANIMAL HEALTH DIRECTORS IN THE SOUTHERN AREA,

CONSIDERING:

That Dr. Roberto Goic, former staff member of IICA based in Brasilia, Brazil, completed his assignment as animal health specialist of IICA;

That Dr. Roberto Goic served as ex-officio secretary of the meetings LABSUR I and LABSUR II and contributed actively to their success,

RECOMMENDS:

To extend a vote of thanks to Dr. Roberto Goic for his services as ex-officio secretary of the First and Second Meetings of Directors of Animal health Laboratories in the southern area of IICA held in 1982 and 1983.

REPORT OF THE
I MEETING OF DIRECTORS OF ANIMAL HEALTH LABORATORIES
IN THE ANDEAN AREA

- LABANDINA I -

LABANDINA I was held in Quito, Ecuador from September 13 through 14, 1984.

Participants

Representatives from Bolivia, Ecuador, Peru, and Venezuela as well as Observers to the Food and Agricultural Organization of the United Nations, the Board of the Cartagena Agreement and the Pan American Health Organization participated in the meeting.

IICA was in charge of The Secretariat of the Meeting.

Officers of the Meeting

Chairman: Dr. Luis Aníbal Narvaez (Ecuador)
Rapporteur: Dr. Marcos Arbulú (Peru)

During the Meeting, the following recommendations were adopted:

RECOMMENDATION I

NATIONAL NETWORK OF DIAGNOSTIC LABORATORIES

THE I MEETING OF DIRECTORS OF DIAGNOSTIC LABORATORIES FOR THE ANDEAN AREA,

CONSIDERING:

The importance of the diagnostic laboratories to the success of animal health programs in the Andean countries;

The need for the diagnostic laboratories to be integrated into the plans of action of the Ministries of Agriculture;

RECOMMENDS:

That the diagnostic laboratories should operate as an integral part of the Animal Health Programs, under the Ministries of Agriculture, as part of a national network focused on sanitary and economic aspects of disease and of epidemiological ecosystems and tailored to the livestock development needs of the countries.

RECOMMENDATION II

FEASIBILITY STUDIES

THE I MEETING OF DIRECTORS OF DIAGNOSTIC LABORATORIES IN THE ANDEAN AREA,

CONSIDERING:

The need to conduct, with respect to the countries in the Andean area, a technical, economic and operational feasibility study for the purpose of designing an integrated national network of diagnostic veterinary laboratories;

RECOMMENDS:

That IICA negotiate non-reimbursable funding for such studies, which will be conducted in cooperation with animal health programs in the member countries of the Cartagena Agreement.

That along with the studies, an inventory of existing laboratory equipment in each laboratory in the countries be prepared. That inventory should specify the mark, model, year, condition and any other information relative to the functional condition of such equipment.

That the situation as regards existing human resources in each laboratory be analyzed with a view to proposing immediate measures for training.

That while the feasibility study to be conducted by IICA is being completed, in accordance with decision 92, the reports of the national veterinary diagnostic laboratories be channeled to JUNAC through the Animal Health Bureau in each country to enable JUNAC to report to the Member countries immediately and continuously on sanitary conditions in the subregion.

RECOMMENDATION III

EVALUATION OF LOSSES FROM DISEASES

THE I MEETING OF DIRECTORS OF DIAGNOSTIC LABORATORIES IN THE ANDEAN AREA,

CONSIDERING:

That in order to determine the benefits of animal health programs to fight animal disease, it is necessary to have available certain indicators for assessing economic losses suffered in animal production as a result of disease;

RECOMMENDS:

That IICA undertake studies to identify appropriate indicators to evaluate losses caused by the most prevalent diseases in animal husbandry in the Andean subregion.

RECOMMENDATION IV

TRAINING IN DIAGNOSTIC LABORATORY WORK

THE I MEETING OF DIRECTORS OF DIAGNOSTIC LABORATORIES IN THE ANDEAN AREA,

CONSIDERING:

That Resolution No. 8 adopted at the Fifth Meeting of Ministers of Agriculture of the Cartagena Agreement ratified a program to train staff in veterinary diagnostic laboratories;

The pressing need to provide all levels of training for staff in veterinary diagnostic laboratories;

RECOMMENDS:

That with the support of the international organizations involved in animal health programs in the Andean countries, the Board of the Cartagena Agreement (JUNAC) design the training program in the organization and operation of networks of national and regional veterinary diagnosis, in coordination with the member countries of the Cartagena Agreement. That program will be supported by courses to be held in the medical veterinary research laboratories of the Colombian Agricultural Institute (Instituto Colombiano Agropecuario) in Bogotá, Colombia and the Institute of Veterinary Research of the National Agricultural Research Fund of Venezuela (Fondo Nacional de Investigaciones Agropecuarias de Venezuela) in Maracay, Venezuela.

The courses should target professionals whose knowledge and experience will enable them to make the best use of the most modern techniques and apply them nationwide.

RECOMMENDATION V

SUBREGIONAL COMMITTEE ON DIAGNOSTIC LABORATORIES IN THE ANDEAN AREA

THE I MEETING OF DIRECTORS OF DIAGNOSTIC LABORATORIES IN THE ANDEAN AREA,

CONSIDERING:

That the I Meeting of the Inter-American Commission on Animal Health (COINSA) recommended the establishment of Regional Veterinary Diagnostic Committees based on the geographical areas into which IICA has divided the region, those committees should be established in organizations to promote the development of veterinary diagnostic laboratories at the level of the individual country and the Andean region;

RECOMMENDS:

The establishment of a Subregional Committee of Diagnostic Laboratories of the Andean region, to be made up of the technical managers of veterinary diagnostic services in each of the countries, with the ex-officio secretariat in charge of specialists in animal health of IICA in the respective subregion.

REPORT OF THE

FIRST MEETING OF LABORATORY VETERINARIANS OF THE ANTILLAS AREA

- LABANTILLAS I -

LABANTILLAS I was held in Port of Spain, Trinidad & Tobago on November 22, 1984.

Participants

This Meeting was convened by Dr. Vincent Lopez of Jamaica and attended by Drs. Max Millien (Haiti), Bonus Nutor (Grenada) and Stephen St. John (Barbados).

The following reports were presented:

Barbados: The relatively small VDL has had a very significant increase in workload since rapid reporting of hand-written reports has been instigated. The culture of mycoplasma and leptospira are the major areas of specialization. A project is due to start in early 1985 to determine the prevalence of mycoplasmosis in pigs and poultry with special reference to its effect on productivity. On-going projects include a leptospirosis project (with Medical Record Council, UK) and porcine mastitis/metritis project.

Grenada: A Veterinary Laboratory is planned and a technician is presently being trained in medical technology in Barbados.

Guyana: The Veterinary Diagnostic Laboratory began operations in January, 1981. Sections now functional are Microbiology, Serology, Clinical Pathology, Pathology and Parasitology. Staff consists of 3 Veterinarians, a Microbiologist, 7 Technicians and 7 Supporting Staff. In-service training of Technologists in on-going and overseas training of Veterinarians and Technicians is in progress.

The main problems reported are reliable electricity supply, submission of samples by the farming public because of our location. Projects are developed from field problems and the response to disease outbreaks is heartening. One satellite lab is functional.

Haiti: For the past several years emphasis has been placed on African Swine Fever eradication with only limited effort on more routine diagnostic techniques. A new Veterinary Diagnostic laboratory has been constructed and now emphasis is being placed on securing funding for staff and the supply of materials and equipment.

Jamaica: The Linton McDonnough Memorial Veterinary Laboratory has had a steadily increasing workload over the last two years. The limitations have been human and material resources. The unavailability of reagents has been a serious restraint in the expansion of services provided by the laboratory. Though training and upgrading has been seen as a necessary requisite in retaining specialist staff, material resources need to be identified in order to allow them to undertake activities in the new areas.

St. Lucia: The laboratory diagnostic facilities are limited but would be quite capable of providing basic techniques if permanent and trained technicians were provided.

Suriname: Histopathology, routine Bacteriology especially for the Meat Inspection Division and serological research are the activities mainly conducted.

Advertisements have been placed in Dutch and Belgian Veterinary Medical Journals to overcome staff shortages.

The following Recommendations were adopted:

RECOMMENDATIONS

(1990) - In each State a VDL should be established with basic services in the areas of pathology, bacteriology, sociology and parasitology. These should be manned by adequately trained staff who are so compensated that attrition would be low. The VDL head should be a veterinarian preferably with graduate training in laboratory work. The technical staff should be trained at least to the level of medical technology which is a diploma course as offered by schools in Jamaica, Guyana and Barbados.

(1995) - In addition there should be regional reference laboratories providing complete services in one or more of these disciplines and/or the more highly technical fields of virology and toxicology. In each case the laboratory must be equipped with the necessary equipment, materials and reagents.

Staff for the reference laboratories should be trained professional specialists supported by technicians trained to the HNC or degree level.

Monetary and other incentives must be offered to ensure retention of such personnel and a system should be devised through Governments and International Agencies to provide these to specialist and reference diagnostic laboratory veterinarians that would reduce the attrition of the public sector.

The building and development of laboratory animal facilities should only be considered for specific reference laboratories.

(1990) - It is highly desirable that IICA should coordinate and fund biennial meetings of the Directors of Veterinary Diagnostic Laboratories of the region and consider their recommendations in the areas of training and other needs.

(1990) - A quality control system should be implemented with 'blind coded' samples distributed to all participating labs (esp. bacteriology, parasitology, biochemistry and serology).

(1990) - The Committee should establish uniform modes for packaging of samples for inter-regional movement of reference countries. It is recognized that veterinary import regulations for movement of biological material must be complied with in each case.

(1990) - IICA should aggressively seek funding for implementation of projects recommended by the VDL Directors from time to time.

RAPID DIAGNOSTIC PROCEDURES FOR ANIMAL VIRUS DISEASES - READINESS OF VETERINARY SERVICES LABORATORIES IN DEVELOPING COUNTRIES

Dr. Luis V. Meléndez
Virginia Polytechnic Institute
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United States

Several very good original papers and reviews on rapid diagnostic procedures of animal virus diseases employing immuno-enzyme assays have been published in recent years (1, 2, 3, 4, 5, 6, 7, 8, 9, 10).

All these publications emphasize the importance of rapid diagnostic procedures to facilitate the identification of viral agents inducing disease in many animal species as well as in man.

Needless to say rapid diagnosis procedures are important in helping to save or protect the life of animals and man.

A good number of rapid viral diagnostic procedures are available today. However, their availability is not yet easily shared among all the Countries having need of their utilization. The main reason for this absence of easy availability is the lack of adequate provision of information on the utilization of these procedures among all countries in need of them.

I would like to qualify "adequate provision of information". It is obvious that this information is available in libraries of several countries, however this is not enough to allow an adequate transmission of all the necessary information for the best utilization of the immuno-enzymatic procedures available. The library information must be supported with adequate practical teaching on the utilization of these rapid diagnostic procedures.

Practical courses on the utilization of these rapid diagnostic procedures ought to be organized and made available to the responsible officers of the diagnostic activities of the Veterinary Services or other relevant Health Services of the Member countries.

It is therefore the main purpose of this very brief presentation to suggest, to all the distinguished representatives of the Veterinary Services of the Member countries attending this Second Meeting of the Inter-American Commission on Animal Health (COINSA II) that the following actions be undertaken for prompt implementation by IICA or jointly with other international organizations:

1. Preparation and distribution to the Veterinary Services of the Member countries (in their respective languages) of relevant information on rapid viral diagnostic, employing immuno-enzymatic assays, particularly those procedures specifically designed for viral diseases affecting the animal population of the Member countries.

2. Organization and conduction of short and intensive Regional Courses on Rapid Diagnostic of Animal Virus Diseases, with special emphasis given to the utilization of immuno-enzymatic procedures.

3. That the above mentioned course be given at least once or twice a year in different regions of the American Continent, and that these courses be considered as part of International Continuing Education activities of IICA.

4. That serious consideration be given to the selection of standard reagents to be employed in the execution of the immuno-enzymatic procedures. This is of paramount importance if different tests and viral isolates want to be compared on similar grounds by national or international laboratories.

5. That the IICA requests its Advisory Committee on Diagnostic and Research Laboratories in Animal Health or other similar body of experts, for advice on the selection, standardization, provision and utilization of the necessary reagents to conduct rapid viral diagnostic procedures. This is also most important if we want to best utilize a good number of precious necessary reagents obtained employing the most modern biotechnology (monoclonal antibodies, synthetic polypeptides, etc.)

It is urgent that the most proper strategy be defined in such a way that all Veterinary Services of the Member countries can have easy access to the latest practical procedures for rapid viral diagnosis.

Disease is a constant threat and health is a constant demand. We must always be ready to fight the first and satisfy the latter (11). Both these everlasting challenges can be met with adequate information sharing through efficient utilization of our learning resources.

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PROGRAM FOR THE CONTROL OF TICKS AND DERMATOBIA IN BRAZIL

Dr. Silvino Carlos Horn
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Brazil

Demands from the primary and industrial sectors for government participation in the design and coordination of a national program to exterminate animal parasites in Brazil have been constant and longstanding.

Professional, industrial and livestock entities have proposed to the state and federal governments the adoption of measures to ensure extermination and reduce the losses caused by parasitism.

On the international scene, organizations such as the United Nations and the Organization of American States have made certain recommendations and sought to encourage the countries to institute measures out of a spirit of concern about increasing food production.

Uruguay and Argentina launched programs to eliminate ticks in 1939 and 1940, Australia in 1956, and Mexico in 1973. However, it was the United States that first initiated the drive to exterminate ticks in 1907, and in 1943, ticks were eradicated in that country.

The Inter-American Institute for Cooperation on Agriculture, IICA, and the Pan American Health Organization, PAHO, OAS agencies, have cooperated with the Government through incentives for the design of a National Program.

The Inter-American Development Bank, IDB, and the International Bank for Reconstruction and Development, IBRD, mindful of the losses caused by parasites, have expressed an interest in supporting a Program financially.

OBJECTIVES OF THE PROGRAM

The overall objective of the program is to reduce losses caused by parasitism and thereby bring about a substantial increase in the production and productivity of national herds. The basic considerations have been the production of meat, milk, wool, and leather, and aspects relative to the birth and death rate.

The Program will have national coverage, starting with those states where stockbreeding is most important, technological know-how advanced, and sanitary animal defense well organized. The Program will also focus on stockbreeders and states that are more receptive to the Program.

Because the incidence of parasitosis is visible in all states and all animal species, activities must be controlled by sanitary defense organizations and implemented by the stockbreeders and their associations.

THE STATUS AS REGARDS CONTROL

Brazil's extensive geographical area, edaphoclimatological variations, the characteristics of animal husbandry, and other factors encourage or restrict the presence of ticks and Dermatobia in the country (Boophilus microplus and Dermatobia hominis).

Efforts to exterminate those parasites are undertaken by the stockbreeders themselves, in accordance with the extent of the infestation. The southern and southeastern regions are those where the negative effects of parasitism are most felt. Because of weather conditions, the concentration of animals and the raising of zebus in the northeast, western and northern central regions of the country, the negative impacts there are not as severe.

In states in the southern and southeastern regions, cattle must be bathed six to ten times a year.

In the northeastern states, the average number of baths is also eight, whereas in the western and northern central states, this number is lower and baths are given in only a few months of the year.

The states of Rio Grande do Sul and Santa Catarina own approximately 10,000 and 740 cattle-dipping troughs, respectively, and their herds consist of cattle of European origin that are more susceptible to ticks.

Estimates indicate an annual death rate of 0.1 to 5%, more than one million cattle a year in Brazil, attributable to ticks. Other losses are those related to a decline in the birth rate (5 to 15%), calculated at approximately 1,500,000 calves.

A 5 to 15% milk production figure represents the loss of approximately 1.5 billion liters a year. A decline of 2.5 to 8.5 kilos of meat per head of cattle each year, represents a loss of more than 75 million kilos of meat production.

According to leather manufacturers, 70% of Brazil's leather is considered to be of inferior quality. Here, 40% of losses are attributable to Dermatobia and ticks, representing approximately 8,610,000 in inferior hides.

In 1982, Brazil's industries spent more than $25,000,000 on parasiticides for destroying ticks on cattle and preparations for killing Dermatobia alone, with 110 specific products for the parasites, containing the most active modern principles (pyretoids, formamides, phosphorates, tiuréias and arsenics. The marketed volume in 1983 was in excess of 220 million liters of parasiticides for destroying ticks and more than 400 thousand kilos of liquid for killing Dermatobia.

THE MARKETING OF ANTIPARASITIC AGENTS

Among the high costs attributed to parasites, is also the purchase of antiparasitic products by the stockbreeder.

To give an idea, a survey on resale marketing of 31 laboratories in Brazil in 1982 revealed the astounding figure of US$97,153,308. US$51,311,917 of this was for endoparasiticides and US$45,841,391 for ectoparasiticides, in other words 36.59% of the marketing of veterinary products.

Also added to the losses of the stockbreeder is part of the consumption of mineral salts, vitamins, tonics, and stimulants that are indicated for the organic recovery of animals plagued by parasites (Table I).

TABLE I

TRADE IN DOLLARS OF VETERINARY MEDICAL PRODUCTS OF 31 LABORATORIES IN BRAZIL DURING 1982

	PRODUCTS	COST IN US$*	%
1.	ENDOPARASITICIDES	51,311,917	19.33
2.	ECTOPARASITICIDES	45,841,391	17.26
3.	MINERALS AND VITAMINS	48,584,003	18.30
	BIOLOGICAL PRODUCTS FOR:		
4.	BIRDS	7,744,576	2.92
5.	CATTLE	36,998,226	13.93
6.	HOGS	857,342	0.32
7.	HORSES	289,527	0.11
8.	OTHER SMALL ANIMALS	1,068,525	0.40
9.	OTHER BIOLOGICAL PRODUCTS	1,144,566	0.43
10.	ANTIBIOTICS AND SULPHA	39,828,231	15.00
11.	TONICS	15,533,595	5.85
12.	STIMULANTS	5,827,231	2.85
13.	SUNDRY	10,234,031	3.85
	TOTAL	265,520,549	100.0%

SOURCE: Sindicato Nacional de Defensivos Animais (SINDAN)
PREPARED: SILVINO CARLOS HORN, Veterinary Physician. SDSA/MA.
* 30% increase to obtain the amounts paid by the consumer.

Expenditures by the stockbreeder for the purchase of parasiticides were in the region of $150,000,000 in 1982.

Endoparasiticides for cattle and sheep are most widely used (53.2%), followed by coccidiostats, mainly for birds (38.7%), as this is rationed (Table II).

TABLE II

TRADE IN DOLLARS BY 31 LABORATORIES PRODUCING ENDOPARASITICIDES FOR VETERINARY MEDICAL USE IN BRAZIL DURING 1982

PURPOSE	ORAL		BY INJECTION		TOTAL	
CATTLE AND SHEEP	12,801,647	35.8%	14,517,553	93.3%	27,319,200	53.2%
COCCIDIOSTATS	19,858,540	55.6%	-	-	19,858,540	38.7%
OTHER	3,089,908	8.6%	1,050,269	6.7%	4,140,177	8.1%

ANTIHELMINTH PRODUCTS FOR ORAL USE: 69.7%
ANTIHELMINTH PRODUCTS BY INJECTION: 30.3%

The consumption of antihelminth products by region, which also corresponds to treatment, represents 35% for the southeastern region, 4% for the western central region, 22% for the southern region, 14% for the northeast, and 2% for the north.

With regard to ectoparasiticides, parasiticides for destroying ticks on cattle (43.5%) and preparations for killing Dermatobia (12.9%) account for 72% of the products (TABLE III).

TABLE III

TRADE IN DOLLARS BY 31 LABORATORIES PRODUCING ECTOPARASITICIDES AND DISINFECTANTS FOR VETERINARY MEDICAL USE IN BRAZIL DURING 1982

PARASITICIDES FOR DESTROYING TICKS ON CATTLE	19,957,756	43.5%
PARASITICIDES FOR DESTROYING TICKS AND PREPARATIONS FOR KILLING DERMATOBIA	5,933,295	12.9%
PREPARATIONS FOR KILLING DERMATOBIA	7,148,993	15.6%
SCABICIDES	1,758,254	3.8%
REPELLANTS	2,302,872	5.0%
POISONS	1,161,385	2.5%
BABESICIDES	1,343,484	2.9%
OTHER PARASITICIDES	459,437	1.0%
DISINFECTANTS	5,767,915	12.6%
TOTAL	45,841.391	100.0%

TICK

The tick exists in the 26 Federal Units of Brazil. The southern, southeast and western central regions are those where ticks are most prevalent.

The cold climate in the southern region in the winter (May, June, July and August), the excessive precipitation and soil moisture and low animal density in the northern region, the low precipitation in the remote interior and the bare rocky area in the northeast as well as in the north of Minas Gerais and the northeast of Goiás are adverse factors in terms of the reproduction and survival of ticks. The States of Sergipe and Paraiba and those in the northern region are least affected by ticks.

From among the informant municipalities, 1,890 (61.24%) show that the tick is a more prevalent parasite than the Dermatobia and screwworm.

However, information that gives cause for concern is that in 2,048 municipalities (66.04%), the presence of ticks throughout the twelve months of the year has been confirmed.

Information shows the prevalence of ticks in 2,495 municipalities (80%), whereas in 467 municipalities (16%), there are few. In 19 municipalities (2%) they are nonexistent. In 2,962 municipalities in Brazil (96%), however, ticks are prevelant in cattle.

In 19 municipalities (2%) where the presence of ticks was not confirmed, the population of cattle numbers 1,664,364. It is acknowledged that there must be other municipalities with small numbers of cattle that are not served by the veterinary medical services for economic reasons, because they are arid regions or regions with dense vegetation or because ticks do not exist.

In 1,982 municipalities (95.6%), the presence of ticks in cattle was confirmed, whereas in sheep, the number of municipalities was 1,040 (33.3%), in hogs, 383 municipalities (12.3%), in horses, 2,010 municipalities (54.4%), in goats, 923 municipalities (29.6%), in buffalos, 461 municipalities (14.8%), and in humans, 439 municipalities (14.1%).

DERMATOBIA

Dermatobia exists in 20 Federal Units in Brazil. Dermatobia hominis has not been observed in Amapá, Rondonia and Acre in the northern region, or in Ceará, Rio Grande do Norte and Sergipe in the northeast of Brazil.

Parasitosis has been confirmed in these states, but only in cattle infested with parasites coming from other states and the larva that falls to the ground is unable to complete its life cycle.

In 1,917 municipalities surveyed (62.3%), Dermatobia is highly prevalent. In 440 other municipalities (14.1%), there are few, which reflects a total of 2,374 municipalities (76.4%) where the parasite manifests itself.

Six hundred and eighty municipalities (21.9%) where more than 12,403,395 heads of cattle are raised, are free of Dermatobia.

The existence of other municipalities that do not have Dermatobia should also be recognized. These however did not participate in the survey as they did not have direct veterinary assistance as the population of cattle in these municipalities was relatively insignificant.

In 591 Brazilian municipalities (19.15%), Dermatobia is more prevalent than ticks and screwworm, whereas in 217 municipalities (7.03%), the three parasites have the same prevalence, as is the case of Dermatobia and screwworm in another 57 (1.84%).

The presence of Dermatobia is observed in animals during the twelve months of the year in 1,156 municipalities.

Two thousand three hundred and seventy-four municipalities reported Dermatobia in cattle (76.4%). Dermatobia exists in sheep in 608 municipalities (11.5%), in hogs in 406 municipalities (13.1%), in horses in 475 municipalities (15.3%), in goats in 699 municipalities (22.5%), in buffalos in 396 municipalities (12.7%) and in humans in 869 municipalities (28.0%), mainly in the southeast, western central and southern regions.

CONCLUSIONS

Parasitism by ticks and Dermatobia in Brazil undoubtedly represents extremely high losses for the livestock economy.

There is a need for the establishment of disciplines in national research, in the sanitary education of stockbreeders and the use of cattle troughs and spray pumps that are the types of equipment most frequently used to exterminate ticks. In some regions in Brazil, sprinkler baths are common on a weekly basis or every ten days. However, technology now exists whereby baths may be given more than every 21 days.

There are factors that limit the development of a program. The reasons are financial and are attributable to the high cost, the medium to long-term implementation, the nonexistence in Brazil of preventive measures against babesia and anaplasma and increased bioecological knowledge of parasites.

However, the reality of investment results are highly significant on account of the favorable cost benefits of implementation of the program.

TICK AND GRUB CONTROL PROJECT IN HONDURAS

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I. INTRODUCTION

Like other Latin American countries, Honduras' potential for livestock production is limited by, among other factors specifically, animal health, and particularly infestations of the livestock by ticks (Boophilus microplus) and grubs (Dermatobia hominis).

As has been demonstrated in other countries, both the grub and tick constitute a serious hurdle to livestock productivity. Its effects are manifested in terms of losses, either because the animals are affected and reaching a certain level of production therefore becomes impossible (stop gaining) or because animals that have reached a certain level are affected and their production is conswquently reduced (to lose).

Moreover, in the specific case of Boophilus, vector of the causal agent of bovine pirosplasmosis (Babesia sp), the death rate, particularly in young animals, can be very high.

Stockbreeding in Honduras is now at an important stage in its development where it is essential to promote it through the implementation of instruments that will improve technology in a reasonable time, and consequently, production. The importance of the role of animal health in livestock productivity is well known. However, it is necessary to note the fact that a sanitary campaign could benefit other aspects of animal production indirectly.

II. OCCURRENCE AND INCIDENCE OF TICKS AND GRUBS

1. Geographical distribution

For preparation of the project, it was necessary to gain information, in the functional framework of stockbreeding, on the geographical distribution, extent of infestation and the seasons in which the tick and grub appear.

The geographical distribution of the parasites generally follows the pattern of distribution of their hosts. Ranges of tolerance are exhibited that are determined by the biology of the organism in question and represented by environmental factors and agents that serve as a restriction even if hosts exist under those conditions.

According to the survey conducted, five species of economically significant ticks may be identified. Of these the Boophilus microplus and Amblyomma cajennense are present in all livestock areas.

The B. microplus tick is distributed throughout the national territory wherever cattle is raised. With respect to this species, there are no barriers that could in practical terms limit their existence, as might be the case of extreme drought and altitudes, although differences in population density are frequent, depending on the ecosystems.

With regard to the grub, there are practical barriers limiting their distribution because of the absence of their principal needs.

a) Altitudes between 450 and 1,200 meters above sea level
b) Presence of susceptible hosts
c) Shrublike and dense vegetation
d) Presence of its specific vectors

There are areas that are free and others with low levels of infestation in valleys and plateaus with limited shrublike and dense vegetation. Areas where infestation is at its highest are mountainous.

2. Infested animals

The B. microplus tick is highly specific in terms of using cattle as a host. Cattle B. is also more susceptible than B. indicus, and there is a variable gradient in both species. Cattle B. indicus constitutes, by virtue of that strain, an important resource for the control of that tick.

In addition to cattle, B. microplus has been carried in horses, sheep, goats, within the group of domestic animals. In the case of the grub, the most important host is also cattle, but there are no differences, as regards susceptibility, between the two bovine species as in the case of the tick.

It is present in a wide number of animals; dogs, cats, pigs, goats, lambs, birds, and very rarely, in horses.

It is occasionally present in man (in children mainly), particularly in rural populations where socio-economic and cultural standards are inadequate.

In tables 1 and 2, one can appreciate the average percentages of animals infested, according to region and broken down according to area, flat and mountainous.

3. Extent of infestation

An evaluation of the extent of infestation from ticks was made considering solely the adult state, represented by females measuring between 4.5 - 8 mm, which ensures that those specimens will be eliminated within the following 24 hours.

In table No. 3, the values of the extent of infestation from ticks (high, medium, low), corresponding to areas,flat and mountainous, for each region of the country may be appreciated.

The extent of infestation for the case of grubs was explored in a similar manner to that of the ticks. Here, the number of grub larvae that are exposed to the naked eye (from the third and fourth stage) was considered. One can observe in table No. 4 the values: high, medium, low, for flat and mountainous areas. For reasons inherent in the biological mechanism that characterizes the grub, the calculations were based on the length of time that the larva remains as a parasite (35-60 days), and therefore, the data on the annual total implies the ratio of months to the extent.

4. Seasonal nature of the infestation

Populations of parasites show seasonal numerical fluctuations, which result in periods of increase and periods of a decline in the number of individuals, because of environmental factors. An understanding of the seasonal nature of the infestation is a significant tool that enables one to program control activities and effectively manage the populations.

For the purposes of this analysis, a sounding was made, through surveys, with veterinarians and stockbreeders where months when infestation was high, medium or low were recorded and population curves obtained, as may be appreciated in figures No. 1 and 2.

III. ECONOMIC ASPECTS

a) Losses caused by Boophilus microplus

A number of studies show losses caused by ticks in cattle, among which the following might be named:

- Turner and Short (1972) confirm that a head of cattle infested by ticks loses one kilo of live weight a year, for each 1,300 ticks in the year (equivalent to 0.00077 k. a day for one (1) tick a day). This estimate is an average of losses suffered by one head of cattle in the herd that is infested, irrespective of its category (young bull, bull calf, heifer calf, heifer, cow, etc.).

- Gonzalez and López León (1981) in Mexico show that a cow afflicted with 40 ticks in a day (14,600 ticks in a year) loses 36 ml. of milk per tick per day. Upon comparing this data with the average production of animals in that study it was observed that a cow infested with 40 ticks a day (14,600 ticks a year) loses 12% of its milk production.

- Little (1966) establishes that in enzootic tick regions, the overall death rate in cattle, attributable to the effect of the ticks and to the diseases transmitted by them, is equivalent to 0.6% of the total herd.

- In Mexico (1972), the "National Campaign" against ticks concluded that the skin of a head of cattle infested with ticks experiences a deterioration equivalent to 10% of its market value.

- Because there are no existing national studies on the subject, and in view of the difficutly in obtaining information on infestation in other species, it was only possibe to calculate losses caused by ticks in cattle.

- In the basis of this background, the rates of infestation from ticks Boophilus microplus existing in the country and average production figures of cattle in Honduras, the following may be determined:

  Annual losses from ticks

- Losses of meat	21.7 million kilos of live meat or 27.1 lempiras
- Losses of milk:	27.4 million liters or 11.8 million lempiras
- Losses by way of death:	3 million kilos of live weight or 3.7 million lempiras
- Losses of skins or leather:	26,461 pieces or 0.7 million lempiras

b) <u>Losses from grubs</u>

It should be noted that there is little background information on losses from grubs. In 1975, Dr. O.H. Graham showed that in Honduras, 3,620,000 lempiras were lost each year because of death, loss of meat, milk and skins, caused by grubs in livestock in Honduras.

With regard to skins, it may be noted that according to work by Valduram and Gonzalez, Mexico 1975, it is established that animals infested with ticks and grubs experience a 23% deterioration in the commercial value of their skins. Because in the case of ticks, a 0.10 rate was used as the deterioration in the value of the skin, it is considered feasible to use, for grubs, a 0.13 deterioration in the commercial value of the skin of animals infested to some significant degree by grubs.

- Annual loss from grubs	4.2 million kilos of live weight or 5.3 million lempiras
- Loss of milk	4.7 millon liters or 2 million lempiras
- Loss of skins	5,003 skins or 130,067 lempiras

Unquantified losses

Clearly, in addition to the direct losses previously estimated, there are others caused by ticks and/or grubs, which although difficult to quantify, are still important, as in the aspects mentioned below:

- Foreign currency expenditures for the importation of chemical products for the control of the ectoparasites mentioned a high percentage of which are ineffectively applied.

- Major restrictions on the installation and development of dairy herds.

- Less availability of protein for human consumption.

- Manpower (management) for its control.

IV. PURPOSE

The purpose of the project is to achieve control of ticks (Boophilus microplus) and grubs (Larva de Dermatobia hominis), in Honduran animal husbandry, to limits that are compatible with economic survival, and to reduce the risk of the human population, especially the rural population, contracting grubs.

V. STRATEGY

To achieve the above purpose, it is considered essential to meet the following, among other conditions:

a) It is proposed that in the first two years, the overall necessary basic infrastructure for the Project be created. (Laboratory support for routine diagnosis and research on operations (immersion baths, fences, pens, etc., importation of inputs). Also suggested is a sanitary education program. In the third year, the Project should be applied basically in regions III and IV (north and Atlantic coast), extended to regions I, II and VI (south, western-central and eastern central) in the fourth year and coverage extended to the entire country in the fifth year by incorporating regions V and VII (northeast and west). In a period of six years (see Plan of Execution of the Program) the Project should be in full operation.

It is estimated that this alternative considers, on the one hand, the fact that it starts with regions where, at least on one of its frontiers, problems are unlikely (the sea), and on the other, the existence of better predial infraestructure and a greater sanitary awareness on the part of the stockbreeder.

b) <u>Alternatives for action</u>

From the standpoint of action to be taken, and on the basis of the analysis and the recommendations of the consultants in entomology and epidemiology-ecology, the following situations should be considered:

1. In flat areas (valleys and/or plateaus) with priority tick problems (Boophilus sp.) and where the infestation of animals by grub is lower than 5% of animals, action should be in the form of a strategy focused basically on ticks, through tickcide baths given every 30 days (12 baths a year), and using chemical products from the family of phosphorated agents that are at least 95% effective, in accordance with laboratory and/or field tests. In the face of this alternative and in light of the amount of cattle on the agricultural holding, the following possibilities should also be contemplated.

   - Agricultural holdings with more than 200 heads of cattle, with proper access roads to farms where immersion baths, with the characteristics described in the course of action and in Appendix I, are required.

   - Farms with less than 200 and more than 100 heads of cattle and/or proper spraying bath as well as chute for that bath.

   - Farms with less than 100 heads of cattle where a knapsack pump will be required for the spraying bath and which will be given the alternative of having a chute.

   It is important to note that the entire strategy described also may be applied to a specific farm located in areas or regions where grubs are also of concern but where ticks and not grubs are the priority problem.

It has been estimated that agricultural holdings with 200 heads of cattle absorb the cost of an immersion bath in a satisfactory manner. Appendix I.

Finally, the option of treatment against grubs 5 (five) to 15 (fifteen) days after the tickcide bath every thirty days, using products that are also from the family of phosphorated agents that are 95% effective, according to tests indicated in courses of action and Appendix I, has also been established as an option for regions, areas of farms using this alternative.

In these cases, the means of applying the product also will be optional by spraying, placement on the back, by injection, etc.

For this type of strategy against the tick, there is also the possibility of installing immersion or spraying baths and/or organized communal baths for which it is hoped that each communal bath accommodates an average of 50 small breeders having an average of 15 heads/farms. Also, a careful study will have to be made in terms of accessibility, numbers of cattle per farm, etc. For this purpose, an attempt will be made to conclude an agreement between the unit executing the Program and the municipality of the sector or the livestock or community association so the latter or two latter may assume responsibility for both the construction and operation of the bath. Research conducted in the field shows that this possiblity will be difficult to materialize and will require special effort on the part of the Executing Unit.

2. Flat areas (valleys and/or plateus) where both the problem of ticks and grubs is serious (grubs more than 5% of infested animals) will be required to bathe cattle by spraying every 30 days, using chemical products from the family of phosphorated agents that are at least 95% effective against ticks and grubs, according to tests indicated in the course of action.

With regard to this strategy, alternatives as to the means to be used, in accordance with the numbers of cattle on the farm, are also proposed.

- Farms with more than 100 heads will be required to use motor pumps for the spraying bath and also an appropriate chute.

- Farms with less than 100 heads will be required to use at least a knapsack pump in good condition, and as an option, chute or to join in or be committed to bathing their cattle in a communal or municipal bath.

As an option, the breeder may choose the first alternative as long as he undertakes to effect the treatment against grubs, from 5 to 15 days after the bath against ticks, every 30 days to use the phosphorated products that are at least 95% effective.

3. Mountainous regions with problems of accessibility where both the problem of ticks and grubs is serious, will be required to use the spraying method to bathe the cattle every 30 days and to use chemical phosphorated products that are 95% effective against both ectoparasites, in accordance with the tests indicated in the course of action.

   With regard to this strategy, alternatives are also offered as to the equipment to be used, depending on the numbers of cattle on the farm. These have the same characteristics as those described for strategy two. The stockbreeder may also choose the first strategy as long as he undertakes to fight against grubs in the manner described above.

c) <u>Project operation</u>

Because of the complex nature of the project, it has been considered essential to divide it into two phases:

i) Phase of promotion and preparation for control, which will consist basically of intense sanitary education, promotion and training of the user by encouraging him to create the bathing infrastructure where necessary and/or improve his knowledge and bathing system in effect for the control of ectoparasites and the state infrastructure of posts to control the movement of cattle; to prescribe legal provisions in support of the project; to institute the system for epidemiological supervision through the monitoring, design and establishment of the project information system and to add it to the existing one in the General Livestock Bureau; to commence the control of chemical products in the central laboratory; to train project staff, etc. It is felt that this pahse should last a maximum of 24 months.

ii) Actual control phase to follow after the infrastructure for the post for monitoring the movement of control has been instituted and at least 80% of the goal has been set for each region in terms of bathing infrastructure for stockbreeder and/or community. A feature of this phase is the control, supervision and technical assistance offered by the state for the execution of baths, the monitoring of the movement of cattle and the full operation of all courses of action provided for in the project.

d) <u>Responsability for action</u>

It must be established that the design of the bathing infrastructure as well as their functioning and operation to bathe cattle every 30 days using the products agreed upon, will be the responsability of the stockbreeder. The frequency of the baths during the course of the Project may vary in accordance with an analysis of the situations as they arise during the control phase.

The State, in turn, through its Unit executing the Project, will be responsible for the pertinent sanitary education, control, supervision and technical assistance with respect to the bathing infrastructure and its operation in addition to those activities facilitating and supporting the operation of the project and the achievement of its goals, such as the application of legal provision, the control of products to ensure the proper control of ectoparasites, etc.

Finally, through a trusteeship, BANADESA, "Banco Nacional de Desarrollo Agrícola" (National Agricultural Development Bank) will channel credit assistance for purposes of establishing the bathing infrastructure (immersion baths, motor pumps or knapsack pumps for spraying, chutes, and any other infrastructure that is considered indispensable during the first year of the project on each farm. For awarding the credit, an individual study of the conditions on the farm and of infrastructure needs will be required (fence, pen, bath or pump, etc.).

e) <u>Strategy for babesiosis transmitted by Boophilus microplus</u>

Here, and consistent with pointers given by the consultant in epidemiology-ecology, and the anticipated results of control action previously defined, it is estimated that babesiosis is now in enzootic balance, given the infestation of existing ticks. This balance will be maintained at infestation of 20 ticks per animal. Up to that time, it is felt that the situation will remain as at present, with focal manifestations that must be dealt with through treatment and premunitions. In parallel fashion, from the first year on, research should be launched to determine the prior control strategy to be executed as soon as, in accordance with epidemiological studies conducted, babesiosis manifests itself in a significant way.

VI. GOALS

To create the bathing infrastructure (immersion, spraying and chutes and other facilities) in annual stages and according to region, in the six years of the Project.

Consolidation of the organizational structure of the Project in five years, in terms of staffing and staff training.

With regard to tick and grub control, to cover 100% of the model and research farms included in the Program for the Promotion of Livestock Production, in accordance with programming.

To control Boophilus microplus in ten years, to limits not to exceed 1% of infested animals.

To achieve the total geographical coverage of the country in the sixth year of the Project and full project functioning.

VII. COURSES OF ACTION

a) Legislation

To give legal support to Project activities to control ticks (Boophilus microplus) and grubs (Dermatobia h.).

b) Importation, control and distribution of pesticides

To maintain the supply of pesticides (ixodicides and insecticides) that have been tested in sufficient quantities to meet Project needs and make possible expeditious and effective distribution.

c) Laboratory

To support field activities under the Project in areas of identification of ectoparasites, diagnosis of diseases transmitted by the ticks, tick and grub susceptibility studies, quality control and pesticide effectiveness tests and research. (Bioecological studies, frequency of baths, etc.).

d) Establishment of the bathing infrastructure (immersion and/or spraying and chutes) in accordance with the necessary strategies suggested for the antiparasitic bathing of at least 80% of livestock in the country

Establishment of infrastructure of posts for controlling the movement of cattle to reduce the possibility of ectoparasites under control spreading throughout the national territory.

e) Credit assistance

To cooperate in the establishment, as soon as possible, of the necessary bathing infrastructure (immersion and spraying and chutes, water supply, fencing, etc.) through establishment of a credit line to the stockbreeder for these purposes.

- Establishment of infrastructure at the farms themselves

- Immersion or deeping baths and related facilities;
- Spraying motor pumps;
- Spraying and knapsack pumps;
- Chutes;
- Wells, conveyance of water;
- Fences

f) <u>Supervision and monitoring of baths and related technical assistance and/or antiparasitic treatments</u>

- To see to it that the stockbreeder takes appropriate action to control ectoparasites (ticks and grubs) and applies the technical measures recommended by the Project.

g) <u>Focus and Action Control against Babesiosis</u>

- To identify and control any focuses of babesiosis that occur and protect susceptible cattle.

h) <u>Sanitary control</u>

- To avoid animals infested with ticks or grubs coming into the country and prevent these ectoparasites from spreading throughout the national territory.

i) <u>Epidemiological supervision</u>

- Establishment of a supervisory system that will allow for the full and prompt detection of the presence and incidence of ectoparasites under control and babesiosis so that effective and appropriate measures may be instituted for their control.

j) <u>Sanitary education</u>

- The Sanitary Unit of the Department of Animal Health should encourage the stockbreeders to change their habits by persuading them to accept, and take the action recommended by the Project.

k) <u>Technical Assistance at the farms or with rural groups</u>

- To extend technical assistance to small-scale producers throughout the country in other sanitary aspects and the zootechnical management of their herds.

- To involve small-scale producers in the profitable production of their livestock.

l) National and international agreements

- To achieve cooperatión among national, international organizations and/or countries to expedite the attainment of the goals and purposes of the Project.

m) System of information, biostatics and evaluation

- To see to it that the information system of the Department of Animal Health of the DGG is attuned to Project needs to make possible the periodic assessment of its activities and objectives.

CUADRO No. 1/TABLE No. 1

PORCENTAJE DE ANIMALES INFESTADOS CON GARRAPATAS
PERCENTAGE OF TICKS INFESTED ANIMALS

PROMEDIOS ANUALES/ANNUAL AVERAGES

REGION/ REGION	AREAS PLANAS/ FLAT AREAS	AREAS MONTAÑOSAS/ MOUNTAINOUS AREAS
SUR/SOUTH	68	44.1
CENTRO OCCIDENTAL/ WESTERN CENTRAL	58.3	32.9
NORTE/NORTH	71.6	30.4
LITORAL ATLANTICO/ ATLANTIC COAST	87.5	87.5
NOR-ORIENTAL/ NORTHEAST	68.3	63.7
CENTRO ORIENTAL/ EASTERN CENTRAL	60	70.8
OCCIDENTAL/ WESTERN	49.1	61.5

FUENTE: Encuestas 1982

SOURCE: Surveys 1982

CUADRO No. 2/TABLE No. 2

PORCENTAJE DE ANIMALES INFESTADOS CON TORSALOS
PERCENTAGE OF GRUBS INFESTED ANIMALS

PROMEDIOS ANUALES/ANNUAL AVERAGES

REGION/ REGION	AREAS PLANAS/ FLAT AREAS	AREAS MONTAÑOSAS/ MOUNTAINOUS AREAS
SUR/SOUTH	-	68.7
CENTRO OCCIDENTAL/ WESTERN CENTRAL	22.5	65.8
NORTE/NORTH	-	74.5
LITORAL ATLANTICO/ ATLANTIC COAST	-	75.4
NOR-ORIENTAL/ NORTHEAST	67.5	67.5
CENTRO ORIENTAL/ EASTERN CENTRAL	45	94.1
OCCIDENTAL/ WESTERN	36.6	40

FUENTE: Encuestas 1982

SOURCE: Surveys 1982

TABLE 3

TICK INFESTATION GRADES

	FLAT AREAS								MOUNTAIN AREAS							
	Grade Infestation			Months			Total	Average	Grade Infestation			Months				
REGION	A	M	B	A	M	B	Annual	Day	A	M	B	A	M	B	Total Year	Average Day
SOUTH	80	50	20	4	4	4	17838	48.8	60	30	10	4	5	3	12486	34.2
CENTRAL/ WESTERN	140	70	30	5	4	3	30527	83.6	85	40	15	4	5	3	16680	45.7
NORTH	80	50	20	3	5	4	17100	46.8	60	30	10	3	3	6	9910	27.1
ATLANTIC COAST	170	80	40	5	5	2	32917	90.1	80	40	15	5	3	4	14973	41
CENTRAL WESTERN	140	70	30	4	2	6	18955	51.9	85	40	15	3	5	4	11093	30
WESTERN	40	20	5	4	6	2	7047	19.3	30	15	8	4	4	4	5151	14.1
TOTAL	115.7	58.5	25.7	4.1	4.5	3.2	22165	60.6	67.8	33.5	12.5	4.1	4.2	3.5	12949	35.4

A= HIGH, M= MEDIUM, B= LOW

SOURCE: Survey 1982

CUADRO No. 4/TABLE No. 4

PORCENTAJE DE ANIMALES INFESTADOS CON TORSALOS
PERCENTAGE OF GRUBS INFESTED ANIMALS

PROMEDIOS ANUALES/ANNUAL AVERAGES

REGION/ REGION	AREAS PLANAS/ FLAT AREAS	AREAS MONTAÑOSAS/ MOUNTAINOUS AREAS
SUR/SOUTH	-	68.7
CENTRO OCCIDENTAL/ WESTERN CENTRAL	22.5	65.8
NORTE/NORTH	-	74.5
LITORAL ATLANTICO/ ATLANTIC COAST	-	75.4
NOR-ORIENTAL/ NORTHEAST	67.5	67.5
CENTRO ORIENTAL/ EASTERN CENTRAL	45	94.1
OCCIDENTAL/ WESTERN	36.6	40

FUENTE: Encuestas 1982

SOURCE: Surveys 1982

FIGURE 1

CURVES OF MONTHLY AVERAGES OF TICK INFESTED ANIMALS

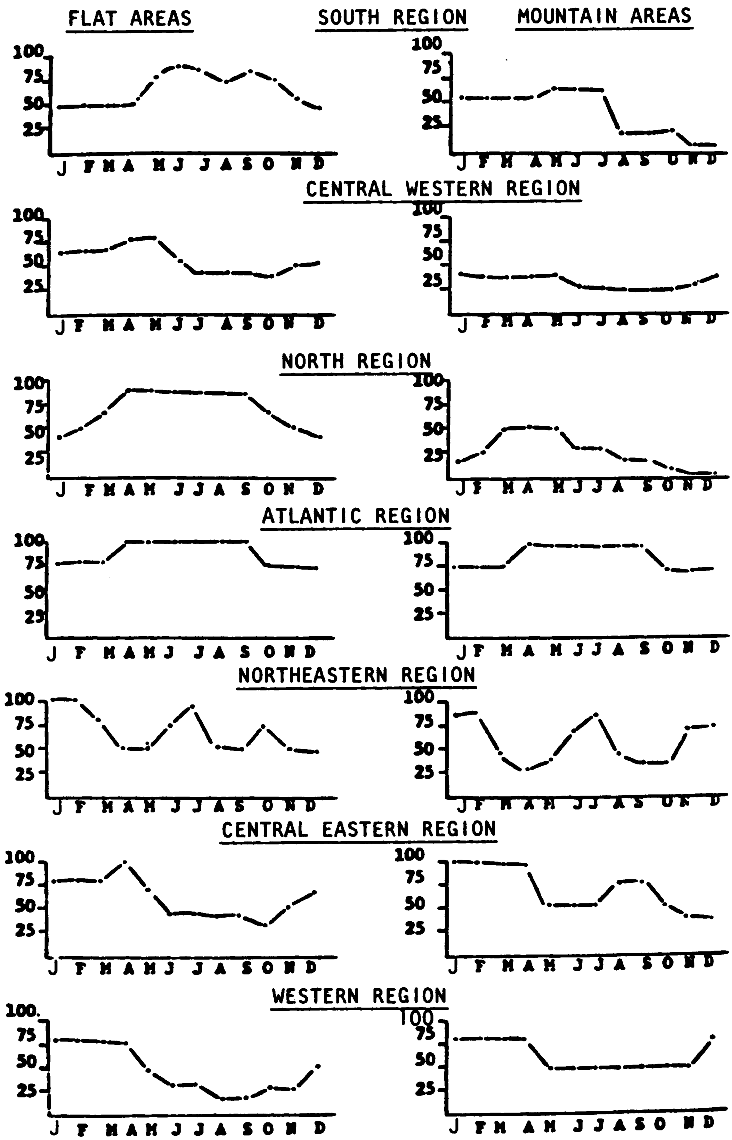
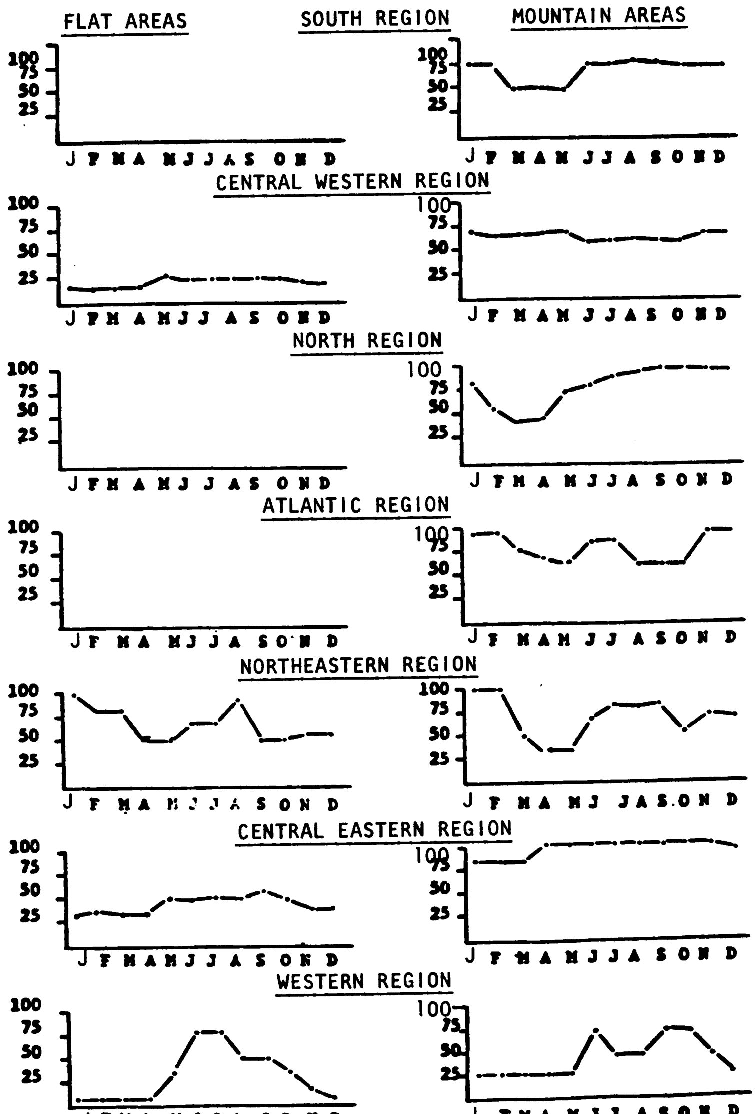


FIGURE 2

CURVES OF MONTHLY AVERAGES OF DERMATOBIA INFESTED ANIMALS



PROPOSAL FOR SCREWWORM ERADICATION PROGRAMME IN JAMAICA

Dr. Linden A. Bryan
Ministry of Agriculture
Jamaica

The Screwworm Fly Cochliomyia hominovorax is considered to be the second most important Arthropod pest affecting livestock in Jamaica. The insect is active all year round seeking any break in the mammalian skin for oviposition. A single egg mass will produce as many as 200 larvae which fee on the living tissues of hosts for 5-6 days creating further injury, misery and sometimes mortality.

History

Interest in a Screwworm Eradication Programme dates back to 1959 when Jamaica Livestock and Government officials contacted the U.S.D.A. concerning the feasibility of Screwworm Eradication in Jamaica.

In 1976 the Ministry of Agriculture estimated the annual loss due to Screwworm infestation at $3 million but no island survey was launched until 1976 when, supported by a USAID grant, prefeasibility studies were conducted. Recommendations were made that because of the severity of infestation, feasibility studies for an Eradication Programme should be initiated as soon as funds were available.

The 1982 preliminary report by the Economic Planning Division of the Ministry of Agriculture estimated that the annual losses in livestock due to the activity of this pest was valued at $12 million.

The problem was reported to be island wide with the highest percentage of infestation ocurring in the rainy season.

In 1984 - a Project Profile for the eradication of the Screwworm was prepared by the Ministry of Agriculture with the assistance of IICA.

The broad objective of this profile was to seek funding for an Eradication Programme. It was envisaged that the programme would proceed in five (5) phases.

Preparatory phase (6 months)

In this phase collection of data on Screwworm population changes in relation to seasons would be undertaken. Sentinel animals would be located in different areas and a study made of the prevalence.

Education of the public would also be carried out in order to create awareness and generate general support.

Phase 2. Attack Phase (1 1/2 months)

Here "SWASS (Screwworm adult suppression system)" would be used where pellets containing an insecticide 2% dichlorovos and an attractant swormlure would be distributed by air and ground crews thoughout the country in order to reduce the screwworm population. This preparation would be manufactured in Jamaica in a specially constructed factory.

Phase 3. (6 months)

The consolidation phase where laboratory raised sexually sterilized screwworm flies would be released by air at the rate of approximately 2000 per square mile (12 million flies per week). These would mate with native screwworm females and these females would produce only infertile eggs.

The two options in this phase were:

1. Importation of sterile flies from the mass rearing facilities of the Mexican - United States Eradication Commission in Tuxtla Gutiérrez - Mexico once per week.

2. The construction of a screwworm mass rearing facility to supply 12,000,000 flies weekly. This would be a costly venture that could only be considered in the absence of other alternatives.

Phase 4. Maintenance Phase (6 months)

In this mopping up phase no flies would be released but where cases are detected release would be resumed.

Phase 5.

Increased effort would be made to detect any infected animal additionally and an active trapping system would be in place to detect screwworms for endemic countries.

Raw materials

1. The use of swass pellets was investigated - in a short study made in early 1984 on the

suitability of the pellets treated with swormlure (the attractant) for the Programme in Jamaica. Swormlure was found to be very effective.

2. Supply of Sterile Flies - It was anticipated that these would be imported from the mass rearing facility in Tuxtla Gutiérrez, Mexico at the rate of 12 million paupae per week for 52 weeks.

Personnel

Scarce skills identified for recruitment for the project were:

a) Project Coordinator - A Veterinarian/Entomologist for (24 man months) with extensive knowledge of the details of such a programme. Local counterparts would be for 6 man months recruited - One Entomologist, One Veterinarian/Epidemiologist (18 man months).

b) Two Laboratory/Quality Control Technologists (for 40 man months) to assist - the identification of larvae, handling storage and release of the imported sterile flies.

c) Eight (8) Animal Health Assistants to monitor screw-worm cases over the island (2 years).

d) Two Pilots for (7 1/2 months) during the attack and Consolidation Phases and these would be on standby during the maintenance phase.

e) Two Pilots to transport sterile screwworm from Tuxtla Gutierrez, Mexico to Jamaica.

f) Administrative Assistant/Secretary (24 man months) for general office duties.

g) Casual workers for SWASS factory.

Estimate of cost US$1,738,320.00

Recently a revised programme was proposed which would modify and reduce the cost of the project as described above. This proposal was made based on the experience in Mexico over the latter part of the Eradication Programme.

1. This programme would involve the elimination of the manufacture and the use of SWASS.

2. Reduction of the capital cost by the use of existing building facilities near to an International Airport.

3. Reduction on the time frame for the Preliminary Phase to 4 months.

4. Eradication Phase of 6-9 months.

The provision of 8-10 million flies per week for 6 months at no cost to the project as well as the use of boxes and other miscellaneous supplies that could be made available through the courtesy of the Mexican-United States Screwworm Commission.

Conclusion

A project to eradicate the screwworm in Jamaica will not lead to any direct increase in revenue but will result in:

1. Savings on the use of insecticides for treatment of animals.

2. Reduced mortality losses in all classes of livestock.

3. Savings on the tremendous labour cost for the surveillance and treatment of screw-worm cases.

4. Increase in the savings in Foreign Exchange by import reduction on meat, dairy products and leather.

The absence of the screwworm will allow manpower to be shifted from surveillance and treatment of animal to more productive activities and enhance a general increase in production in the livestock sector.

It is undoubtedly a feasible project and merits external assistance for early implementation.

MEMOIRE BY THE MEXICAN-AMERICAN COMMISSION FOR ERADICATION OF THE SCREWWORM IN CATTLE 1977-1984

Dr. Nazario Pineda Vargas
Mexican-American Commission for Screwworm Eradication
Mexico

I. PROGRAM FOR THE ERADICATION OF THE SCREWWORM IN CATTLE IN THE UNITED STATES

For more than 100 years, it has been assumed that losses caused by the screwworm in cattle were caused by the Cochliomyia macellaris (fabricus) fly. However, researchers in the United States (USDA) discovered that the latter fed on dead tissue and that the screwworm was from a different species. This discovery led to the raising and widespread sterilization of the screwworm flies.

Another group proposed sterilizing a large number of male flies and spreading them over infested areas so that upon mating with wild females they would be sterilized (technique of the "sterile male"). This procedure was subject to laboratory research and tested in Curacao where results were positive. That country was free of the parasite after four months.

At the request of stockbreeders in the southeastern part of the United States, in 1958, a government program was launched, using flies produced at the Sebring plant in Florida. The parasite was wiped out in 1960, thereby preventing the loss of US$11,000,000. On the basis of these results, stockbreeders in the southwestern part of the country requested another similar program, thereby putting an end to the loss of US$100,000,000 a year.

A plant to produce sterile flies, capable of accommodating 150 million a week, was built near Mission, Texas. Its purpose was to spread them in infested areas in Texas, New Mexico, Arkansas, Lousiana, Oklahoma, Arizona and California, and through agreements between Mexico and the United States, low northern California, Sonora, Chihuahua, Coahila, Nuevo León and Tamaulipas.

In 1966, eradication from the southwest of the United States was successful, but migration from the south continued to cause losses. At the request of stockbreeders in both countries, therefore, a study was conducted during the sixties demonstrating the feasibility of eradicating the parasite in Mexican territory.

II. BACKGROUND IN MEXICO

In 1959, Mexico and the United States prepared a study on the screwworm in cattle in the north of Mexico and the southwest of the neighboring country. It was on the basis of that study, that our government authorized the United States to disperse sterile flies along 80 to 100 kilometers of the border line to avoid reinfestations in areas that were free in the United States. That area was gradually increased.

Because of the benefits obtained from these activities, the "Confederación Nacional Ganadera de Mexico" (National Livestock Confederation of Mexico) and organized stockbreeders in the southwestern part of the United States asked their respective governments to cover the entire border. This was done in the sixties through joint agreements between stockbreeders and the authorities in both countries. Subsequently, they requested the establishment of an organization associated with a joint program in the Mexican Republic. Thus, on August 28, 1972, the governments of both countries signed the agreement establishing the Mexican-American Commission for the Eradication of the Screwworm in Cattle to exterminate the parasite in Mexico and to form a barrier of sterile flies in the Tehuantepec Isthmus.

It was established that the American government would finance 80% of the program and that the Mexican government would finance the remaining 20%.

In 1977 the Commission commenced its operations with 1,107 workers. It now has 2,550 workers and a plant with capacity to produce 500 million sterile flies a week.

Since 1977, five regional head offices have been operating with five dispersion centers and one packing center. At present, however, all are involved in technical functions and only three perform administrative tasks as a result of this year's reorganization. Sixty-two plans responsible for the dispersion and supervision of that operation are available to the Commission.

III. FUNCTIONS

The Commission attains its objectives by performing the following functions:

a) It locates areas infested with the screwworms through sanitary veterinary inspection programs and media publicity of the program.

b) It collects samples of the parasite and sends them to the regional head offices for analysis and identification.

c) In conjunction with the use of insecticides for the treatment of injuries, it provides the respective assistance and is responsible for sanitary veterinary inspection.

d) It produces sterile flies (and SWASS up to 1982), scatters them in areas infested with the screwworm and conducts research to improve techniques for their eradication.

IV. PROGRAMS

In 1977 and a part of 1978, activities to monitor and publicize the program were carried out and sterile flies scattered throughout the country. There was no underlying strategy, specific objective and method, but flies were produced at the Chiapa de Corzo Plant, Chis., and transported from Mission, Texas.

At the beginning of 1977, the reorganization of the Commission that was completed at the end of 1978 at the same time as the redirection of its operations, entered into effect. Here, great stress was placed on the establishment of overall and specific objectives. Regional head offices and distribution centers were established, work systems improved and experimental activities stepped up. The results were four new types of flies and the application of SWASS (system to wipe out adult screwworms). A strategy was designed to forge ahead full force to combat the plague in the border states with the United States and gradually to advance to the Tehuantepec Isthmus to establish a barrier of sterile flies at Meridian 93. The handbook of policies and procedures and the manual of general organization of the Commission were prepared and put into operation. Stages for the development of the program were determined and it was decided that the campaign would be waged on the basis of three operating programs and one support program.

V. RESULTS OBTAINED FROM 1977 TO 1984

Through its operations to control and eradicate the parasite, the Commission supports the national food program, because it recovers losses, increases the country's livestock production, meets the internal demand for foods with basic products and raw material, generates exportable surpluses and productive employment.

With the intensification of the campaign, at the end of 1978 the Commission made significant headway in eradicating the screwworm from cattle, which enhanced the results obtained over the last eight years.

SANITATION PROGRAM (FIELD OPERATIONS)

From 1977 to 1984, the migratory routes of flies producing the screwworm in cattle were determined, 169,471 samples were collected for analysis and identification in 30 states: 213,838 were positive and 18,579 were negative. Infestation was reduced by four times, and in 1977, work was done on 77,300,000 hectares; in 1984 on 196,700,000 hectares. 167.9 million hectares in 30 states are now free of the parasite and 72,573,365 heads of cattle are protected.

PROGRAM FOR AGRICULTURAL AND FORESTRY PRODUCTION AND TRANSFORMATION

(production of sterile flies)

From 1977 to 1984, 146,956 million sterile flies were produced. This production figure was achieved with the use of four types developed by the Commission, which have given better results. Two more are being researched. A toxic substance known as SWASS was produced and used in the northern part of the country where the parasite persisted.

PROGRAM FOR THE MARKETING AND DISTRIBUTION OF AGRICULTURAL AND FORESTRY PRODUCTS

(dispersion of sterile flies)

From 1977 to 1984, approximately 15,507,000 sterile flies were dispersed in 39 states in the country, and in areas where the parasite persisted, SWASS in combined form was dispersed and/or the cattle was bathed with a special insecticide (Supona).

AMBLYOMMA variegatum TICK ERADICATION PROJECT IN DOMINICA

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Dominica

INTRODUCTION

The tropical bout tick Amblyomma variegatum is believed to have been introduced into the Caribbean through Guadeloupe in the early 1800's on cattle imported from Senegal. The confirmation of Heartwater in Guadeloupe and the dissemination of the efficient Amblyomma tick vector within the Caribbean region (with accompanying Dermatophilosis) poses a serious threat to the ruminant livestock industries of much of the Western Hemisphere. Dominica, the closest country to Guadeloupe is especially vulnerable. In July 1982, a USDA/IICA sponsored Heartwater disease survey in the Caribbean showed Dominica to be free both of the rickettsia Cowdria ruminatium and the Amblyomma tick vector.

However, in November 1983, members of the island's Veterinary Services discovered and tentatively identified Amblyomma variegatum on a cow belonging to a farmer -Mr. Francis Carew- at a Southern village named Bellevue Chopin. Some of the ticks preserved in isopropyl alcohol were sent to the USDA/ARS laboratory where Dr. D. Wilson and Dr. R.K. Strickland made a confirmatory diagnosis. The Government and IICA were informed. A Veterinary Research team consisting of Drs. Burridge, Uilenberg and Birnie also positively identified the tick during a visit at about the same period. Though no quarantine order was declared, the farmers of the area were officially requested not to move their animals.

Meanwhile for the next few months till May, an island-wide search was embarked upon, which verified that Amblyomma existed only in that area and that an eradication attempt was a feasible approach to the problem.

From an exchange of letters between Dr. F.C. Alexander of IICA and the Chief Veterinary Officer, a project was drawn up and financial assistance sought for the eradication attempt.

MATERIALS AND METHODS

It was decided to use two properly trained technicians outfitted with protective clothing on a full-time basis to do the actual spraying.

The acaricide used was the Shell product "Supona" - an organophosphate at the dilution rate of one tablespoon per gallon of water. It was used because of its efficacy, ready availability, proven residual effect of about two weeks, and the farmers acquaintance with its use.

Four gallon capacity knapsack sprayers were used since the technicians had to trek through very rugged farmland to get to the various animals owned by an estimated 50 farmers. Nose-leads were supplied to them to assist in constraint.

STRATEGY

Due to the limited funds made available for the programme the strategy decided upon consisted basically of individual spraying of all the ruminant livestock and dogs in the area at two week intervals for four months (July to October inclusive) - a total of eight treatments by the two technicians, and establishing a surveillance period in the area and island for two years.

Based on this general strategy, a number of activities were realized:

1. Legal declaration of a prescribed area (within a mile radius of the infected premises) - the whole of the village of Bellevue Chopin, under Quarantine under the Diseases of Animals Act by the Minister of Agriculture. As a result strict restrictions were placed on movement of livestock out of the area.

2. Promotion of an information campaign using radio, newsletters and displays at local exhibitions.

3. Implementation of a special training programme for the two technicians doing the actual spraying in June 1984.

4. Implementation of a workshop for the people in the area on: Tick identification; Disease conditions caused by ticks; Tick eradication methods; Correct procedures for preparation and use of insecticides; insecticide hazards and their control; the eradication strategy to be used.

5. Routine tick collection and identification.

6. Implementation of the actual 4 month Intensive Insecticide application:

This began on July 2nd and ended on October 31st. Basically it consisted of spraying of all the ruminant livestock and dogs of Bellevue Chopin at 2 week intervals to keep them free of ticks and break the tick cycle.

During the first fortnight of spraying, it was found that:

a) Instead of one as originally thought, the Amblyomma tick seemed to be established on the holdings of five farmers - more or less neighbouring each other.

b) The farm register livestock figures used in the project document gave a gross understatement of the actual cattle population. It was found that rather than the 91 head of cattle stated in the document, 220 had to be sprayed each fortnight and these cattle together with the 52 head of sheep and 23 goats were distributed among no less than 60 farmers.

c) Availability of water posed a serious problem in the area and arrangements were made for transportation of water in 40 gallon drums to the project area.

The insecticide application phase was carried out very satisfactorily with *Amblyomma variegatum* being found only once during the last month of spraying.

7. Establishment of Supervisory Procedures.

With the ending of intensive insecticide application on October 31st, supervisory procedures were established. Routine examination of animals in the area was carried out by the resident Agricultural Extension Officer in the area and the Animal Health Assistant responsible for that particular district.

The five farmers on whose holdings Amblyomma was positively identified were all provided with a free acaricide supply by the Ministry of Agriculture and spray machines made available so that they could continue their own spraying programme at two week intervals. The other farmers in the area were advised to do the same.

On January 11th 1985 recurrance of *Amblyomma variegatum* on one of the originally infected holdings was reported after a virtual absense of 2 1/2 months. Two cows of this farmer showed clinical signs of Dermatophilosis in its early stages. These cows were successfully treated using a 4 day therapy of Oxytetracycline in high doses.

Due to this new development, moves were made to seek immediate increased Ministry of Agriculture assistance to the eradication effort. This was successful. New equipment and protective clothing were obtained for the technicians and routine insecticide application recommended at the beginning of February and is intended to continue till the end of April - as presently available funds will permit.

For the months of March there has been no reported occurrence of *Amblyomma variegatum*.

RESULTS AND DISCUSSION

The effectiveness of the spraying programme can be readily appreciated when one considers:

a) There has been no further reported spread of *Amblyomma variegatum* to date - as a matter of fact it was not identified on livestock during the last 3 months of 1984. Also as a result of intensive spraying it was not seen during the month of March 1985.

b) Concurrently, there has been a marked reduction of the commonly prevalent cattle tick - Boophilus microplus in the area.

It is thought that the reported recurrence of the *Amblyomma variegatum* on cattle during the supervisory period arose by virtue of the farmers basic weakness to spray his animals when he can clearly observe a certain level of tick infestation rather than at routine fortnightly intervals as requested.

Therefore, it is imperative that funding be obtained to retain the two technicians on a full time basis for at least a year to continue the routine spraying programme in the area, before we move into a period of surveillance, to increase the chances for a successful eradication.

In addition to this, areas of pasture where the cows have been known to pick up Amblyomma ticks when tethered can be sprayed with a "Sevin" solution and rested from animals for a period of time.

The project is also favoured by the fact:

i) That Bellevue Chopin is a relatively isolated village geographically; and
ii) There is very limited movement of livestock within the project area due to the local practice of tethering cattle in specific locations on the privately owned parcels of land.

CONCLUSION

In conclusion, I must say that the goals achieved to date have fully justified the eradication effort. On behalf of the Ministry of Agriculture of Dominica I must thank IICA (especially Dr. Franz Alexander) for their speedy positive response to our request for assistance which has resulted in a micro-Eradication project the successful completion of which would yield great dividends - the eradicaton of dangerous tick species from Dominica thereby assisting in the protection of the future of its ruminant livestock industry and that of its neighbours.

AMBLYOMMA TICK CONTROL PROJECT IN ST. LUCIA

Dr. Keith Scotland
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Saint Lucia

BACKGROUND

The problem was first identified fifteen to twenty years ago, in the northern part of island, where Amblyomma sp. tick, and severe cutaneous infection with Dermatophilus congolense, were observed to be associated with poor production, growth and increased mortality in cattle and small ruminants being reared in the area.

An epidemiological survey of the problem led to the view that the ticks may have been brought to this part of island, from neighbouring French territories, on small ruminants that may have been imported illegally on small craft flying between the islands. Since then the tick has remained in this area approximately 11 sq. miles, until 1984, when the tick was observed on a few animals in the Savannes area outside Vieux-Fort. The two points are about 40 miles apart.

The livestock production system in the northern part of the island consists of numerous farmers, each owning from one to twelve cattle, sheep and goats and in most cases, utilizing natural pastures available on government or privately owned lands in the area.

A recent survey indicated that approximately one hundred farmers were involved with about one thousand animals scattered through out the affected area.

Though this small farming system may not appear significant in any way, it must be appreciated; (a) that to the individuals concerned, these animals represent a significant investment, (b) The activity of the tick in the infested area has been so devastating that, much concern has been expressed in the event that this tick was inadvertently transported to the Viewux-Fort area, where approximately 80% of the livestock production on the island is to be found and where climatic and other conditions represent an exact replica of that found in the affected area in the north, (c) The threat of the existence of Heartwater disease, associated with this Amblyomma tick, has been of major concern to officials concerned with livestock.

With these factors in mind, it was decided to seek technical and financial assistance to effect a control programme in the first instance, while the feasibility of a more sustained eradication programme is explored.

ASSISTANCE PROGRAMMES

In 1983, the OAS and IICA were approached with a view to assisting in a programme of tick control or eradication in the affected area.

IICA agreed to make available the services of two consultants, to determine the exact distribution of the tick problem in the first instance and to outline the requirements for an eradication programme.

The second consultant looked into the economics of such a programme and the benefits to be derived from it.

The OAS meanwhile agreed to the financing of a control programme, in order that some immediate action could be taken to alleviate the hardships experienced by farmers in the area.

In 1984 US$11,000.00 were provided for this programme and it is anticipated that US$13,000.00 will be made available in 1985.

The consultants indicated that approximately US$536,546.00 would be required to effect an eradication programme over a five year period. The potential benefit in the affected area alone is estimated to be in the range of US$722,496.00.

CONTROL PROGRAMME

The control programme began in January 1984. The objectives were: (a) Provide a well coordinated spraying routine for farmers in the affected area, (b) Identify and treat cases of Dermatophilosis, and other common problems found in the area, (c) Attempt to educate farmers in aspects of parasite control and animal husbandry that appeared to present a problem at that time.

The area was broken into four spraying zones and a fortnightly programme using 0.1% Asuntol-50 (Bayer) was adopted. Animals with lesions of Dermatophilosis, were treated with intra-muscular injections of Oxytetracycline or Penincillin/Streptomycin twice weekly.

OBSERVATIONS

The programme to date has been a very successful one. The majority of farmers involved have appreciated that with proper spraying, the tick and skin problems can be eliminated. The constant contact with veterinary personnel has greatly increased the confidence of these farmers in the division, while it has significantly decreased the incidence of other veterinary problems experienced.

The fact that his programme is not a compulsory one at this stage has provided problems with the degree of compliance. Farmers leave and re-enter the programme at will, usually dependent on the tick burden on their animals.

The current use of a wettable powder appears to be less effective during the rainy season. The topical residue relied upon for continuous action, is quickly washed away, thus leaving animals more susceptible to ticks and associated Dermatophilosis, when these two factors are at their highest levels.

The unavailability of proper animal restraint facilitaties in the area, has contributed to the difficulty encountered in the efficient handling of cattle. This factor has to some extent decreased the number of animals treated.

In recognition of the problems above, effort will be made for rectification.

The tick burden currently seen on animals in the programme has decreased significantly and on many animals there is a total lack of engorged females.

The incidence of new cases of Dermatophilosis is the lowest seen in the area for many years.

These developments have greatly increased our confidence that a well organized eradication programme, in the affected area is a feasible endeavour at this time.

SUMMARY OF THE ACTIVITIES OF THE CAMPAIGN TO CONTROL THE BOOPHILUS MICROPLUS TICK IN ARGENTINA - 1984

Dr. Alberto Signorini
Ministry of Agriculture
Santa Fe, Argentina

I. BACKGROUND

Law No. 4155, adopted by the Argentine Congress in 1902, added to the Animal Health Policing Law provisions designed to prevent the tick infestation, which had been advancing for a long time from the subtropical regions in the north into the central part of the country, from spreading any further. Argentina was thus divided into three large areas, classified as infested, intermediate, and not affected. At the same time, the Government ordered construction of a line of immersion baths as a buffer between the tick-infested area and the unaffected zone. All cattle moving into the unaffected area were obliged to pass through the tick bath, and in the intermediate area also, all cattle on farms in which ticks had been proven to be present were also obliged to pass through a series of baths.

From the very beginning, the law permitted the sale of only those pesticides that had been tested by the Livestock Bureau, where an ad hoc commission submitted them to extensive analysis to prove that they were harmless to cattle and powerfully destructive to ticks, before granting them official approval.

In 1904, there were 18 registered government baths, and 118 private facilities. These increased in number, and by 1916, there were 66 government baths and approximately 1,000 private immersion stations. The number of cattle put through the immersion baths also increased, from 153,827 in 1904, to 1,872,354 in 1916 (all figures refer to the number of cattle disinfected under the supervision of Ministry of Agriculture staff).

As areas were declared tick-free, they were gradually incorporated into the unaffected zone, and the cordon sanitaire kept moving north. By 1916, the infestation had been eradicated from some 6,255,000 hectares, as the result of pesticide baths for the cattle, and the ploughing over of land to change the vegetation.

The laws were gradually perfected, and the tick campaign took on a more technical and scientific grounding, with better supervision of the work methods.

In 1938, the Congress approved Law No. 12,566, the Mandatory Tick Control Law, which is still in effect.

2. THE CURRENT SITUATION

The country is divided into four areas (see map).

a) INFESTED AREA, which covers all of the provinces of Jujuy, Salta, Tucumán, Catamarca, Formosa, Chaco and Misiones, and part of the provinces of Santiago del Estero, Córdoba, Santa Fé and Corrientes.

   The area covers some 76,678,000 hectares infested by ticks but not included in the eradication program.

b) PRE-CONTROL AREA, which includes part of the province of Corrientes, with 117 farms over an area of 237,403 hectares, and 122,513 cattle. The technical and administrative aspects for the control plan are being organized in this zone.

c) ACTIVE CONTROL AREA, covers part of the provinces of Santiago del Estero, Córdoba, Santa Fé, Entre Ríos and Corrientes, with 12,524 farms over an area of 5,420,154 hectares, and 2,477,829 cattle. Eradication of the parasite is mandatory in this area.

d) UNAFFECTED AREA, is the area of the country that is free of the infestation. It covers an area of 26,777,500 hectares, with 91,246 farms in the provinces of Córdoba, Santa Fé, Entre Ríos and Corrientes, which was free of ticks since the beginning of the campaign.

Current status of the active control area as of December 1984:

Clean farms:	11,912	(95%)
Infested farms:	612	(5%)
Clean hectares:	4,613,448	(85%)
Infested hectares:	806,706	(15%)
Tick-free cattle:	2,078,716	(84%)
Infested cattle:	399,113	(16%)

Current status of farms closed because of tick infestation in the unaffected area as of December 1984:

Total number of farms closed: 925 over 517,955 hectares and 265,868 cattle

Clean farms:	889	(96%)
Infested farms:	36	(4%)

Clean hectares:	483,233	(93%)
Infested hectares:	34,722	(7%)
Tick-free cattle:	252,564	(95%)
Infested cattle:	13,304	(5%)

III. SUMMARY OF THE ACTIVITIES OF THE TICK CONTROL PROGRAM - 1984

In the unaffected area, 686 farms of 298,763 hectares in total were reopened, but 132 farms, with a total area of 50,291 hectares, were closed on account of proven infestation.

A total of 15,922,094 cattle were put through immersion baths, 83% of which (13,207,736 head) were disinfected in private dips, and 17% (2,714,358) in government baths.

Inspection of herds to permit transit in the quarantine area:

Total number of herds inspected and total rejected:

	Herds inspected	Herds rejected
Infested area:	6,665	636
Control area:	42,254	303
Unaffected area:	2,709	11
Total	51,628	950 (2%)

Total number of heads of cattle inspected and total rejected:

	Cattle inspected	Cattle rejected
Infested area:	568,852	60,741
Control area:	1,924,438	29,083
Unaffected area:	167,820	335
Total	2,661,110	90,159 (3%)

Inspections in cattle auctions and fairs:

	Auctions checked	Herds	Head of cattle
Infested area:	17	376	9,935
Control area:	750	16,000	555,988
Unaffected area:	8,367	233,873	4,075,729
Total	9,134	250,249	4,641,652

In 1984, 200 government cattle dips and 2,435 private baths were supervised. A total of 489 samples of ticks were sent to laboratories for classification.

Biological tests were carried out to determine the effectiveness and nontoxic nature of a new tick pesticide, for which a license for use and marketing had been requested. The "sentinel" farms where systemic tick pesticides are being tested continued to be monitored.

PROGRAMA DE CONTROL DE GARRAPATA BOVINA (B. microplus, Can.) - Cattle Tick Control Program

ZONAS DE ACCION Activity Areas	AREA CUBIERTA al 31-12-84 Area Covered		Inspección de Tropas para permiso de tránsito * Control of droves for Southward Shipment during the period *	Número de Bovinos bajo tratamiento en establecimientos infestados Number of Cattle under treatment in infested farms		Número de establecimientos liberados: a) de tratamiento garrapaticida en zonas de lucha b) de clausura impuesta por haber sufrido reinfestación Number of Farms Freed a) from tickicidal treatment b) from closure after reinfestation		
	Superficie en Km2 Territory in Km2	N° de Establecimientos N° of Farms		Bañaderos oficiales Public Dipping Vats	Bañaderos particulares Private Dipping Vats	Durante el mes Dic./84 During the month	Acumulado 1983 Enero-Diciembre Accumulated (Jan.-Dec. 1983)	Total Liberado ** al 31-XII-83 Total Freed on Dec. 31 1983 **
A. ZONA INFESTADA sin Acciones Obligatorias para el productor ganadero Infested Zone without Compulsory Activities	766.780	73.973	1) 504 2) 36	6.408	47.623			
B. ZONAS DE LUCHA Preparatoria y Activa (ley 12.566/1938) Preparatory and Active Control Zones	56.575	12.641	1) 3.295 2) 16	217.543	923.944	58	1.035	7.353
C. ZONA LIBERADA con estricta vigilancia de reinfestaciones ocasionales Infestation freed Zone, under Strict Surveillance	267.784	91.246	1) 140 2) -	8.306	110.622	10	686	90.321

* (1) Total de tropas inspeccionadas (Total of droves inspected) 2) Rechazadas (Rejected)

** Desde el comienzo del Programa (Año 1907) From inception of the Program (1907)

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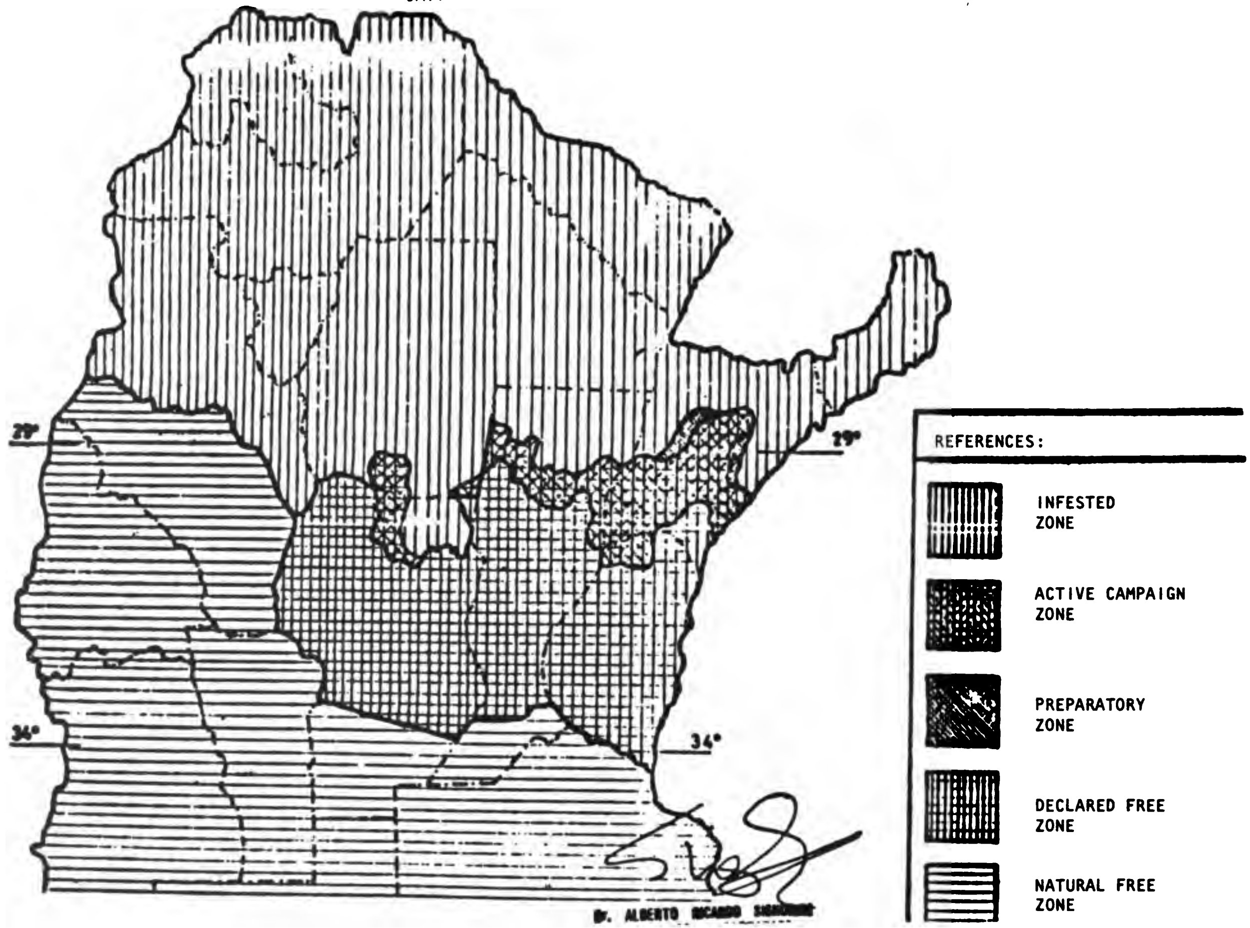
JEFE PROGRAMA GARRAPATA
- SELSA -

CATTLE TICK CONTROL PROGRAM 1984 -SENASA-



EXTERNAL PARASITES OF LIVESTOCK IN LATIN AMERICA: PROBLEMS AND SOLUTIONS

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In Latin America in general, the most important external parasites of livestock are: Berne (*Dermatobia hominis*), *Worms* (*Cochliomyia hominivorax*), *the Stable Fly* (*Stomoxys calcitrans*), the *Horn Fly* (*Haematobia irritans*); and *Ticks*, especially the *Boophilus microplus*. This order does not necessarily suggest the economic importance of the parasites. In some regions, at various times of the year, all of them have been observed to attack simultaneously. However, *D. hominis* and *B. microplus* are the most common.

This paper will discuss the four parasitic insects of livestock in greater detail, based on some of our studies conducted at the International Center for Tropical Myases (CIMIAT) at the Federal Rural University of Rio de Janeiro, Brazil.

1. Dermatobia Hominis

1.1 Distribution

This parasite is found in all of the Latin American countries, with the exception of Chile.

1.2 Damage

According to data provided by the leather industry, in Brazil the damage caused to the hides by berne, worms and ticks may amount to US$67 million per year, (Horn, 1984). The effect of the parasitism on milk and meat is unknown. Losses caused by *Dermatobia* in Latin America are estimated at US$200 million annually, but unfortunately the methods used in that estimate are not indicated. Well-planned research in this area should be carried out in order to determine the cost/benefit of any program to combat this parasite.

1.3 Bioecology

A number of studies on the life-cycle can be summarized as follows: the egg stage lasts 6 to 10 days; the complete larvae stage 25 to 40 days; the pupa stage 28 to 35 days; and the life-span of the adult is 3 to 6 days. Temperature is a very important factor in the length of this cycle, and as a result, there may be three to four generations per year.

Studies on the bioecology and behavior of the Dermatobia adults are incomplete. It is known only that cattle become more heavily infected when they graze near wooded mountains. This leads us to believe that both the Dermatobia flies and their egg carriers are found on the edges of these forests. Neither the flight capacity nor the population density of these flies is known. On rare occasions, females searching for vectors have been seen on cattle, but it was impossible to observe mating. According to observations made by Guimaraes (1966), it seems that the males come together in certain places (small mountains) where the females flock for mating. This hypothesis is based on the finding of twelve males on an avocado tree on a hill in Rio de Janeiro.

The mature larva abandon their hosts and penetrate the soil to become pupa. Preliminary observations indicate that the greatest emergence of adults occurs following rainy periods, but that prolonged rainy or dry periods negatively affect pupation. After mating, the females avidly seek out vectors. Dipterons with zoophilous diurnal habits which are smaller than the Dermatobia may be vectors of their eggs (Bates, 1943). Dipterons of the Muscidae, Anthomyiidae, Calliphoridae, Tabanidae, Culicidae and Simulidae families have been reported as vectors (Guimaraes and Papavero, 1966). A detailed study should be made of the distribution and seasonal abundance of the most important carriers in each region. The carriers are more attracted by animals with dark skin, which consequently suffer more infestation by Dermatobia larva, as is frequently observed in breeds of cattle of European origin. In addition, these animals are not adapted to the humid tropical heat and thus tend to find protection from the sun in the shade of forests, which is precisely where the largest population of Dermatobia and their vectors is found.

1.4 Control

The control of berne has been carried out basically using systemic insecticides which are applied to cattle directly to eliminate the parasitic larva; however, the indiscriminate use of insecticides for unlimited periods can result in serious problems, such as environmental pollution, reduction of beneficial insects, illegal levels of residues in milk and meat and the development of resistance to the insecticides. Acceptable control has been obtained using Trichlorphon and Cruphomate (Muller, 1962), but use of these insecticides is costly. In addition, the type of extensive cattle farming practised in most Latin American countries does not permit regular application of insecticides.

Two new parasiticides, Closantel and Ivermectine, are highly effective against the Dermatobia larva and have a residual power of several weeks. New formulas for feed containing Ivermectine could protect animals for four to six months. The modern piretroides, such as decametrine, cipermetrine, permetrine, fenvalerate, alphametrine, fluvalinate, etc. are highly effective in repelling Dermatobia egg carriers. Animals bathed with piretroides are less parasitic than control animals not so treated. Rings impregnated with these substances also protect animals from attack by hematophagous insects, and indirectly from berne larva.

Information on biological control is almost nonexistent; however, the search for parasites and predators should be intensified. It is supposed that birds and reptiles feed off Dermatobia adults, and that rodents and ants feed off recently fallen larva or their pupa.

Studies on those breeds which are resistant should be encouraged. Generally, Bos indicus is more resistant to attack by Dermatobia larva than Bos taurus.

Integrated control, including the release of sterile males, should be attempted in isolated cattle raising regions, whether by the sea, mountains, forests, soy or sugar cane plantations. Using this technique, Weintraub (1978) and Kunz Et.Al. (1984) have been eradicating Hypoderma lineatum from small areas on the Canadian/U.S. Border. Similar results could be obtained with berne, bearing in mind the following observations: 1) the density of flies per square kilometer appears to be low; 2) prolonged rainy or dry periods significantly reduce berne populations; 3) Dermatobia males gather in certain places where the females flock to mate. This curious behavior should be researched in more detail in order to identify those places, so that sterile males can be released so as to minimize or eradicate this parasite; 4) studies by Moya Borja (1966) and by Banegas and Mourier (1968) indicate that it is possible to sterilize Dermatobia adults with 10 Kr of gamma radiation, without creating side-effects such as a reduction in the life span or sexual vigor.

2. Cochliomyia hominivorax

2.1 Distribution

This insect is found from Guatemala to the north of Argentina. The United States and Mexico (central and northern zones) have already eradicated this parasite.

2.2 Damage

C. hominivorax is the causal agent of cutaneous myases in bovine cattle and other domesticated and wild animals of tropical and subtropical America. In the southern United States, this parasite was responsible for losses in bovine cattle in the amount of US$100 million per year (Baumhover *Et. Al*., 1966). In Latin America, due to the extensive type of cattle raising commonly practiced in many areas, the losses may be greater.

2.3 Bioecology

Guimaraes *Et. Al*. (1983) prepared an extensive, well-documented paper on the identification, biology and control of *C. hominivorax*. The flies deposit masses of their eggs on the edge of wounds and the larva develop in the first 24 hours. The larva destroy tissues and enter the wounds. After seven to eight days they fall to the ground to become pupa. The pupa period takes almost seven days in the summer, after which the adults emerge. The flies mate three to four days after emerging and the females begin to seek out animals with wounds to deposit their eggs. *C. hominivorax* is a very serious pest for bovines, since any wound caused by branding, dehorning or castration makes the animals susceptible to attacks.

C. hominivorax flies survive better in moderately cool and humid climates. In these regions they tend to congregate close to rivers and stables. Studies on the distribution and abundance of the adults were conducted in Brazil by technicians of the Ministry of Agriculture (Horn, 1983); however, there are very few such studies, elsewhere in Latin America.

The parasite has been treated with chlorate insecticides; and currently, systemic phosphorate insecticides (chlorfenvinfos, trichlorphon, cruphomate, dimethoate, ronnel, coral, etc.) are used. However, due to the type of extensive cattle-raising and form of animal husbandry, chemical treatment is expensive. Thanks to the ease with which the larva can be reproduced in an artificial environment, American researchers managed to eradicate this pest from the USA in 1966. An agreement is now in effect between the governments of Mexico and the United States, and eradication in Mexico has been a success. In the future, American entomologists hope to eradicate the parasite from Central America and to establish a zone of sterile insects in Panama in order to avoid reinfestations from South America (Baumhover Et. Al., 1966). Moya Borja believes that it will be possible to eradicate C. hominivorax from South America, thus completing eradication from the entire American continent. His hypothesis rests on the following:

1. Herds of bovine cattle in the region of Manaus are free of this parasite, which suggests the possibility that the Amazon forest may be an effective barrier against the spread of the pests.

2. Herds of several types of cattle in the Brazilian Northeast have also been found to be free of C. hominivorax, due to the low rainfall in the region.

3. Very severe winters possibly reduce C. hominivorax populations in the Southern States of Brazil or force migration to warmer zones. These could be eliminated with low-toxic biodegradable insecticides before the release of sterile males.

4. High mountains such as the Andes are free of the C. hominivorax parasite or have only small populations, which are susceptible to eradication using insecticides or by releasing sterile males.

3. Stomoxys Calcitrans

3.1 Distribution

This fly has a wide-spread distribution.

3.2 Damage

The stable fly, S. calcitrans, is a hemotophagous insect which feeds off animals in a vicious manner, thus increasing transmission of the pathogenic agents. Damages caused by this pest in cattle in the United States reached US$142 million due to a reduction in the production of milk and meat. These losses begin to be felt from 25 flies/animal/day (Steelman, 1976). The damage caused by this fly in Latin America is unknown, but it is believed that because of favorable climatic conditions and health conditions on the farms, the damage may be greater. In Brazil, outbreaks of S. calcitrans have been occurring due to the inappropriate use of chicken feces and waste materials, which are spread over the fields as fertilizers.

S. calcitrans is an excellent vector of D. hominis eggs, and is very important in the mechanical transmission of several species of the genus Trypanosoma.

3.3 Bioecology

The life cycle of this fly is as follows: the incubation period of the eggs is three days; the larva stage is 12 days, the pupa stage is 10 days; and the lifespan of the adults is approximately 15 days.

The stable fly breeds frequently during warm and humid periods.

3.4 Control

As the larva of this parasite develop in the humid feces of animals mixed with animal feed and decomposing organic matter, control should mainly be based on health and sanitation measures; humid food waste and feces should constantly be removed from the corrals and stables and spread over a larger area. Chicken feces should be spread over the field in thin layers. Research should be conducted immediately to study the appropriate application of waste over the field without creating an excellent larva environment for the flies.

Some promising results have been noted in the control of larva by using commercial preparations of Bacillus thuringiensis when it is orally administered to the cattle (Gingrich, 1965)

Muscidifurax and Spalangia genus parasites should be studied to determine their efficacy in the tropics, remembering that the larva of S. calcitrans have the tendency to become pupa on the larva substratum.

Chemical control of larva by direct application of organochlorate or organophosphate insecticides to the fecal matter is not recommended, because of environmental pollution and negative effects on the parasites and predators. Some growth regulators as well as certain triazines and ivermectines have helped to control this parasite, due to their specificity and low toxicity.

Spraying cattle with piretroides or using rings which have been impregnated with these substances helps repel or eliminate this fly and other dipterons associated with cattle.

4. Haematobia irritans

4.1 Distribution

This pest originating in the old world was introduced into the United States in 1884 by cattle imported from Europe; and by 1898, it had already spread throughout the entire North American continent. It is known in Central America and in some South American countries, such as Colombia, Venezuela, British Guyana, Ecuador and Peru. Valério and Guimaraes (1983) recently reported on the introduction of this fly in Northern Brazil, and today it is found throughout the entire territory of Roraima, the entire State of Amazonas and part of the State of Pará.

4.2 Damage

H. irritans is a hematophagous dipteron which prefers to attack bovine cattle. The flies form bands and attack the animals, causing serious damage to the hides and cutting down on the production of milk and meat. The U.S. Department of Agriculture estimated annual losses caused by this parasite in bovines to be US$179 million. Skin lesions produced by this fly are susceptible to attacks by *C. hominivorax*. The *H. irritans* fly already has been reported to be a vector of *D. hominis* eggs (Morales, 1958), as well as of *Bacillus Anthracis* and Trypanosoma.

There is great concern in Brazil over this new pest. In those regions where *H. irritans* is presently found, there is a predominance of nelore cattle, which is considered resistant to external parasites; yet, it has already been possible to detect as many as two thousand flies per head. The greatest concern lies in the fact that this fly continues to spread to the South of Brazil, Argentina and Uruguay where dairy cattle of

European origin, which are more susceptible to attack by this Dipteron, predominate. The possibility also exists that some tropical diseases appear as the result of the presence of *H. irritans*. For these reasons, several researchers from Sao Paulo and Rio de Janeiro, as well as representatives of business associations of Brazil, met at the Biology Institute of Sao Paulo on April 16, 1985 to propose effective steps to control this pest.

4.3 Bioecology

The biology of this parasite was studied in the United States by Bruce (1964). *H. irritans* adults attack bovines and remain on their hosts day and night. The females lay their eggs on fresh cattle feces and the larva easily develop in this environment. The emerging adults immediately seek out a host on which to feed. The incubation period of the eggs is 16 hours, the larva stage lasts 4 days, the pupa stage, 5 to 6 days and the lifespan of the adult has been estimated at 6 to 8 weeks. The same favorable climatic conditions of the stable fly are preferred by the horn fly.

4.4 Control

Commercial preparations of *Bacillus thuringiensis*, Cyromazine and Diflubenzuron maintain good control of the *H. irritans* larva on bovine feces. Ivermectine administered sub cutaneously has the same effect. Rings impregnated with piretroides protect the animal for up to three months in the tropical humid areas near Manaus. This fly appears to be very susceptible to these insecticides.

Natural biological control occurs due to the existence of parasites, predators and competitors of the immature forms of the horn fly, which also evolve in the fecal matter of the bovine. Dipteron and Coleopteran larva, as well as ants play a very important role in biological control.

5. *Boophilus microplus*

5.1 Distribution

This tick is broadly distributed in America, Asia and Australia.

5.2 Damage

Losses caused by this parasite in Australia totalled 20 million pounds sterling in 1959.

Before eradication of this tick in the United States, losses caused by this tick and by the Babesia and Anaplasma pathogenic agents totalled US$100 million per year.

Massive attacks by ticks create sores on the cattle which are used by the C. hominivorax fly to establish its myases.

The damage caused by this tick in Latin America is greater that that indicated in the United States; control of this parasite is thus of major importance.

5.3 Bioecology

B. microplus is a tick which prefers to attack bovine cattle and completes its three parasitic stages in a host soil. When the females are completely full they let go and fall to the ground where they look for places of protection in the grass or under rocks. Approximately 2,500 eggs are laid by the female after one week. Incubation period of the eggs is 30 days. If they manage to protect themselves in the soil, the females can survive fires or flooding of the pastures and continue their cycle. Several days after the eggs hatch, the larva climb the plants and wait for the cattle to arrive. The larva are extremely resistant and can survive in the pasture for one to three months. The larva feed off the cattle and after 5 or 10 days move to the nymph stage which lasts from 7 to 11 days. The adult stage lasts from 6 to 14 days.

5.4 Control

B. microplus is controlled basically by chemical products. The number of tick baths depends on the region and breed of the animals. Once again the Nelore breed proves itself to be more resistant to attack by ticks.

The most serious problem with B. microplus ticks is that they develop resistance to ixodicides in an alarming manner. They have already shown resistance to arsenic based insecticides, as well as to organochlorates, organophosphates and carbamates. Ixodicides based on amidins and pyretroids are currently in use, but we do not know for how long they will continue to be effective.

GENERAL CONCLUSIONS

This brief analysis of the status of the principal external parasites of cattle in Latin America shows that there are many problems and few solutions. Thus we may conclude the following:

1. Little information exists to identify the major external parasites of livestock in Latin America.

   A survey of all Latin American researchers who work in taxonomy is recommended in order to set up several reference centers.

2. Little precise information is available on the damage caused by the most important external parasites of cattle in Latin America.

   It is recommended that a number of institutions with the infrastructure to quantify the damage caused by external parasites be identified.

3. There is a lack of studies on the bioecology of external parasites of cattle in Latin America.

   It is recommended that laboratories be set up or strengthened in institutions located in different ecosystems to study the effects of biotic and abiotic factors on ectoparasites.

4. There is a lack of technicians and a scientific information system on the integrated control of ectoparasites.

   Several specialization centers with a tradition in research should be identified as centers to train technicians, as well as encourage, aid and coordinate research on integrated control in the different regions of Latin America.

HEARTWATER - DERMATOPHILOSIS - AMBLYOMMA SPECIES IN EASTERN CARIBBEAN

SUMMARIZED REVIEW

Dr. Franz Alexander
IICA
Guyana

1. HISTORY - *Amblyomma variegatum* - Tropical Bont Tick

1830	Guadeloupe and Antigua (through Zebu cattle from Senegal; also went to French Guyana but were not established there; Curasson, 1943).
1909	? St. Kitts.
1948	Martinique - Through the importation of cattle from Guadeloupe.
1967	St. Croix - Eradicated 1970.
1970	St. Lucia.
1974	Puerto Rico.
1977-78	St. Kitts/Nevis.
1978-79	St. Maarten/St. Martín. Also reported in Vieques, Anguilla, Marie Galante, La Desirade.
	Heartwater - (*Cowdriosis ruminantium*)
1980	Confirmed in Guadeloupe (Perreau, P., Morel, P.C., Barre, N. & Durand, P. Rev. Elev. Med. Vet. Pays Trop 33:21-22, 1980)
1983	Confirmed in Antigua (Birnie, E.F., Burridge, M.J., Camus, E. & Barre, N. Vet. Rec. 1985, 116:121-123)

2. USDA/IICA/PAHO MISSION - June 28 - July 20, 1982

Participants: L. King, D. Wilson, J. Edwards, F. Alexander

The Mission visited: Antigua, Barbados, Dominica, Nevis, St. Kitts, St. Lucia, St. Vincent.

Results of the Mission:

- Confirmed A. Variegatum in Antigua, Nevis, St. Kitts, St. Lucia.
- Reviewed Heartwater situation with veterinary authorities.
- Alerted need for increased precautionary measures.
- Serological samples taken for diagnosis.
- Observed close association of A. variegatum with Streptothricosis.

3. JOINT US/DUTCH/FRENCH RESEARCH PROJECT

a. Objective: Identify and define the distribution of A. variegatum and C. ruminantium in the Caribbean.

b. Participating institutions and specialists:

- The Tropical Animal Health Centre - College of Veterinary Medicine University of Florida - M.J. Burridge, E.F. Birnie.
- Institut d'Elevage et de Medicine Veterinaire des Pays Tropicaux - Mision Antilles - Guyane - N. Barre, MV, E. Camus, MV.
- Department of Tropical Diseases and Protozoology - Faculty of Veterinary Medicine, University of Utrecht, the Netherlands - G. Uilenberg, DVM, Ph. D.

c. Summary of work done:

Studied 17 Caribbean Territories (Anguilla, Antigua, Barbuda, Barbados, British Virgin Islands, Dominica, Guadeloupe, La Desirade, Les Saintes, Marie Galante, Martinique, Montserrat, Saba, St. Barthelemy, St. Eustatius, St. Kitts/Nevis, St. Lucia, St. Maarten) for the visual presence of Amblyomma ticks. All adult ticks were detached from infested animals and collected in plastic bottles. At the end of each collection day, all Amblyomma ticks were ground with cold phosphate buffered saline - pH 7.0 - as diluent to a volume of 0.5 ml/tick. The suspension was transferred to a graduated cylinder and allowed to stand at room temperature for 10 minutes. The supernate was dispensed in sterile plastic storage tubes and snap frozen in liquid nitrogen after adding DMSO as cyropreservant with final concentration of 10% V/V. Infectivity trials were conducted in Guadeloupe.

d. Results:

1. The only Amblyomma species identified on domestic animals in any of the islands studied was A. variegatum, Tropical Bont Tick.

2. Distribution of A. variegatum in Caribbean Countries:

Type of Distribution	Countries
Wide	Antigua Guadaloupe Marie Galante Martinique Nevis
Restricted*	
- Southern Area	St. Kitts
- Northern and Southern Areas	St. Lucia
- Central & Western Areas	St. Maarten
- Three Farms (Central)	St. Martin
- Three Farms (Central)	Montserrat
- 2 Foci	La Desirade
- 5 Foci (Bellevue Chopin)	Dominica
- 2 Ticks	Barbados
- 1 Tick	Anguilla
None found during survey but existence reported.	
- Report from Farmer	St. Eustatius
- Report of purchase of infected animal from St. Maarten	Saba
Non existent	Barbuda British Virgin Islands

*Known to exist on Puerto Rico and Vieques.

Not Reported | St. Vincent, Grenada, Trinidad and Tobago

3. Bovine Dermatophilosis

   - Bovine Dermatophilosis only seen on herds with A. variegatum.

   - Clinical dermatophilosis distributed throughout the islands corresponds to the occurrence of A. variegatum.

   - Dermatophilosis heralds the spread of A. variegatum.

4. Heartwater - Cowdriosis (C. ruminantium)

   C. ruminantium was isolated from A. variegatum ticks from Guadeloupe, Marie Galante and Antigua. Fatal Heartwater infections were confirmed in goats and cattle on Guadeloupe and sheep on Antigua.

4. CONFIRMATION OF HEARTWATER - ANTIGUA - JULY 19-20, 1983

Study carried out and results:

- 103 adult ticks (A. variegatum) - 41 cattle - 4 areas of Antigua (Olivers Stock Farm, Claremont, Cades Bay, Morris).

- Samples comprised of the ticks from the 4 areas were ground (+PBS), frozen (+DMSO) and sent to Guadeloupe for tests and diagnosis.

- August 15: solution thawed and inoculated into experimental goat.

- Sept 1 (day 17): Fever (40.1 - 40.6 C)
- Sept 5 (day 21): Brain Biopsy - Positive C. ruminantium

- Animal recovered - challenged - no reaction

- Four other experimental goats, first innoculation - no reaction. Challenged, all died from Heartwater. Control sheep recovered after 5 days of febrile reaction.

- 500 adult ticks (225 females and 275 males) from 184 cattle, 13 sheep and 1 goat were infesting 55 of 59 herds examined.

Some important observations were noted during the study:

- A. variegatum larvae are not infected since there is no transovarial transmission of C. ruminantium.

- A proportion of ticks are expected to feed on vertebrates not susceptible to Heartwater.

- The blood of infected ruminants is only infective for ticks for a limited period.

- Many ruminants remain susceptible to Heartwater in endemic areas despite repeated exposures to tick vectors.

- No antigenic differences believed between isolates from Antigua and Guadeloupe - former test reaction conferred solid inmunity to Guadeloupe isolate.

  Dr. Uilenberg has confirmed complete cross immunity between the Gardel strain (Guadaloupe) and the South African Ball 3 strain.

- Gardel experimental transmission studies were being conducted. A. cajennense and A. americanum nymphs failed to transmit A. maculatum results awaited.

5. KNOWN VECTORS - Heartwater

- A. hebraeum - Bont tick
- A. variegatum - Tropical Bont Tick
- A. lepidum
- A. gemma
- A. pomposum

6. EXPERIMENTAL VECTORS

- A. maculatum +++ (Gulf Coast Tick)
- A. cajennense +- (Central, South America, Cuba, Jamaica, Trinidad)
- A. americanum -
- A. neumanni ? (South America)

DISTRIBUTION OF AMBLYOMMA variegatum and HEARTWATER

X Amblyomma variegatum reported.
XX Heartwater.

PREVENTION OF AFRICAN SWINE FEVER IN THE MEMBER STATES OF THE CARTAGENA AGREEMENT

Dr. Franco Bernardini
FAO-JUNTA
Lima, Perú

1. BACKGROUND

The Fourth Meeting of Ministers of Agriculture of the countries of the Cartagena Agreement considered that there was a risk that African Swine Fever could spread to the Subregion and cause enormous damage, as it had in a number of countries of Latin America and the Caribbean. As a means of dealing with the problem, it recommended that the Commission aprove sanitary regulations and a subregional program to combat the disease. The Commission adopted this recommendation in its Decision 153. At the same time, the Fourth Meeting of Ministers of Agriculture recommended that the Board seek the cooperation of FAO and seek nonreimbursable financing in order to strengthen the national animal health services of the member states in order to prevent the disease.

The Board's efforts were successful, and the project was included in the Agreement signed by FAO and the Italian Government as the donor country. On June 9, 1983, the Board and FAO signed the Plan of Operations for the project GCP/RIA/071/ITA "Prevention of African Swine Fever in the Member States of the Cartagena Agreement". It has an execution schedule of 4 years, to be completed by September 18, 1987, and nonreimbursable financing of up to US$4.3 million.

2. OBJECTIVES OF THE PROJECT

The objectives of the project are to strengthen the animal health services in the member states to prevent African Swine Fever, and to contribute to improved application of the regulations and the Program adopted by Decision 153. It is also designed to help prevent other exotic diseases.

The specific objectives are:

2.1 To help train human resources in the Member states by courses and fellowships, and simulated experiences.

2.2 To help solve specific problems related to execution of the project, by engaging the services of short-term, specialized consultants.

2.3 To provide the animal health services of the Member states with equipment and materials to improve their diagnostic laboratories, sanitary inspection services and epidemiological surveillance.

2.4 To contribute to the publicity campaign in each country.

2.5 To cooperate in improving epidemiological surveillance, animal health inspection in ports and harbors, and organization of action brigades to carry out the eradication process, if the disease were to be found.

3. ACTIVITIES CARRIED OUT

The following main activities have been carried out:

3.1 Training in the Laboratory Diagnosis of African Swine Fever, Hog Cholera and Aujeszky's Disease.

The training was conducted in the Animal Virology Laboratory of the Spanish Agrarian Research Institute in Madrid, between June 4 and July 6, 1984. The project had provided five fellowships for one specialist from each Member state.

3.2 First National Course on the Epidemiology and Epidemiological Surveillance of African Swine Fever.

The course was held in Medellín, Colombia, on June 26-30, 1984, in cooperation with the Colombian Agricultural Institute (ICA). Twenty-seven veterinarians working throughout Colombia in the areas of epidemiological surveillance and the diagnosis and control of animal diseases attended the course.

3.3 First Andean Subregional Course on Animal Health Inspection in International Ports and Airports and Border Posts.

The course was conducted in Lima, Peru, at the headquarters of the Board of the Cartagena Agreement on October 1-12, 1984, in cooperation with the Peruvian Ministry of

Agriculture. Five veterinarians, each the Animal Health Inspector of his country, attended, and the host country sent thirteen participants.

3.4 Services of Short-term Consultants to solve Specific Problems.

The Agriculture and Livestock Bureau of the Ministry of Agriculture of Peru was provided with the services for 10 days of a consultant in the laboratory diagnosis of African Swine Fever. A consultant who was an expert in incinerators for international airports conducted missions in Bogotá and Barranquilla, at the request of the Colombian Agricultural Institute (ICA).

3.5 The same consultant also went to Lima, Peru, and La Paz and Santa Cruz in Bolivia, for a total of 20 days, to recommend the most appropriate equipment for destroying food waste offloaded in the international airports serving those cities.

3.5 Equipment and Materials supplied.

The Animal Health Officer (Coordinator) of the Project, working with each of the national counterpart officials, identifies the equipment and materials most urgently needed to carry out work to prevent African Swine Fever in each of the Member states. The purchases in 1984 totalled US$400,000, and the requests for 1985 are now being formulated and will be received during the second half of the year.

The equipment and materials provided have meant that a diagnostic laboratory for African Swine Fever and Hog Cholera has been placed in operation in each of the Member states. These laboratories are working in close cooperation with the epidemiological surveillance units that are doing tests and taking samples in places where African Swine Fever is most likely to develop. These units are being provided with vehicles and the necessary instruments.

Hog cholera vaccination units are being put in place in areas where there is the greatest risk of African Swine Fever. The vaccination units use China strain vaccines, in order to eliminate the possibility of confusion in the field diagnosis, if African Swine Fever were to occur.

Finally, each of the Member states has been provided with audio-visual equipment to be used in publicity campaigns and for training purposes.

3.6 <u>First Seminar for National Counterpart Officials and First Meeting of the Andean Technical Committee created by Decision 153.</u>

The First Seminar for National Counterpart Officials of the Project was held in Lima, Peru, at the Headquarters of the Board of the Cartagena Agreement, on February 25-28, 1985. The purpose of the meeting was to examine the activities programmed and carried out in 1984 by each member state and by the FAO-JUNTA project, identify the main difficulties encountered, and propose alternative solutions. It also considered the Plan of Activites of the FAO-JUNTA Project for 1985, the activities and goals to be met in each member state, and proposed procedures for coordinating them. The seminar achieved its stated objectives.

On March 1, the First Meeting of the Andean Technical Committee of the Subregional African Swine Fever Program Created by Decision 153 took place. The meeting evaluated the application of Decision 153, and determined what subregional activities would be conducted with the fund created by that decision. It also decided on the financing, and consolidated the Subregional African Swine Fever Program and the activities that the FAO-JUNTA project was to carry out during 1985.

4. <u>ACTIVITIES PROGRAMMED FOR 1985</u>

The main activities for 1985 will be:

4.1 <u>Training</u>

The following courses and fellowships will be given:

- Second Andean Subregional Course on Animal Health Inspection in International Airports and Border Posts, to be held in Santa Cruz, Bolivia on May 13-24. There will be five participants from each Member state, except for the host country, which will send ten participants.

- Third Andean Subregional Course on Animal Health Inspection in International Ports and Airports and Border Posts. Discussions are under way to have this course held in the United States between November and December. There would be three participants for each Member state.

- Second National Course on Epidemiology and Epidemiological Surveillance of African Swine Fever, to be held in Guayaquil, Ecuador, on June 24-28. Thirty national participants.

- Third National Course on Epidemiology and Epidemiological Surveillance of African Swine Fever, to be held in Maracay, Venezuela, on July 8-12. Thirty national participants.

- First Simulation of the Eradication of African Swine Fever, to be held in Bogotá, Colombia, on September 30 through October 16. Four participants from each Member state, with the exception of the host country, which will send ten veterinarians and other officials who would be called on in a health emergency. Also attending will be six guests from countries outside the Subregion.

- Fellowships: Up to 8 fellowships will be given to specialists from the Member states in laboratory diagnosis, to receive training outside the Subregion, at a course for five participants, one from each Member state. The course will be held in the Animal Virology Laboratory of the Spanish Agrarian Research Institute in Madrid; fellowships will be given to 3 specialists from the Member states to learn the techniques of laboratory diagnosis of African Swine Fever, hog cholera and Aujeszky's Diseases in Perugia, Italy.

4.2 Consultant Services

Short-term consultant services have been planned to help in the training courses and to meet the needs that have emerged during execution of the project in the Member states. The consultants would address the following subjects: laboratory diagnosis, the epidemiology and epidemiological surveillance of African Swine Fever and other exotic diseases, animal health inspection in airports, the organizing and conducting of simulations, informatics and statistics, systems of compensation for slaughtering, animal health inspection manuals, incinerators for airports, and guidelines for drawing up health emergency programs in the Member states.

4.3 Equipment and Supplies

The project will continue to provide the Member states with equipment and materials, which will be placed according to the needs identified jointly by the Animal Health Officer (coordinator) of the project and each of the national counterpart officials, and will be presented to the Board through the integration agency in each country.

4.4 Publicity Campaign

The production and distribution in each Member state of publicity materials is being prepared on the basis of the needs they have made known to the Board.

The FAO-JUNTA Project, in cooperation with the Audiovisual Teaching for Training Services Center, CESPAC, of Peru, will produce a course on animal health inspection in ports and airports, which will be videotaped to be used in the Member states.

AVIAN INFLUENZA ERADICATION IN THE UNITED STATES

Dr. John K. Atwell
USDA/APHIS
Washington, D.C.

I am honored to appear before this group today. And I am pleased to be able to share with you our experience in eradicating a recent infection with lethal avian influenza in the United States. I would like to give a brief history of the eradication effort and then describe the scope of the program and some of the lessons we learned from it.

THE ERADICATION CAMPAIGN

Those of us who devote our careers to helping our people to feed and clothe themselves know that we face many challenges. One of the most trying of these occurs when we face a threat to our agricultural production system. No matter how carefully we plan for these emergencies, they inevitably call for extraordinary efforts to meet them successfully.

We believe that we were fortunate to be able to eradicate avian influenza in a relatively short time. We were fortunate that we had a good plan; that the poultry industry was very cooperative; that we had excellent technical advisors; and that we had a highly professional work force able to adapt to changing conditions.

The changes that made our job most difficult were the changes in the disease itself. Our eradication campaign can be divided into four phases, based on these changes and our approach to fighting the disease.

The setting of the recent outbreak was the eastern United States. A major flyway for migratory waterfowl exists in this region. This flyway passes over several major poultry areas, including southeastern Pennsylvania. Seabirds also populate this area. Avian influenza viruses have been isolated from wild aquatic birds. Over 1,200 poultry farms are concentrated in this corner of Pennsylvania, including broilers, layers, turkeys, and game birds. Many poultry farms have ponds also frequented by both wild fowl and seabirds.

The disease first appeared in poultry in the state of Pennsylvania in the spring of 1983. At that time the virus, subtype H_5N_2, appeared to be a mild form. Symptoms included a drop in egg production and relatively low mortality. Innoculating laboratory birds with the virus did not produce the 75 percent mortality generally accepted as the criterion for highly pathogenic avian influenza. During this time, the Federal Government was not directly involved in control activities. Industry and State efforts were made to contain the disease.

But the picture changed dramatically in late October. A genetic change occurred in the virus. Infected layer flocks suffered a dramatic drop in egg production. Laboratory birds innoculated with the virus now suffered up to 100 percent mortality.

Under these conditions, the State and industry asked the Federal Government for assistance.

On November 9, 1983, the Secretary of Agriculture declared an "Extraordinary Emergency," and a Federal/State task force was set up to battle the disease. A group of technical advisors was also assembled. The group included government, industry, and academic scientists known to be amoung the most knowledgeable people in the world on this disease.

The goals of the eradication effort were to contain the disease and eliminate the highly pathogenic strain of the virus. The strategy included:

-- Establishment of an emergency task force of Federal and State personnel to implement campaign activities.

-- Quarantine of areas and premises, including either prohibition or restriction of movement of certain poultry and poultry products.

-- Use of basic eradication procedures, including detection of infection, depopulation, vector control, decontamination, repopulation, and surveillance. Surveillance activities included monitoring migratory waterfowl, seabirds, and other free-flying birds.

This drastic eradication strategy was selected for several reasons. The disease itself was extreme. In this area of intensive poultry production, neighboring flocks were highly vulnerable. Also, no effective vaccine existed for avian influenza. In short, there was an urgent need to eradicate the disease as quickly as possible.

During this second phase of the disease, we were learning more about it as we were containing it and depopulating infected flocks. The quarantined area had to be redefined several times. Also, a small infestation was found in the neighboring state of New Jersey. This isolated pocket of infection was dealt with swiftly. The area was quarantined, and the single infected flock was depopulated.

Throughout the eradication effort, depopulation was carried out by humanely euthanizing birds with carbon dioxide (CO_2). This was accomplished by placing them in CO_2-filled refuse containers.

Because of soil conditions on the farms in Pennsylvania, the carcasses had to be buried in sanitary landfills. Birds were buried and covered by 8 to 10 feet of refuse.

After depopulation, we placed great emphasis on effective vector control and on cleaning and disinfection. Premises were treated for both insects and rodents. Cleaning of poultry houses included a detailed dry clean of all cages, equipment, and surfaces, followed by a wet clean.

After the cleaning process, the premises were disinfected. Then at least 30 days of observation was required before replacement birds could be brought into the houses.

Because of the ease with which the disease could be spread, we recognized the need for rigid biosecurity procedures. Extreme security precautions were taken by task force personnel. All vehicles and equipment were disinfected or sterilized to prevent mechanical spread of the virus.

Quarantine restrictions within the quarantined area were also severe. No birds or materials could be removed from infected premises. Security personnel were deployed to each infected farm until all birds were destroyed. Movement of birds from noninfected flocks was restricted within the quarantined area. Movement to slaughter required visual examination by task force personnel. Replacement birds were examined and tested for evidence of virus before they were moved. Eggs from noninfected flocks were washed, sanitized, and packed in new or sanitized containers within the quarantined area before release. Only new or disinfected equipment and vehicles were permitted to be used in transporting poultry and poultry products in marketing channels.

It also became apparent that a strong education effort within the industry was needed. A major campaign of lectures and demostrations was provided to poultry producers and servicing personnel. Media support of biosecurity principles was provided by newspapers, television, and radio. Literature on avian influenza prevention was distributed to all producers.

While Federal resources were initially directed toward the highly pathogenic strain of the virus, the State and industry were taking action to combat the other less virulent strain of the disease.

In January 1984, we found that clear distinctions could no longer be drawn between forms of the H_5N_2 virus. Under these circumstances, we became convinced that we must eradicate all flocks with evidence of avian influenza.

Also in January, a major outbreak occurred in the nearby state of Virginia. The majority of the birds affected by this outbreak were turkeys. A separate task force was set up to battle this infection, and the same basic strategies were used.

During this third phase of fighting avian influenza, we depopulated any flocks with clinical, epidemiological, or laboratory evidence of avian influenza. In Pennsylvania, this included flocks that in the earlier phase of the program had been considered infected, but not by the highly pathogenic strain. Also, surveillance was extended to the entire poultry population.

As we neared our goal of eliminating the infection, we found that antibody levels remained high in recovered flocks. The virus had been isolated from some of these flocks as much as a year earlier. Our technical advisors considered that these birds represented a continuing threat. They thus recommended that these flocks be considered for depopulation. We agreed and began our fourth phase of the program.

During this phase, the remaining sero-positive birds were removed. But perhaps the most important aspect of this phase was surveillance. Biosecurity procedures continued to be successfully emphasized. Final area quarantines were lifted in Virginia on September 14, 1984, and in Pennsylvania on October 4, 1984. A surveillance called "Operation Poultry Watch" continued until April 2, 1985.

THE SCOPE OF THE PROGRAM

Now that I have given a brief history of the eradication program, I would like to take a few minutes to discuss the scope of the program and some of the lessons we learned from it.

The program was one of the largest eradication programs undertaken in the United States. At peak strength, the Pennsylvania task force had 406 people on board, and the Virginia task force had 279 people working.

During the 11-month eradication effort, more than 17 million birds in 452 flocks were destroyed. Federal indemnities totalled $41.9 million, with an additional $22.6 million in support costs. This brings the total Federal cost to $64.5 million. Substantial state and industry resources were also expended.

And yet this program was almost certainly a bargain in terms of the threat the disease posed to our production system. At stake was a national poultry industry valued at nearly $10 billion.

A study conducted by the U.S. Department of Agriculture highlights the benefits of this program. This study concluded that, if the disease had become widespread on the East Coast, affected producers could have lost more than $500 million in the first 6 months of the outbreak. And consumers would have had to pay more for reduced quantities of poultry products during that time--an estimated $2.2 billion.

Even these losses do not include the potential loss of export markets. I know the concerns that many of you felt during that time about possible threats to your own production systems. We appreciate the understanding you showed during this time. And we consider the fact that few embargoes were imposed is a high tribute to the credibility of our program.

LESSONS FROM OUR EXPERIENCE

When we look at the benefits of the eradication program, we should look beyond the tangible economic benefits derived from the program's success. We must also look at the lessons we learned. We can benefit from them, and we hope that others can.

Our technical consultants evaluated the program and made suggestions for countering future threats by the disease. For example, they suggested that States develop emergency response plans, as the Federal Government has. They suggested that free-ranging domestic fowl be kept away from commercial premises. The consultants also emphasized that poultry producers should prevent direct or indirect contact between waterfowl and domestic poultry. These waterfowl are regarded as a persisting reservoir of avian influenza.

Our experience with avian influenza also raises some further issues. These should be of concern to the poultry industry, researchers, and animal health agencies. They include the general need for improved biosecurity in the poultry industry, as well as the need for research on the nature of avian influenza viruses, including development of vaccines.

Some of the lessons we learned can be considered even more general, perhaps universal. We saw that even with the best planning and the best tools available, the program required extraordinary human effort. The changing situation required great flexibility by everyone involved. The keys ingredients for a successful effort included preplanning for emergency disease outbreaks, wisdom and reason by our advisors; knowledge and fortitude by our task force personnel; and cooperation and dedication to eradication by the industry.

This kind of response to a threat to our agricultural production systems was inspiring to me. And I hope all of us devoted to improving agriculture in our countries can be pleased with this demonstration of combining the best of science and human heroism to protect our ability to feed and clothe our people.

PREVENTION OF EXOTIC DISEASES IN MEXICO

Dr. Benjamín Jara Guillén
Agriculture Secretariat
México

The Mexican-American Commission for the Prevention of Foot-and-Mouth Disease was formed after the first outbreak of foot-and-mouth disease which lasted from 1946 to 1954, caused heavy losses, and was finally wiped out by the joint efforts of Mexican and United States specialists. The Commission maintained surveillance of all types of bladder diseases for the past thirty years. Any instance of bladder disease is immediately inspected to clinically determine whether foot-and-mouth disease is present.

The Commission has a basic infrastructure with which it can easily be altered from a preventative organization to a Commission for eradicating in case of another foot-and-mouth disease outbreak. An agreement was signed in October of 1976 between the Mexican-American Commission for the Prevention of Foot-and-Mouth Disease (CPA) and the General Office of Animal Health (DSGA). The DSGA agreed to work on a program with the CPA to prevent foot-and-mouth disease through the use of veterinarians currently employed in its regional laboratories, ports and border posts throughout the country.

The Commission's general objectives were:

- To reply promptly to all reports of vesicular disease.
- To take samples for analysis.
- To impose quarantine as a preventive measure.
- To analyze and give final diagnosis.
- To raise the level of awareness of cattle farmers, veterinarians, zootechnicians and any persons in the field of livestock, of the importance of the program.
- To maintain the infrastructure necessary for an emergency plan to deal with a possible outbreak of foot-and-mouth disease.

The Organic Structure of CPA is the following:

DIRECTOR GENERAL
(Livesctock Undersecretary)
TECHNICAL SUBDIRECTOR
CHIEF OF LABORATORY
CHIEF OF FIELD OPERATIONS

Due to the ever-increasing risk of exotic diseases, as evidenced by the recent outbreak of African Swine Fever in Brazil, Haiti and the Dominican Republic in 1978 and in Cuba in 1980, a proposal was presented to the November 1984 meeting of CPA commissioners to restructure and expand the functions of the CPA. The proposal to expand includes preventive measures for all types of exotic diseases and pests that affect animals, while the restructuring involves the division of the country into seven individually coordinated emergency regions. The Commissions and their coordinators will:

- Keep constant contact with sources of information such as veterinary laboratories, livestock associations, etc. for detecting the presence of exotic disease.

- Insure the thorough investigation of suspicious instances of exotic disease outbreaks.

- Present educational, informational programs on exotic diseases in the regions to insure prompt detection.

- Establish emergency systems in the seven regions with personnel from the Secretariat for Agriculture and Water Resources (SARH) and other departments.

- Provide technical support for animal health quarantine programs.

- Maintain an updated file on basic emergency information.

- Organize and conduct training programs and field text exercises on exotic diseases, for use by emergency staff.

- Perform samplings of epizootic diseases of interest to the CPA, such as Vesicular Stomatitis.

Activities scheduled for the present year include:

- 6 field test exercises, one for each region, except the Central Region.

- 1 field test exercise on avian influenza (at the international level).

- Dissemination of information on exotic diseases through talks with livestock farmers and veterinary schools.

- A constant surveillance for all exotic diseases in the country.

ERADICATION OF FOOT AND MOUTH DISEASE OUTBREAK IN CHILE IN 1984

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Ministry of Agriculture
Santiago, Chile

Three years after Chile declared itself to be rid of Foot-and-Mouth Disease, without vaccination, the virus was reintroduced into that country on March 13, 1984 following the illegal entry of diseased cattle into the valley of Trapa-Trapa (bordering Argentina), Commune of Santa Bárbara, Province of Bío-Bío, VIIth region of the country. These were the causes of the primary focus because they compromised the national cattle herds, which were highly susceptible since they had not been vaccinated since 1978.

The animal health Structure that the Ministry of Agriculture, through the Agricultural and Livestock Service, owns in the country was thereby put to the test. To prevent further contagion of the virus, which spreads rapidly, and in an effort to control and eradicate the disease, a sanitary emergency plan had to be instituted.

That plan was designed at the various decision-making, operational and logistic support levels by the pertinent organizations and institutions (Ministry of Agriculture, Livestock, Archbishopric, Armed and Law and Order Forces).

The technical staff was made up of veterinary medical professionals, agricultural engineers, statisticians from the central and regional levels of the SAG (Agricultural and Livestock Service) as well as agricultural experts, administrative officers and assistants.

At the operational level, the continuing support of the Armed and Law and Order Forces was available.

The development of this emergency plan covered the establishment of areas for action, with an adequate information system that would allow for the gathering, preparation, analysis and interpretation of cadastral register and epidemiological data on those areas to facilitate coordinated and dynamic action, in accordance with variations as to topography, population, animal marketing, socio-economic aspects of those owning animals in each area.

The epidemiological and economic analysis determined the strategy of the plan to eradicate the virus.

AREA INFECTED. (Focus and Perifocus)

The area of focus covered 12,417 hectares in the valley of Trapa-Trapa and Cochico, an animal population of 5,242 heads of cattle (1,328 cows, 769 sheep, 2,976 goats and 169 pigs) belonging to 176 owners. The perifocal area was 19,333 hectares, with 5,962 animals (1,919 heads of cattle, 1,088 sheep, 2,830 goats and 125 pigs belonging to 141 owners.

With regard to the cadastral register, a total of 21 summer pastures in the area were visited, and a total of 317 owners with 11,204 animals identifies. The reporting and timely detection of the disease made it possible to establish initial controls in the affected valley (Trapa-Trapa and Butalebún) within a short period of time.

However, socio-economic, cultural and topographical conditions and the nature of stockbreeding (common use of several valleys by the same owners, system of common ownership, consignment, etc.), delayed implementation of the sanitary policy to slaughter the animals, and as a result, the disease spread to other neighboring valleys. With regard to the theory on the spread of the virus from the primary focus, Valley of Trapa-Trapa (summer pastures of Trapa and Butalebún) to other valleys in the region of the Cordillera), epidemiological research established that possible channels for transmission of the disease were:

- The surreptitious transfer of aparently healthy animals in the period of incubation and/or illness.

- Transmission by persons and carriers. This would explain the appearance of the focus of Foot-and-Mouth Disease in Trauleo Bajo (Casad de Trauleo) and Nuevo Mundo.

Viral multiplication in the primary focus through the spread of the virus plus the mechanisms referred to above determined a total of six focuses in the valleys of Trapa Trapa, Butalebún (primary focus), Cochico, Inifernillo, Trauleo (Huaquizorra, Nononquín, El Mirador), Trauleo Bajo (Casas de Trauleo) and Mundo Nuevo (secondary focuses), involving a total of 7,719 diseased susceptible animals and contacts that were slaughtered. In the primary focus, the species affected were cattle and pigs. The introduction of diseased animals in an area of small-scale owners with mixed subsistence livestock would explain a high increase of the virus in cattle herds and other susceptible species (area in which the virus spread).

In the secondary focuses, the only species affected was cattle as the clinical disease had not been detected in other biungalates.

The active supervision of herds that were not infected was undertaken through continuous monitoring based on the updating of cadastral registers, the identification of animals and cattle herds (crotal), clinical inspection of susceptible animals, serological sampling (V.I.A.), delimitation of pasture and quarantine areas.

Quarantine, with the prohibition of the movement of animals and restrictions on the exit of persons outside of the work areas, involved the establishment and operation of sanitary barriers. This control mechanism was developed by staff at the Agricultural and Livestock Service (veterinary doctors and agricultural specialists) supported by military personnel and police officers at the various barriers established.

The implementation of the "stamping out" policy was effected through a "parliamentary consensus" between the affected Indian communities and government, military, ecclesiastical and sanitary authorities where it was decided that animals that would be compensated for and replaced in those places that had been approved in accordance with the Sanitary Policy on Summer Pastures, 1984-1985, would be slaughtered.

On April 3, 1984, the depopulation of the animals started in the affected valleys where the "sanitary rifle" policy was applied and the animals buried. In other cases, because of the rocky subsoil, the animals were burnt and the detritus subsequently buried in the appropriate spots.

The places where the animals were slaughtered subsequently were enclosed and disinfected with 4% sodium hidroxide and/or iodized products.

It should be noted that most of the slaughtering areas were far from populated centers, except for Butalebún and Trapa-Trapa where the animals were buried immediately.

A total of 2,247 cattle, 1,203 sheep, 4,080 goats and 188 pigs were slaughtered.

AREA THREATENED

Here, a perimeter for observation has been established and the movement of animals prohibited and barriers placed. The Cordillera region to the Central Valley has been considered normal for livestock traffic flows, and a topographical characterization of the sector with the identification of natural barriers effected. These have made it possible to set up supervisory (army and police) control (SAG and army) posts and effective (SAG) barriers to maintain that quarantine area during the period of quantification of the problem.

With regard to activities, the areas entered in the cadastral register include 77 summer pastures located in the sectors of Los Barros, San Lorenzo, Cauñico, Ralco and Huallalí.

A total of 29,820 animals (11,846 heads of cattle, 6,662 sheep, 10,595 goats and 717 pigs) belonging to 488 owners were at risk.

Active supervision and control of the animals was effected by identifying the animals through crotal, thereby facilitating serological samplings.

The animal population was inspected by veterinary doctors. 79% of the animals were covered by the inspection.

A sampling coverage of 100% of the cattle was proposed, 90.7% of which was actually covered. A total of 10,748 heads of cattle were bled (Venoject suction tube) and the corresponding samples subject to a protocol and sent to the Central Livestock Laboratory for anti V.I.A. tests.

The percentage ratio of positive herds was 4% in relation to the total. Higher percentages corresponded to the sector Los Barros y San Lorenzo whose herds had a high proportion of adult animals over pasture animals from properties in the Central Valley and which during the vaccination stage under the "Plan to Control Foot-and-Mouth Disease" had a high coverage of vaccination with four-month intervals with vaccines inactivated with formol.

It should be noted that of the 35 heads of cattle that were positive in terms of V.I.A., 31 were cows over six years of age. The epidemiological interpretation of the results and the veterinary inspection. Which did not detect the presence of clinical states of the disease, made it possible to authorize the exit of animals from the area threatened to their properties of origin in the Central Valley. In all of these properties, visits of inspection were paid for purposes of additional supervision.

FREE AREA:

The area of the Province considered to be free of the disease was subject to a sanitary alert plan. Here activities focused on the areas in which animal husbandry and marketing were central (1,038 properties covering a total area of 232,979 hectares, a total of 69,604 animals).

The objectives were:

To confirm definitively the absence of the disease on properties in the area, and identify through slaughterhouses and fairs suspicious or diseased animals, thereby verifying the effectiveness of the barriers set up in areas with problems.

The measures were based on:

Reupdating of the cadastral register, recompilation of epidemiological data, follow-up of properties and supervision at fairs and slaughterhouses.

During visits to all places with animals in communes in the area considered to be• unharmed, it was possible to confirm the absence of the disease and determine the physical location, and also, the numbers of properties that had some relation to the summer pastures.

Supervision at all of the fairs (11) on days where there were sales was effected through veterinarians from the SAG, who along with the private veterinarian from the fair, observed the state of health of the animals entered and the disinfection of materials and vehicles. They also reviewed information on the number of animals sold, their original and destination, based on the register of entries and exits of livestock. Should it be necessary, this activity would facilitate retrospective and follow-up epidemiological studies.

A total of 34,373 heads of cattle, 1,559 sheep, 9,542 goats and 186 pigs negotiated at fairs in Los Angeles from March to May.

Background information on animals negotiated at Fairs in the VIIIth region destined to go to other areas in the country was reported, by radiogram to the places of destination to proceed to their inspection on arrival. That control was conducted between March 28 and July 18, 1984.

At slaughterhouses, the origin of 100% of the animals that entered 23 existing establishments was confirmed.

At the VIIIth Region, the benefit extended to 20,409 heads of cattle, 18,332 pigs, 709 sheep and 17 goats which were under the veterinary medical supervision of the Agricultural and Livestock Service and the National Health Service.

The absence of clinical cases from May 16, 1984, date on which the last animal involved in the Mundo Nuevo focus, was slaughtered, along with the analysis and interpretation of serological checks and the monitoring of inspection, made it possible to lift restrictions on the movement of animals in the perifocus on August 13 of that year three months later, even though control and supervision were maintained.

In short, as of August 13, 1984 after all of the established requirements and conditions of the international organizations have been met, Chile considers itself to be rid of Foot-and-Mouth Disease in the commune of Santa Bárbara, VIIIth Region in the country, and has resumed its status as COUNTRY FREE OF FOOT-AND-MOUTH DISEASE WITHOUT VACCINATION.

To maintain this status, during the period 1984-1985, strict control and supervision continue at all border summer pastures, with the identification, inspection and continous sampling of animals upon entry into, during their stay at, and upon exit from, these pasture areas.

ERADICATION OF AFRICAN SWINE FEVER IN BRAZIL

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Ministry of Agriculture
Brasilia, Brazil

I. Background

I.1 History of Hog Cholera in Brazil

Hog cholera has been occurring in Brazil since the beginning of the century. Between 1940 and 1942, some severe outbreaks made it necessary to set up an official control program. Official government action has gradually been tapering off since the 1970s, and it has remained involved only in the area of the quality control of vaccines. Vaccinations were done by the farmer himself, without any official intervention. An analysis of the number of doses of vaccine sold shows that less than one-third of the hog population was protected. The vaccine used was of the violet crystal type, which produced only short-term immunity.

This, together with the increase in pig farming, meant that the incidence of the disease increased, and in 1977, 640 foci (12,717 cases) were reported. In 1978, therefore, the hog population was without any health protection and hog cholera was endemic throughout the country.

I.2 History of African Swine Fever in Brazil

The first focus of African Swine Fever in Brazil occurred in the State of Rio de Janeiro, on a simply-managed farm some 50 kms away from the international airport in Rio de Janeiro.

The Secretariat for Animal Health Protection received the report on May 13, 1978. An epidemiological survey then showed that the first animal had died some 15 days beforehand, and that in the intervening period, some 200 animals out of a total of 1,000 had died. The clinical diagnosis of African Swine Fever was reached on the basis of:

- the appearance of severe hemorrhagic fever;
- the evidence of the use of food waste off-loaded from international airports to feed the pigs;
- pathological anatomical findings.

Despite the fact that there was no laboratory confimation, all animals on the farm that was the focus of the disease were stamped out immediately (hogs, cattle, poultry and dogs). All plants were eliminated, the earth was turned over, and pulverized with quick lime.

Despite the rigor of measures taken in this case, a new focus was identified two weeks later in a slum in the urban area of Rio de Janeiro. This new focus spread the disease.

The laboratory analysis carried out in the International Reference Laboratory for African Swine Fever in the Americas in Plum Island in the United States, with materials forwarded from the first and second foci, showed positive findings for African Swine Fever. This was immediately reported to neighboring countries and international reference agencies, and a health emergency was declared.

African Swine Fever was eradicated from Brazil in two distinct phases:

First phase: Emergency Measures - 1978-1979

Basic actions related to dealing with and controlling the foci.

Second phase: Program to combat African Swine Fever - Beginning in 1980.

This phase basically consisted of repeating in all foci those actions taken during the emergency phase, and preparing organized measures to eradicate the disease, on the basis of an analysis of the high-, medium-, and low-risk areas.

II. Emergency Action to Eradicate African Swine Fever, 1978-1979

A special federal task force was immediately set up through the Central Eradication Commission. Subcommissions composed of specialists in the different areas were formed in every state.

Strategy.

Destruction of urban waste

This operation was designed to burn the waste and ban deposits of waste. Hogs were slaughtered and cremated, and possible reservoirs were disinfected and destroyed. The destruction measures were also applied to waste off loaded from international flights, because it had been determined that the food waste was being improperly used to feed hogs in the initial foci of the disease.

Control of transit.

In order to limit the occurrence of ASF to the smallest possible geographical area, transit control posts were set up along roads used to move animals. All vehicles transporting animals were inspected and disinfected, and fairs, shows and other events were prohibited.

Surveys.

A survey was conducted of the hog population in the focal, perifocal or other areas of influence considered to be strategic to eradication of ASF. Wild pigs in the areas studied were examined because of the importance that they might have in the transmission of the disease.

Focus operations.

The disease was tracked and all sick, suspect and possible contact pigs were captured, valued and slaughtered and then cremated. The work was so rigorously done that the total numer of farms dealt with was higher then the total number of reports, because the tracking teams were able to identify farms that had some link with those where the initial foci has been identified. International recommendations were adopted in all foci: interdiction, slaughtering of sick animals and contact animals, cremation of the carcasses, disinfection of the physical facilities and complete halt of activities for 6 months.

Restocking.

After 6 months of a complete halt in activities and a minimum of 2 disinfections, authorization was given to restock the farms with sentinel animals. These animals were serologically negative to African Swine Fever and had been vaccinated against hog cholera.

Health education and mass communications.

This operation was intended to encourage participation by all sectors of the community, alerting them to the danger of having the disease spread, teaching control measures and warning them about the harm that could be caused to the country's economy.

Funding.

The Federal Government released funds provided by the states, cities, public corporations, associations and foundations. The total amount, in direct and indirect costs, was US$13,000,000.

Impact on the economy.

The negative effects that the ASF eradication measures (reduction or complete halt of pig breeding, marketing and processing) had on the economy were fully assessed.

Coordination of international support.

The goal here was to coordinate and expand the technical and economic cooperation provided by international agencies such as IICA, FAO, OAS, WHO, PAHO, OIE and foreign governments. FAO sponsored the setting up of diagnostic laboratories.

All these actions were coordinated by the Ministry of Agriculture, with the participation of the other ministries. During this phase, efforts were made to increase the reporting of diseases occurring in the hog population, by means of requests from the Ministry of Agriculture to all veterinarians in the country.

During the emergency phase, 224 foci of ASF were identified; 66,966 hogs were slaughtered, and compensation totalling Cr$44,313,945 (US$2,118,257 at 1978 prices) was paid.

III. Specific African Swine Fever Eradication Program

A specific African Swine Fever Eradication Program was set up in 1980 to consolidate the work of eradicating ASF and to control hog cholera.

The priority targets of the Program were those areas of the country where there is the heaviest concentration of pig farming (high risk). It was based on the following points:

- vaccination of young pigs against hog cholera at the age of two months, and annual revaccination of reproductive animals;
- certification of farms as being free of African Swine Fever, and as having hog cholera, Aujeszky's disease, brucellosis and tuberculosis under control;
- epidemiological surveillance, using frequent serological tests on samples of the hog population;
- action in foci of blood and reproductive diseases.

In order to facilitate the work, the country was divided into a number of different areas.

Area I: southern region - the large hog-raising and meat processing area (15,240,000 hogs). Given the characteristics of the area, the etiological agent could well persist and turn it into an endemic area threatening other regions. Priority was placed on work in this area, which meant that it could be declared FREE OF ASF on August 13, 1983.

Area II: One year after work had begun in Area I, activities were gradually started and stepped up in the south-eastern region, both because of its proximity to Area I and because it was a high-risk region (70% of all foci of ASF had occurred in the south and the south-east.

Area III: In the rest of the country, hogs are raised in a non-intensive and unscientific way; they are less concentrated, and therefore present less of a risk. Close surveillance was conducted in this region, particularly in the State of Pará (extensive farming), along with virological and serological testing (a total of 7,422 tests), all with negative results.

III.1 Results obtained.

III.1.1 Surveillance.

Control of international transit.

Controls were stepped up at ports, airports and post offices. In the last two years alone, approximately 7,008 kg of products were seized and destroyed. Checks were made mainly of flights arriving from high-risk areas, and off loaded waste was destroyed. The same controls were in place in ports and airports. The country did not import any hogs.

Control of the internal movement of hogs.

A system was set up to control the interstate movement of hogs. It was operated by the State Animal Health Defense Services, and by accredited veterinarians. Animals transported from one place to another were accompanied by health certificates.

The information contained in the health certificates was analyzed by a specially developed computer program, so that all movements of animals were recorded. This made information available for epidemiological studies. As an example of the controls put in place, once the southern region had been declared free of ASF, a ban was placed on bringing hogs from other areas into the region to be slaughtered. They were permitted only for reproduction purposes, under government control. Table 1 shows the movement of hogs for slaughter, mainly from the southern region (main production center) to other parts of the country. Some 1,407,887 live hogs were shipped for slaughter. Table 2 shows transit control of animals for other purposes (raising, reproduction, fattening, fairs and shows), with a total of 20,320 hogs in transit, 10,461 of which came from the southern region. Only 287 pigs entered the southern region (246 from Minas Gerais to the State of Paraná, and 41 from Sao Paulo to Rio Grande do Sul). They all entered under the control system, were accompanied to their destination, and came from certified farms.

III.1.2 Shows and fairs.

All animals shipped to fairs and shows came from farms certified to be free of ASF and where hog cholera was under control. Controls were also in effect in these farms for brucellosis, leptospirosis, tuberculosis and Aujeszky's disease. Two negative serological tests at a three-month interval were required for the latter disease.

III.1.3 Active surveillance.

Disease of hogs, particularly diseases of the blood and reproductive diseases were also checked at the laboratory level. A total of 1,445 samples were tested during the period, with 7 positive for ASF (Table 3). The last positive test was found in 1981. In meat-refrigeration plants, samples of waste material were selected for laboratory examination. The serological tests were always done at two levels:

Slaughter hogs: serums collected in meat-refrigeration plants, a representative sample from various cities, identified according to origin;

Reproductive hogs: the total reproductive population was tested. On small farms, the following sample was takem: $20 + \frac{(n-20)}{4}$.

A total of 304,488 tests were done over the five-year period, and 128 positive tests (0.04%) were found in 1980-81. Table 4 gives the results of the serological testing up to the present, broken down by slaughter animals (meat-refrigeration plants) and reproductive hogs (farms), which completes the study of the surveillance for different age groups.

III.1.4 Certification of controlled farms.

The government program issued certificates stating that the farm had been officially checked for control of hog cholera and as being free of ASF. This certificate was valid for six months, and authorized unlimited transit and participation in fairs and shows. The basic conditions for obtaining a farm certification were:

1. The farm must be attended by a veterinarian;

2. Two negative serological tests, taken at intervals of six months on the entire reproductive hog population, must be presented;

3. Husbandry techniques compatible with proper health control must be practiced, and the entry of animals and persons must be strictly controlled;

4. Regular hog cholera vaccinations must be conducted;

5. The hog population must be restocked with animals from the farm's own reproduction center, and six-monthly tests of the entire reproductive population must be conducted;

Farms free of ASF are called "controlled farming units".

III.1.5 Hog cholera vaccination

The program called for systematic hog cholera vaccination with China vaccine. In 1984, this, together with other health measures, reduced the number of foci of the virus to three, in the southern region of the country. Control of hog cholera, characterized by a reduction in the number of clinical cases, is important to the field surveillance of ASF. Around 25 million hogs were vaccinated during the three years of the Program.

Control and eventual eradication of hog cholera is vital, not only in order to prevent the losses caused by the virus, but also to assist in the surveillance of ASF in pig farms.

III.1.6 Regional laboratories for the diagnosis of ASF and hog cholera and vaccine quality control.

Backed by a number of specific agreements, the National Animal Reference Laboratory (LANARA) set up five regional serological diagnostic laboratories to conduct immunoelectroosmophoresis tests. Positive serums were then tested by indirect immunofluorescence at LANARA in Pedro Leopoldo. The technicians performing the final diagnosis were trained at the Veterinary Research Laboratory in Alfort, France, which also provided advice on setting up the diagnostic laboratory service in Brazil. As a result, all current methods of testing for hog cholera and ASF are now being used.

III.1.7 Health education and personnel training.

Health education is a constant part of all the Program's activities, seeking greater awareness on the part of veterinarians, pig farmers and pork processors. The educational materials consist of audio-visuals, a pamphlet contaning health indications for pig farming, a Procedures Manual, a pamphlet for veterinarians showing how to collect samples for laboratory testing, and leaflets on the risk of the reintroduction of ASF for passengers on international airline flights. A total of 719 veterinarians and 4,863 assistants received training in all aspects of the Program.

III.1.8 Information system.

The system is intended to receive all reports received by veterinarians of diseases ocurring on pig farms. A standard form (FORM ASF) is used to report the disease and medical history, and for action-oriented follow-up.

The attending veterinarian responsible for the focus of the disease must return to the farm at least twice within a one-month period, and must direct the cleansing operation.

IV. Epidemiological Analysis.

Generally speaking, the slaughter of the hogs did not allow for any epidemiological follow-up on the foci of ASF. However, in the State of Santa Catarina, despite the ban on farms, the slaughter program was delayed, and this enabled the following observations to be made:

a) the incidence of the disease was 7.51%;

b) the average rate of death was 72.64%; however, in 18 of the 26 foci in the state, the death rate was 100%.

c) the highest incidence of the disease was 71.73%, while the lowest was 0.18%. These figures seem to show that some of the foci were not caused by the ASF virus, even though confirmed as such by laboratory tests, because a single agent could not cause such discrepancies in the rate of incidence. The figures may indicate false positives due to the poor techniques used at the beginning, or even to mishandling of the sample in some cases. To consider them positive and eliminate them was, therefore, an important part of the strategy to speed up the work of eradication and prevent the risk of false positives that could keep the disease alive.

d) The rate of morbidity in the hog population in the towns was 7.16 per ten thousand, while the death rate was 52.05 per hundred thousand; however, the rate of morbidity for the entire state was 1.3 per ten thousand, with the death rate at 9.7 per hundred thousand.

In 1978, serums in stock since 1976 were tested by IEOP, and some showed positive results. This raised doubts about the first focus identified in the country (see index). At that time, it had been thought that it may not have been the primary focus and that the disease was already present in the country. However, after some intensive serologicl testing, it may be concluded from the small number of positive findings that the test on the serums in stock since 1976 had probably shown false positive, and that the first ASF focus identified in Brazil (Paracambi, RJ) was indeed the primary focus. Our view is based on the results of serological tests taken on subsequent samples, with negative findings, and the evidence that the IEOP test tends to produce a large number of false positives, as verified by the analysis of 434 serums that showed positive to IEOP, only 80 of which were confirmed as positive by the indirect immunofluorescence test (LYRA et al., 1983). In 1976, the serums in stock had been tested by IEOP.

V. Some factors favoring the identification, elimination and eradication of ASF in Brazil

V.1. Factors favoring rapid identification.

a) In the initial focus, the farmer had changed his brand of feed, and attributed the deaths to poisoning. He asked the firm selling him the feed for an indemnity.

b) The veterinarian responsible for selling the feed immediately sought a diagnosis to exclude the possibility of poisoning, and contacted specialist at the Brazilian Agricultural Research Corporation (EMBRAPA) and the Rural University of Rio de Janeiro, who suspected ASF. The suspicion was confirmed by an international consultant at the university, Dr. Neitz, who was familiar with the disease in other countries. This view was immediately considered by another consultant from the Pan-American Health Organization working with LANARA in Pedro Leopoldo.

c) There was evidence on the farm that hogs had been fed with waste from international airline flights; the owner worked at the international airport at Rio de Janeiro.

V.2 Factors favoring elimination.

a) On the basis of the clinical suspicion alone, the health authorities decided immediately to slaughter the animals on the affected farm, despite the fact that there had been no laboratory diagnosis. The focal area was promptly delimited on the basis of the epidemiological test, and the hogs were slaughtered.

b) Once they had received a communication from the Plum Island ASF Reference Laboratory, the health authorities assumed the responsibility of labelling as positive some cases that suggested a high probability of ASF, and ordered eradication measures. This may have caused some foci to have been reported during the 1978-79 period, when in fact they were false positives, and may have contributed to creating a climate of disquiet among technicians and the community at large, and was thus decisive in the success of the eradication.

V.3 Factors favoring eradication.

a) The adoption of the policy of slaughter in all foci where ASF was confirmed or suspected;

b) A breakdown of pig farms by density per hectare, which showed low density in the country as a whole--60% of owners had fewer than 50 pigs. Depite poor health controls in these farms, the risk is lower because pigs do not come in or go out, since they are raised for family consumption and are killed at home. If on the one hand, the incidence of the disease in these farms may go unnoticed beause it is not reported, on the other hand, the disease may be self-limiting.

c) No ornithodorus ticks of the moubata or erraticus species, which are proven to be related to persistence of ASF, were found in the country, according to research by the National Science and Technology Development Council and reports by parasitology specialists. Reports of the appearance of the Ornithodorus tick in Brazil are rare.

d) In general terms, hog cholera and African Swine Fever were considered to be indistinguishable at the field level, for the purposes of the Program.

VI. Impact of the occurrence and eradication of ASF in Brazil

VI.1 Social impact.

The emergency measures taken to ensure rapid eradication of ASF, mainly the slaughter of hogs, interdiction of farms, low prices offered the producer by meat processing plants, impossibility of indemnity for "lost profits", and the halt in pig farming for a minimum of six months, all created significant problems for the producers. The social problem caused by the occurrence of ASF in Brazil was without precedent, and those most affected were the small farmers, for whom pig farming represented their only income and, at times, the only source of food for themselves and their families. The disease did not affect scientifically-managed farms. All of this generated protests against the Government's action by the rural community, through farmers' associations and religious and political groups.

The low death rate observed in the majority of the foci created a lack of confidence in the diagnosis, even among veterinarians. The political repercussions were great: statements were published in the press to the effect that it was a government plot to favor the large hog-raising businesses and harm the small farmer.

In addition to the impact of the economic loss and the slaughter of animals, the panic among the people caused by media reports of the death of pigs led to the conclusion that the government ban on the consumption of pork was indicative of a public health risk. This caused a 40% decline in the consumption of pork and a consequent decrease in slaughter, which resulted in a down-slide for the entire sector, the failure of some small farmers, and unemployment for more than 4,000 families whose livelihood depended on pig farming.

VI.2 Economic impact.

The direct and indirect costs of the emergency actions taken in pig farms at the time amounted to something on the order of US$13 million.

In addition, some US$14 million in current dollars were lost in pork for internal consumption (death and slaughter) that was not consumed.

The 40% decline in the consumption of pork meant a considerable reduction in demand, and meat processors cut back on their operating capacity. This forced the Federal Government to spend US$25 million on buying up meat for reserve stocks.

In 1976 and 1977, exports were at a record level, and the average price per kilo was US$1.39 and US$1.72 respectively. In the following year, 1978, the outbreak of ASF paralyzed exports, and for the first quarter of the year, only 4,895 tons were exported. Table 5 shows that exports were increasing at a rate of 285% between 1973 and 1977, but fell to 5.5% in 1978;

A broad analysis based on linear adjustments and average 1977 prices shows that had all other conditions remained constant, BRAZIL FAILED TO EXPORT AROUND US$227 MILLION IN FROZEN PORK. At an optimistic estimate based on the boom in international markets, this could have represented about US$724.2 million during the 1978-83 period.

At the same time, there was a marked contraction in the foreign markets for other agricultural products such as chicken, soya beans and meal, eggs, bananas, beans and peppers, for an estimated total of US$52 million.

VII. Benefits

The indirect benefits are related to:

- health structure for the sector;

- diagnostic laboratory; expansion and improvement of diagnostic techniques;

- specific training for technical and auxiliary personnel;

- system for assessment of health programs;

- community participation in all of the actions of the specific Program, with the cooperation of farmers and industrialists;

- control of hog cholera and other diseases of hogs;

- formation of a health structure, not only for ASF, but also for other diseases of hogs.

VII.1 Resumption of exports.

As soon as the southern region of the country had been declared free of ASF (August 13, 1983), exports of pork resumed. They picked up in 1984, and in 1985, the export of 2,230 tons in the first three months alone is a harbinger of an expected increase.

Exports of Pork - September 1983 to April 1984

	Tons	Average price/kg	Total
1983	819	US$1.60	US$ 1,310,400
1984	2,860.7	1.80	5,149,337
1985*	2,230	1.80	4,015,260
	TOTAL:		10,474,997

*As of April 15.

VIII. Cost-benefit ratio.

The overall cost-benefit study has not yet been completed, but preliminary data indicate that:

- In the emergency phase, the costs were high in relation to benefits, in a proportion of 2:1. During the specific Program, the ratio was inverted, with the benefits outweighing the costs, at a ratio of 3:1. The benefits of the Program phase reflect the worth of the actions taken during the first phase.

IX. Conclusion

1) African Swine Fever was eradicted in Brazil by the slaughter of pig present in the foci and the non-use of their meat, by systematic action within the context of a specific program.

2) The speed with which the first foci were identified and eliminated contributed to the subsequent success of the Program.

3) The work done in Brazil was assisted by the advice, chiefly in the emergency phase, of international agencies such as FAO, IICA, WHO, PAHO and the governments of a number of countries. Special mention must be made of the contribution of the French Government and Dr. Ramon Carnero Cabrera, who was present on a variety of occasions. The contribution of FAO was important in setting up a diagnostic laboratory.

4) The costs of an eradication program are high at the beginning, but become smaller later on, given that time is limited in an eradication program.

5) The funds used were provided by the Brazilian Government, and the eradication policy was also adopted

by the Government. The work of coordination was done by the Secretariat for Animal Health (Table 6).

6) The social cost was high. This must be avoided, because in a country where there is hunger, other strategies must be examined to deal with an emergency.

7) The risk of African Swine Fever is present in all countries of the hemisphere. This risk can be eliminated only by stringent surveillance programs, to be maintained particularly once the disease no longer occurs. Serological testing will thus be kept up, in order to ensure that the area is kept free of the disease, and to make the authorities and veterinarians aware of the need to continue a government pig health program, whose costs are low when compared to the cost of an emergency, and which does not cause the impact of emergency actions.

TABLE 1 - MOVEMENT OF HOGS FOR SLAUGHTER 1983

ORIGIN			DESTINATION		
State	Total	%	State	Total	%
Paraná	953,317	61.98	Santa Catarina	508,547	33.06
Rio Grande			Sao Paulo	463,775	30.15
do Sul	311,603	20.26	Minas Gerais	229,864	14.94
S. Catarina	159,518	10.37	Rio de Janeiro	90,679	5.90
Other	113,713	7.39	Rio Grande do		
			Sul	41,710	2.71
			Paraná	38,320	2.49
			Bahía	37,281	2.42
			Other	127,975	8.33
TOTAL	1,538,151	100.00		1,538,151	100.00

TABLE 2 - MOVEMENT OF HOGS FOR OTHER PURPOSES 1983

ORIGIN			DESTINATION		
State	Total	%	State	Total	%
Paraná	6,043	29.32	Sao Paulo	7,561	36.69
Minas Gerais(1)	4,741	23.01	Minas Gerais	2,721	13.20
Sao Paulo (2)	2,586	12.52	Paraná	2,269	11.01
Rio Grande			Rio de Janeiro	1,547	7.51
do Sul	2,350	11.40	Goias	1,132	5.49
S. Catarina	2,181	10.58	S. Catarina	961	4.66
Goais (3)	1,146	5.56	Rio Grande do		
Mato Grosso (3)	871	4.23	Sul	755	3.66
Mato Grosso do			Espirito Santo	714	3.46
Sul (3)	403	1.96	Mato Grosso	444	2.15
Ceara (3)	237	1.15	Mato Grosso do		
Other	49	0.24	Sul	393	1.91
			Ceara	366	1.78
			Bahía	361	1.75
			Sergipe	354	1.72
			Pernambuco	331	1.61
			Pará	252	1.22
			Other	446	2.18
TOTAL	20,607	100.00		20,607	100.00

SETAD/DICOMD/SDSA

(1) Destination of 246 hogs from certified farms, going to the State of Paraná, specially accompanied. (2) Destination of 41 animals coming from certified farms going to the State of Rio Grande do Sul (3) Destination in other states outside the southern region of the country.

TABLE 3 - ASF DIAGNOSTIC LABORATORIES

BRAZIL 1980 - 1984

YEAR	No. Materials	ASF Positive
1980	270	--
1981	202	07
1982	221	--
1983	427	--
1984	325	--
TOTAL	1,445	07

TABLE 4 - SEROLOGICAL TESTING FOR AFRICAN SWINE FEVER

YEAR	Serums tested	Positive serums	%
1980	49,643	80	0.1
1981	51,118	48	0.09
1982	59,506	0	0
1983	86,298	0	0
1984	58,423	0	0
TOTAL	304,988	128	0.04

TABLE 5 - PORK EXPORTS

73/78 - Actual data
78/83 - Estimates

YEAR	OBSERVED DATA TONNES	OBSERVED DATA VALUE (US$1,000)	ESTIMATED DATA TONNES	ESTIMATED DATA VALUE (US$1,000)	
1973	3,202	3,847		y = 1.602 + 2,835 x	
1974	1,623	2,667			
1975	5,652	8,142			
1976	11,700	16,229			
1977	12,338	21,264			
1978*	4,895	8,202	15,408	25,885	LINEAR
1979	--	--	18,243	30,648	TRENDS
1980	--	--	21,078	35,411	AND
1981	--	--	23,913	40,173	PRICES
1982	--	--	29,743	44,933	
1983	--	--	32,583	49,699	
TOTAL	39,410	60,352	137,968	226,752	

OPTIMISTIC ESTIMATE - INTERNATIONAL MARKET

US$ 724.2 million

TABLE 6

RESOURCES OF THE AFRICAN SWINE FEVER ERADICATION PROGRAM

	US$	Cr$
Emergency phase (1978-79)	13,000,000	552,890,000
First stage (1980-83)	2,596,149.2	1,819,900,589
Second stage (1984-86) (estimate)	9,493,835.1	4,076,090,768
TOTAL	25,089,984.3	6,448,881,357

DOMINICAN REPUBLIC
FREE OF AFRICAN SWINE FEVER AND HOG CHOLERA

Eradication and Restocking Program

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1. INTRODUCTION

The epidemic of African Swine Fever in the Dominican Republic in 1978 caused a major upheaval in the social, political and economic structure of the country. It had a direct effect on the family income of field workers and indirectly, the entire population was affected. It had an impact on the stability of the family; eating habits; production activities and systems; the attitude of technicians and producers towards animal diseases, particularly exotic diseases; and the structure of the livestock sector in general and of the epidemiological surveillance system in particular. The image that the people and the authorities had of veterinarians was changed by the epidemic, and it had an effect on domestic and foreign trade and the country's international image.

The African Swine Fever epidemic accelerated the economic depression that was already beginning to make itself felt in an increasingly large foreign debt, and was accompanied by a rise in the cost of living. The development of the specialized hog production and marketing systems, which had been flourishing up to that point -so much so that we were preparing to begin exports of fresh pork-was irrevocably damaged. All of this combined with an outbreak of equine encephalomyelitis in the northeast of the country in February 1978, which kept the livestock bureau fully occupied and which, when humans began to die from the disease, made an enormous impact on the population and the atmosphere began to be one of disaster and calamity. The situation became more serious when the outbreak of African Swine Fever was confirmed in July 1978, not long before hurricane David and hurricane Frederick devastated the population in August 1979, and contributed to delays in implementing the African Swine Fever Eradication Program.

One can imagine what effect, in this context, the slaughter of hogs had on the small peasant farmer, and the difficulties that the eradication program had to contend with in bringing the eradication to a successful conclusion, i.e., the declaration in February 1984 that the country was free of African Swine Fever and hog cholera, and a successful restocking program.

However, development of the hog-raising industry in the Dominican Republic came to a halt as the result of a number of factors, most important of which were: the country's inability to produce inputs (feed) in the amounts needed for an increasingly large hog population; a dependence on imported inputs that were rising in cost; a low demand for pork because of the people's low purchasing power; increasingly small profit margins; and the minimum demand from abroad as a result of the closing down of exports to the United States. The latter was due to the fact that the country was trying to meet the requirements for the detection of trace materials in the analysis of meat in our Bromatology Laboratory.

This subsector of livestock production, which has made so many efforts to survive, may be on the verge of a recovery as a result of the opening up of exports of pork to the United States and other countries in April of this year, the possibility of selling live hogs to the neighboring country of Haiti, and the government's policy of enouraging local production of grains.

The main purpose of this paper is to decribe in a simple and general way the entire process of the various phases of the eradication of African Swine Fever. In describing the phases of slaughtering, disinfection and epidemiological surveillance, sentinelization, and restocking, we used information from the paper "Study on Arican Swine Fever" by Dr. David William (1979); the paper "Erradicación de la Fiebre Porcina Africana y Programa de Repoblación en República Dominicana (1978-1983)", presented by Dr. Reynaldo Peña de la Cruz, the then Director of the Department of Animal Health (COINSA I) in Mexico (September 19-23, 1983); the thesis paper reporting on research done by Lourdes María Portorreal Reyes; the paper "La Fiebre Porcina Africana en República Dominicana", presented by Dr. Orlando Sánchez Díaz, then Executive Secretary of the Program, to REDISA II on September 8, 1980; and the statistics of the Office of Development and Evaluation of the Livestock Bureau.

We trust that this description of our experiences with the Eradication of African Swine Fever and the Restocking Program may be of some use to those countries that have not had the misfortune to suffer the terrible consequences of the spread of an exotic disease of great economic importance such as African Swine Fever, which causes direct and indirect losses, whether or not they can be quantified.

2. BACKGROUND

In 1978 in the Dominican Republic, as in most Latin American countries today, pigs played an important role in the family economy and in the food of country people. However, the main production species were cattle, and second in importance were poultry and pigs. But it was poultry that was the main production species for the low-income farm worker and peasants, because poultry represented an eonomic and food reserve to which they could have recourse to solve their immediate nutritional or economic problems.

The hog population, which was distributed throughout the country, was raised mainly in private backyards, or in a nonintensive system. On average, each owner had from 1-10 pigs. The 1971 census counted 787,052 pigs on 162,404 farms. In the period 1973-1978, there was a notable increase in both hog-raising and poultry-farming, with an annual rate of growth in the hog farming subsector estimated at 3%. By 1978, it was estimated that there were 1,452,000 pigs, 466,000 of which were reproductive animals, 634,000 were young animals, and 352,000 were being fattened for slaughter.

By 1978, great strides had been made in modernizing hog production, particularly in the specialization, concentration and intensification of production by genetic improvement, imported breeds and the introduction of advanced production technologies.

In recent years, there has been a notable increase in the industrial processing of pork meet, and it may fairly be said that we were in a position to begin exporting.

2.1. Health Situation

Our hog population was acceptably healthy, given the absence of diseases such as foot-and-mouth disease, vesicular diseases and African Swine Fever itself. There were some chronic communicable diseases such as brucellosis, leptospirosis, atrophic rhinitis and tuberculosis, and serious diseases such as hog cholera and porcine erysipelas.

2.2. Health Protection System

The health protection system was very weak and was limited to a relatively poor control of animal products and by-products in ports and airports. The small number of control personnel did not have sufficient technical background, the waste and food waste in ports and airports was not properly treated; there was no system of epidemiological surveillance that would enable an outbreak of an infectious-communicable disease to be detected in time; there was no system of domestic transit control; there was no clear awareness of the importance of the prevention of exotic diseases, and most of the veterinarian staff were unfamiliar with most exotic diseases.

The work of the Livestock Bureau was limited almost exclusively to the control of brucellosis and tuberculosis, through a specialized program called Animal Health Project (PIDAGRO), which had the support of aproximately 52 veterinarians, 20 of which came from a National Livestock Extension Project. The work was conducted through 7 Regional Livestock Sub-bureaus throughout the country: the eastern, central, northeastern, northern, northwestern, southern and southwestern.

In 1978, the country had a central laboratory for the diagnosis of diseases and the production of biologicals (including strain 19 brucellosis vaccine, Chinese strain (K) for hog cholera, and canine and human anti-rabies vaccines). There were also 8 regional laboratories for simple diagnoses, i.e., serology (diagnosis for brucellosis) and coprological analyses.

This general survey shows that the overall control of diseases in the Dominican Republic was very limited, because there was no central comprehensive veterinarian service.

It might said that, without specifically saying so, we trusted merely in to the fact that we were a country sharing an island and that this would prevent the introduction of any exotic diseases. Undoubtedly that gave us an advantage, but unfortunately, the development of international tourism and the increase in trade with other countries without increased surveillance and control measures in ports and airports necessarily meant that sooner or later, we encountered the reality of an exotic disease in the country, without being properly prepared to detect it in time or to control and eradicate it.

3. OCCURRENCE OF THE DISEASE IN THE COUNTRY

A severe disease appeared in February 1978. It caused many deaths in the hog population, and the symptoms were similar to those of the "dandy" hog cholera, or KC2, as it was known in the countryside. The first deaths occured in the National District, specifically in the town of Villa Mella, subsequently spreading throughout the rest of the country.

Veterinarians confused the disease with hog cholera, and as a result, the Livestock Bureau began a general plan of vaccination against hog cholera. Some 100,000 doses of China (k) vaccine were produced. Since the animals did not respond to the vaccination against hog cholera, the presence of African Swine Fever was suspected, first by veterinarians of the Autonomous University of Santo Domingo.

At the beginning of July, arrangements were made with the Pan American Sanitary Bureau (PASB) to send samples of organs and serum from San Juan de la Maguana to the Animal Disease Laboratory at Plum Island, New York. The confirmation of the disease was received on July 5, 1978. The country was indeed infected with African Swine Fever.

From the beginning, the strain of the virus operating in the Dominican Republic was recognized as having characteristics different from other strains such as the African, Lisbon and Havana strains. It was less virulent, had longer incubation periods and lower death rates (40-60%, and rarely more than 80%).

3.1 The Initial Actions

African Swine Fever control actions were begun immediately on July 7, 1978:

By Decree 3479 dated July 12, 1978, a Commission responsible for taking the measures needed for total eradication of the outbreak of African Swine Fever was created. This Decree was amended by No. 44, which during the same month created the "High-Level Commission for the Eradication of African Swine Fever", which was chaired by the Secretary of State for Agriculture. The Director General of Livestock acted as Secretary, and representatives of the Secretariat of the Armed Forces, the Agricultural Bank, the Secretariat of State for Public Health and Social Welfare, the Dominican Agrarian Institute and the Price Stabilization Institute were also members.

The first specific control measures included:

- Slaughter and burial of sick and potentially sick (exposed) hogs in the focal and perifocal areas.

- Institution of quarantine and epidemiological surveillance measures in threatened areas.

- Rapid establishment of a laboratory for the diagnosis of African Swine Fever, with the cooperation of international agencies.

- Compensation to hog farmers for the loss of their animals as a result of the disease.

- In law 909 dated August 11, 1978, the National Congress empowered the Executive to issue and negotiate bonds to the value of RD$10 million, as a means of covering the cost of compensating hog farmers.

Despite these actions, the rapid multiplication of foci and their spread to the entire country meant that the eradication strategy had to be changed: it was decided that the entire hog population would have to be completely and definitively eliminated. The basic components of this strategy were:

- Total slaughter of the species
- Disinfection
- Evaluation and compensation
- Veterinary services at the border (quarantine)
- Health education and publicity campaign
- Carcass dressing, storage and consumption

At the same time, the International Agency for Development (USAID) was approached for a loan to finance the eradication program.

Loan No. 517-T-031 was signed on December 14, 1978 by the Government of Dominica and AID. The loan was for US$6 million, together with a donation of US$200,000 for technical assistance. The Dominican counterpart was RD$20,845,000, of which RD$20 million were for compensation and RD$845,000 for operating costs.

4. AFRICAN SWINE FEVER ERADICATION PROGRAM

The High-Level Commission for the Eradication of African Swine Fever required an executing agency for the different phases of the ASF Program, and the Executive Secretariat of the High-level Commission was therefore created.

The first portion of the loan funds was made available to the Executive Secretariat at the end of May 1979, so that it could begin to implement an animal health surveillance program. The principal activity of this program was to be a nation-wide serological study, to begin in the eastern part of the country, to determine which areas were affected by ASF.

1979 was a year of considerable activity, both in the organization of the program and in program execution at the field level.

The program, which began in June 1979, was to consist of three basic phases to be carried out over a 27-month period:

First phase:	Slaughtering/Decontamination
Second phase:	Health Surveillance
Third phase:	Sentinelization

Up until the end of 1978, the main activities of the African Swine Fever Eradication Campaign were fairly disorganized, until it was decided to start the Eradication Program. The decision was taken to begin a pilot plan in the east of the country and the Samaná Peninsula, to be completed within 9 months. This would test the program's feasibility and enable it to be applied in the rest of the country. The Plan also called for slaughtering all hogs found in a 15-km wide band along the border with Haiti. For preference, the work would move from east to west.

A field study (logistics plan) was done to determine the strategy to be folowed in the slaughter and decontamination of the eastern region and the Samaná Peninsula. This study, which was completed on March 29, 1979, determined that it was more feasible to have the decontamination done during the second phase of the plan (health surveillance), because carrying it out during the slaughter phase would reduce the efficiency and performance of the brigades.

The Government took the decision to complete the First Phase (Slaughter/Decontamination) on August 31, 1980. This forced the Executive Secretariat to reinforce its personnel structure and to bring on 7 regional animal health experts (7 veterinarians for the 7 regions). Other technical experts, military personnel, workmen and assistants were also added to the program. By October-December 1980, the Eradication Program had a staff of 729:

57	Veterinarians
76	Technicians in various fields (responsible for the brigades and other works)
126	Technical assistants
264	Military personnel
38	Administrative personnel
2	International technical assistants
729	

4.1 First Phase: Slaughtering

This phase meant the slaughter of all hogs and the subsequent decontamination of all places where they had been living and all objects that had been in contact

a) Detection:

Consisted of taking blood and/or tissue samples in order to detect the presence of the ASF virus and thus locate the places that had to be taken into account in the sentinelization phase.

The Swine Diseases Laboratory was used for the analysis of the samples, and the following diagnostic techniques were employed:

- Direct Immunofluorescence (DIF)
- Indirect Immunofluorescence (IIF)
- Immunoelectroosmophoresis (IEOP)
- Hemoabsorption
- Elisa's technique
- Seroneutralization

The total number of samples analyzed for ASF was 27,387, as follows:

1979-1980: 12,348

Samples of tissue and serum from farms, backyards, slaughterhouses, woods and national parks. The findings were as follows:

12,221 negative samples
70 positive samples
53 unsuitable samples

The 70 positive findings in December 1980 were found throughout the length of the country.

The last positive case found by a DIF test on tissue, with reported deaths on the farm of origin, was in the Sánchez Ramírez Province (Cotuí) in July 1979.

The last diagnosed case (IIF) on a sample without any reported deaths was in the national district, in the township of Guerra in August 1980.

1980-84: 15,039

All samples analyzed for ASF tested negative.

During the period 1981-1983, 15,877 samples were processed for the diagnosis of hog cholera in the sientine hogs and the hogs in the Restocking Program, and all tested negative.

b) Slaughtering:

The total elimination of all hogs, whether or not they were suitable for consumption.

The slaughtering phase was begun in November 1979 as a pilot plan in the eastern region and the Peninsula of Samaná, and in a 15-km wide area along the border with Haiti. The plan in the east began in August 1979 and ended in January 1980. The slaughtering in the rest of the country began in March 1980.

The slaughtering phase ended in the entire country in August 1980. During the entire period, a total of 157,567 hogs, belonging to 24,229 pig farmers, were slaughtered directly.

Three principal systems were used in the slaughtering phase:

- The health rifle
- The mazo
- Injections of succinilcolina chlorohydrate

Burial trenches were used. These were sufficiently deep so that there would be 2 meters above the carcasses, and on top, at ground level, there was a 3-foot mound of earth. The hogs were disembowelled and burnt before burial.

Buying and selling of apparantly healthy pigs was allowed and encouraged through free trade and through the mechanisms of the Price Stabilization Institute.

Pigs on Saona Island (458) were totally eliminated, because although in principle, consideration was given to keeping them as a genetic reserve for the Restocking Program, the findings of a serological survey indicated that although they were free of ASF, there were positive testings of hog cholera. This forced a decision to abandon the project.

c) Compensation

A price was established of RD$1.00 per kg of meat of the slaughtered hogs. The 157,567 slaughtered hogs produced a total of 8,501,527.12 kg of meat, for which RD$8,501,512.10 were paid through the Agricultural Bank. An additional RD$8,514.06 were paid for the appropriation and destruction of sausages and cholera vaccines on sale during the last quarter of 1980.

The control posts were important in carrying out the Eradication Program, because without them, it would have been difficult to carry out a planned slaughter program.

The checkpoints dealt with inter-regional, inter-provincial and international traffic. At that time, the country had 11 maritime ports, 5 airports, and 4 border posts along the border with Haiti.

By the end of the slaughtering phase, 25 control posts were in operation.

After August 31, all live hogs within national borders were declared to be of "public utility".

4.2. Second Phase: Epidemiological Surveillance

This phase, which was carried out immediately after the slaughtering, lasted for three months. During this period, brigades went through the entire slaughter area searching out any live pigs or products that had been prohibited in the area. During this phase, live animals, pork meat and related by products were seized.

The area under epidemiological surveillance was surrounded by a military cordon.

During this phase, farms and places where pigs had been raised were decontaminated and certificates were issued. The 25 control posts throughout the country played an important role in this work.

The decontamination of farms and places where pigs had been raised was done mainly with iodine- and phenol-based disinfectants.

- One stroke Environ (R), a strong anti-AF phenolated compound
- Varopdome (R), an iodine compound
- Mikloklene (R), an iodine compound

4.3. Third Phase: Sentinelization

The preparations for sentinelization of the eastern region and the Samaná Peninsula began in the second quarter of 1980. The Eastern Hog Reproduction Center (CERPE) in the Seybo was put into operation for this purpose.

In this phase, hogs imported from the United States and Canada that were highly susceptible to ASF and hog cholera were located in places chosen by the Executive Secretariat.

The first 1,341 sentinel hogs arrived in July 1980. They were taken to the CERPE, where they were quarantined for a period of one month and then distributed for sentinelization purposes.

The following criteria were used to select the places where the sentinel animals would be placed:

70% in places in which there had been a positive laboratory diagnosis.

20% in places where deaths had occurred.
10% in places where hogs had been raised without evidence of ASF.

The sentinelization phase was to last for 3 months, beginning in the eastern region in August 1980.

A total of 174 locations were selected in the eastern region and the Samaná peninsula and the sentinelization phase was completed there in December 1980.

The animals underwent frequent clinical checks and coprological analyses (every 21 days), and were bled after 45 days for the purpose of ASF and hog cholera diagnosis.

The sentinelization phase had been completed by mid-1981 in five of the country's agricultural regions. That meant that all animals in the southern, southwestern, and northwestern (border) regions had been slaughtered, but that the sentinelization program would not be started until such time as the ASF eradication program in Haiti should slaughter pigs in the areas bordering on these regions.

The sentinelization phase in the central, northern, northeastern and north-central regions was completed by May-June 1981, while sentinelization in the south, southwest and northwest ended in the period August-November 1982.

The sentinelization phase in the southern region used 308 animals, divided into 77 groups of 4 animals. In the southwest, 280 animals were used, divided into 70 groups of 4 pigs each.

The principal pathologies suffered by the first sentinel animals were: myasis, allergic asthma, conjuntivitis, abcesses, pneumonia, diarrhea, bronchitis, dermatitis, onphalitis and otitis.

4.4. Research

Concurrently with the three phases of the Eradication Program, a study was begun in July-September 1979 of vectors capable of serving as reservoirs and transmitting African Swine Fever.

a) A study to determine the presence of the Ornithodorus tick, which can transmit the ASF virus.

This tick, of the Argasidae family, is found in the north (Puerto Plata, Santiago), northwest and center (Hatillo, San Cristóbal) of the country.

In the period July 1979 through December 1980, samples were taken from 122 farms, and sent to laboratories in the United States, where they proved to be negative.

Further samples were taken in more than 200 farms in September 1983, and all of the samples collected were negative for ASF and hog cholera.

b. Capture of wild pigs

This operation also began in the period July-September 1979, to capture wild pigs in wooded areas and national parks.

Sixty-nine wild pigs were captured during this period, and 92 samples of tissue and 58 of serum were collected. All proved to be negative.

5. THE RESTOCKING PROGRAM

Once the sentinelization phase had been completed, the Restocking Program began in August 1981. The system used was the one known as "two for one" (each new pig would be paid for with two piglets born of the first litter). The Restocking Program was reformulated in August 1982, and the "two for one" system was abandoned. The new system of distribution consisted of sales to small hog-raisers and associations of hog raisers. Complementary to this new system was a distribution through the "Reforestation with Pigs" Program, which had the dual purpose of restocking the hog population and contributing to reforestation of the country (1,000 trees were to be planted for each pig given).

Large numbers of pigs were bought by the State and private enterprise, both within the Dominican Republic and in the United States and Canada.

By August 1982, the hog population was estimated to be 27,233, on 605 farms, following specific hog-raising standards supervised by the Hog Restocking Program and by September 1983, the hog population was estimated to be 320,364 on a total of 2,936 farms.

All the farms had to honor the rules laid down by the Program for the establishment and imports of pigs.

As rapid restocking proceeded, epidemiological surveillance measures continued to be reinforced.

Samples were sent to the Pig Disease laboratory, and further controls were set up on internal traffic and at border posts, ports and airports.

As of October 1983, the Restocking Program reported that a total of 13,144 pigs had been distributed:

-	Pigs distributed through the "two for one" Program	1,516
-	Imported pigs	7,405
-	Pigs bought inside the country	2,803
-	Pigs bought and distributed by related institutions	1,420
		13,144

In February of 1984, the hog population was estimated at 400,000.

To date, the entire program has spent RD$23,533, 934.10 since its inception in 1979.

The benefits of the program are:

- The elimination of the "back-yard" system of hog raising, which had made it easier for diseases to spread.

- Higher technical standards of hog raising, which has now become an important economic factor in national production.

- The development of an entire industry revolving around hog production: sausage factories, feed processors, equipment manufacturers, etc.

- An increase in production coefficients: an average of 8 piglets per litter, a high yield per litter, higher yield per dressed carcass, an increase in the level of feed-meat conversion, etc.

At present (1985), only the first of these benefits has failed to continue, because after the country was declared free of African Swine Fever, the open ("back-yard") system of pig-raising has again been increasing.

A national pig survey was done in July 1984 and the total number of pigs in the country was found to be 505,104 on 17,296 farms. The Restocking Program is considered to be a complete success.

At the same time, a national crisis was occurring in the hog-farming sector, as the result of a number of factors:

- An increase in the cost of inputs (feed).
- A high dependence on imported inputs.
- The country's inability to produce gains locally in the quantities necessary to keep pace with the rapid increase in the pig population.
- Marketing difficulties, due to the low purchasing power of consumers and the absence of foreign markets, principally because of restrictions in the United States, which limited meat imports because of public health regulations (analysis of waste in the Bromatology Laboratory).

The outlook for a recovery of hog farming after the first half of 1985 is good, with the prospect of meat exports to the United states and the sale of live pigs to Haiti for its own restocking program.

6. THE COUNTRY IS DECLARED FREE OF AFRICAN SWINE FEVER AND HOG CHOLERA

In a ceremony at the Universidad Central del Este (San Pedro de Macorís) chaired by the Secretary of State for Agriculture and attended by guests from a number of national and international institutions, the Dominican Republic was declared free of African Swine Fever and Hog Cholera on February 14, 1984.

The slaughter/decontamination, epidemiological surveillance and sentinelization phases had been completed; a period longer than that required by international regulations had gone by without a single diagnosed case of ASF and hog cholera, and the country thus had met the principal objectives of the program.

According to the regulations of the International Animal Health Code of the International Epizotic Organization, a country may be considered as free of African Swine Fever when 6 months have passed after the slaughtering (stamping out) without any further evidence of ASF.

The slaughtering was conducted in our country with disinfection, and the last case appeared in August 1980. The declaration came in February 1984.

Immediately thereafter, recognition of this fact was requested from a number of friendly countries, mainly the United States, with which most of our foreign trade is conducted.

U.S. recognition came on June 18, from the U.S. Department of Agriculture.

AFRICAN SWINE FEVER ERADICATION AND SWINE REPOPULATION IN HAITI

Dr. Jolivert Toussaint
Ministry of Agriculture
Haiti

It is now a little more than a year since we have been able to speak about the presence of African Swine Fever in Haiti. In fact, we must go back to March 3, 1984 to find the last two positive cases, verified in two black pigs in the region of St.Marc. Since then, all tests have proved negative. These tests have been conducted on captured black pigs, sentinel animals and samples of privately imported hogs.

The country was declared free of African Swine Fever on September 3, 1984, and notification was sent to other countries, particularly those that had helped eradicate the disease, and to the international animal health authorities.

Nonetheless, a series of measures have been taken since March 1984, the date of the last positive case:

1. Institution of a blood testing system at all sites in the country;

2 All doubtful cases found at the time of analysis were sent to Plum Island, New York in the United States.

3. New guidelines and directives to the zoonoses and infectious diseases section: health control of swine;

4. Opening of discussions on a thorough reorganization of animal quarantine.

A small project was set up by the Service and approved by the relevant authorities to conduct testing throughout the country. Initially, this has permitted the Service to begin a system for testing a sample of hogs and ensuring that the samples are sent to the laboratory in good condition.

Sample for each site: 1/2 of the adult population, young animals already weaned.

Parallel to this activity, samples of tissue taken from dead animals are sent to the laboratory for analysis. If by chance, the weather or distance makes it impossible to take the sample and the animal has been buried for more than 12 hours, strict surveillance of the hog farm or site is required for some days, in order to guard against any abnormalities.

In addition, IICA and AID have both found the means of assisting in the various hog testing activities and research. Their assistance has been invaluable, and has enabled us to increase the number of samples taken during the second phase of the testing campaign.

Most of the samples were taken in duplicate. One of the samples was sent to a laboratory in the United States for reference testing. The following findings come from the laboratory of the Ministry of Agriculture:

Month		No. of samples	Findings
January	1984	368	Negative
February	1984	281	2 Positive
March	1984	11	Positive
April	1984	15	Negative
May	1984	8	Negative
June	1984	6	Negative
July	1984	5	Negative
August	1984	34	Negative
September	1984	4	Negative
October	1984	1	Negative
November	1984	2	Negative
December	1984	388	Negative
January	1985	44	Negative
February	1985	354	Negative
March	1985	188	Negative

As the table above shows, no case of classic hog cholera or of African Swine Fever has been verified since March 1984.

Strict application of import controls has been required throughout this period. Imports were allowed only from countries free of hog cholera and ASF, and additionally, of other diseases that might occur in the farm of origin, namely, porcine atrophic rhinitis, Aujeszky's disease, tuberculosis, brucellosis, transmissible gastro-enteritis. Thus far, all hogs imported after the sentinel phase have come from the United States. Of course, other countries, particularly in the Americas, could participate in this program, but a lack of information has prevented them from doing so.

Veterinarians have been stationed at international ports and airports, and at the principle points of entry along the border, where many pork products have been seized and burned. The same is true of the international airport, where in particular, hams coming from other islands have been confiscated for destruction.

The first hogs imported after the sentinel phase were brought in by the GOH/IICA/AID Project. Then the private sector began to move into the same activity. A quarantine period is required for all imports, and thus far, no major problem has been noted.

The hogs have adapted well to the climate of Haiti, despite a Husbandry system that is different from that used in their country of origin. In some cases, the environment on peasant farms was far from ideal, but we have determined that it was mainly the daily care the animals are given, particularly their food (water and feed), that determined the yield (non-industrial farming). In rural areas, problems of feed had to be addressed, particularly during periods of drought. A solution was found by the Ministry of Agriculture: rations of 16% and 18% protein, including even some prime material (wheat bran or mash), were made available to the 14 agricultural districts. The sale of this feed enabled the different agricultural districts to set up a revolving fund to secure direct supplies and thus provide a better service to the peasants.

In Haiti, those farmers whose hog raising is intensive or semi-intensive have products and drugs available that enable them to solve certain small problems. The situation for the peasant farmer is different, however. The peasant farmer is more likely to wait for assistance from the State, i.e., the Ministry of Agriculture. Therefore, the Ministry of Agriculture has increased the number of staff in the animal health service that work with health surveillance of swine, and has provided farmers in the 14 agricultural districts with a set of veterinary products (drugs, syringes, needles, vaccines). Agents and veterinarians are stationed in the different towns in the agricultural districts to ensure that the Service performs effectively. They are ready to respond to the slightest alert. Their interest has become greater since the Ministry has recently been thinking about increasing their salaries...

The emergency intervention section set up within the service acts in all cases of anthrax, rabies and sick hogs. Regular inspections are also assured by the Chief of the Service, both to provide moral support, to see the situation in situ, and to assist the technician in the field to find a solution to the many problems he may have to deal with.

The attempt has been made to control all health problems that occur in the different agricultural districts. With the assistance of the laboratory, the following diseases have been identified in hogs:

Ascariasis
Cutaneous myiasis
Mastitis-agalactia syndrome
Vaginitis
Neo-natal diarrhea
Dystocias

Although leptospiras have been found in certain samples, no clinical signs of Leptospirosis (Leptospira, pomona) have been verified in hogs.

The restocking of the hog population has been done at two levels: 1. the offspring of hogs formerly used as sentinels were distributed to the peasants (generally to groups of peasant farmers), or the community action councils. The IDB project will be attached to this one. 2. The GOH/IICA/AID project has a reproduction center, with 500 progenitor hogs imported from the United States. Reproductive animals are sent out from this center to secondary multiplication centers, where the offspring will be pre-selected before being given to the peasants.

The loan obtained from the IDB should ensure complete restocking of the country and the setting up of adequate structures conductive to the development of the hog industry.

It should be noted that at both levels, the private sector buys and sells young pigs to develop their own farms. But this goes beyond a mere activity of immediate interest, when the actions of a private entrepreneur cover several small farmers or peasants. Thus AEPN (Association of Hog Farmers of Nippes) is working actively to restock the hog population and is giving considerable assistance to the small farmer. The rub is that this association does not merely think of the interests of the small farmer, but also of its own.

The current status of the different activities involved in the hog restocking program is shown below:

No. of departure sites (sentinel animals)	500
No. of new sites	350
Total:	850

Hog population

Sentinel and breeding animals	7,191
Hogs imported under AID/GOH project	500
AID/GOH breeding hogs	1,913
Privately imported hogs	567
Total:	10,171

This figure should be increased to reflect the young pigs born of hogs imported by private farms.

EXOTIC DISEASES FOR THE ANDEAN SUBREGION

Dr. Pablo Quevedo Rodríguez
Cartagena Agreement
Lima, Peru

The first meetings of government animal health experts of the Member states of the Cartagena Agreement made it clear that in order to prevent the introduction into the Andean Subregion of diseases exotic to the area, it was necessary first to have a list of the diseases, and then to have a mandate from the Commission to enforce established restrictions and prohibitions on imports to the Andean Subregion of animals and agricultural products from affected countries.

Articles 23 and 25 of Decision 92, which set up the Andean Agricultural Health System, thus refer to the Basic Catalogue of Exotic Diseases in the Andean Subregion.

The initial list for this Catalogue was drawn up by the III Meeting of Government Animal and Plant Health Experts held in Quito on December 9-10, 1976. The Meeting also recommended that the Board take appropriate action to propose it to the Commission. At its Twenty-third Regular Session, the Commission approved the list by Decision 122, and it went into effect on December 16, 1977.

Pursuant to Decision 122, the Basic Catalogue of Exotic Diseases in the Andean Subregion lists all those diseases that have not been varified as existing in the Member states and that cause considerable harm to agricultural and livestock production because they are easily transmitted, costly to control and difficult to eradicate. In addition to the names by which the diseases are commonly known, the Catalogue specifies the causal agents, the animal group affected, the agricultural products and by-products, and in general, all objects by means of which the exotic diseases can be spread. It also lists the countries affected by these diseases. The Member states have undertaken to prohibit the importation of animals and animal products from such countries, except when they have complied with the requirements and procedures to ensure that the animals are not infected.

In preparing the list of diseases in the Basic Catalogue, the government experts were conscious that the animal health situation is constantly changing and that the list would therefore need to be brought up to date whenever warranted, so as not to have an adverse effect on the trade of animals and animal by-products between the countries of the Andean Group and third countries. This would be essential to the normal functioning of the Andean Agricultural Health System.

The changes that had occurred in the initial list contained in the Basic Catalogue approved by Decision 122 were submitted to the Fifth Meeting of Ministers of Agriculture of the Andean Group, which decided that the Catalogue should be updated. Subsequently, in its Decision 195, the Commission of the Cartagena Agreement approved the Basic Catalogue of Exotic Diseases in the Andean Subregion, which includes the following animal diseases:

- Foot-and-mouth disease (virus Sat 1, 2, and 3 and Asia 1). Affects all cloven-footed animals and their meat, products and by-products originating in Africa south of the Sahara and the Asian continent.

- Rinderpest, which affects all live ruminants and swine and their unsterilized products originating in some African and Asian countries. (The Annex to Decision 195 gives an exact list of those countries known to be affected).

- Bóvine contagious pleuropneumonia, which means that live bovine and semen from Africa south of the Sahara and Asia may not be imported into the Andean Subregion.

- Sheep pox, which affects live sheep and untreated wool originating in Africa and Asia.

- African horse sickness, which affects solipeds, their meat and unsterilized products. The entire African continent, with the exception of Morocco, Algeria, Tunisia and Libya, is known to be affected.

- African swine fever. Hogs, pork, unsterilized products and by-products and semen from Africa south of the Sahara, the island of Sao Tome and Principe, the Iberian Peninsular and Italy, and Haiti and Brazil may not therefore be imported into de Andean Subregion.

- Swine Vesicular disease, which affects hogs, their semen and unsterilized products and by-products originating in Europe and the Far East.

FIRST CONSULTATION OF INTERNATIONAL ORGANIZATIONS ON ANIMAL HEALTH IN THE AMERICAS

Dr. Norvan L. Meyer
IICA
Washington, D.C.

At the suggestion of the United States Department of Agriculture (USDA), a meeting was held in Washington, D.C., January 25 and 26, 1984, to discuss coordination of animal health activities of the various international organizations operating in the western hemisphere.

The following is a list of those in attendance at the meeting:

<u>Food and Agriculture Organization (FAO) of the United Nations</u>

Dr. Henry Jasiorowski, Director of Animal Production and Health Division.
Dr. Y. Ozawa, Chief, Animal Health Service.

<u>Inter-American Institute for Cooperation on Agriculture (IICA)</u>

Dr. Frank J. Mulhern, Director, Animal Health Program.
Dr. Héctor Campos, Animal Health Specialist.

<u>Regional International Organization for Plant and Animal Health (OIRSA)</u>

Dr. Lionel Jaen, Chief, Section on Foot-and-Mouth Disease, OIRSA, Panamá.
Dr. Roberto Rivera, OIRSA Representative, Mexico.

<u>Pan American Health Organization (PAHO)</u>

Dr. Mârio V. Fernandes, Coordinator of Veterinary Public Health Program.
Dr. Primo Arambulo III, Regional Advisor of Veterinary Public Health Program.

<u>International Office of Epizootics (OIE)</u>

Dr. Luis Melendez, Chef du Department Technique.

United States Department of Agriculture (USDA)

Dr. Norvan L. Meyer, Assistant Deputy Administrator, International Programs.

In addition, the "Cartagena Agreement" (JUNAC) was invited to send a representative but did not do so.

The Agenda for the meeting was as follows:

1.	Introduction and Welcome	John Ford Deputy Assistant Secretary
2.	Animal Health Programs 1984-1985	Each Organization
3.	Exotic Disease Program	Each organization
4.	Mechanics of Coordination Between Organizations	Group Discussion
5.	Establishment of Channels of Communication Between the Directors of Animal Health	Group Discussion
6.	Place and Date of Next Meeting	Group Discussion

CONCLUSIONS

* FAO offered to host the next meeting of the Directors of Animal Health. The offer was accepted by the group.

* The next meeting of Directors of Animal Health of the International Organizations will be held toward the end of calendar year 1984. FAO is to suggest date and will consult each Organization on agenda, time, and place. Will provide simultaneous translation.

* Hope to meet at least once each year.

* Haven't been keeping each other informed, but will try to do so in the future.

* Animal health activities in the OIRSA area should be coordinated through OIRSA.

* PAHO is recognized as the FMD research, diagnosis, and prevention program leader for the Americas.

* IICA's role is prevention and eradication of animal disease other than vesicular disease.

* OIE works in harmony with the other international animal health organizations and is not involved in the problem of overlapping responsibilities which faces IICA, FAO, PAHO, OIRSA, and JUNAC.

* FAO, if requested, will try to provide "first-strike funds" to deal with an animal disease emergency.

* All agreed that a single meeting of CVO's of the countries of the Western Hemisphere is a worthy goal; however, it was decided that the integrity of RIMSA, COINSA, and CIRSA meetings must be maintained at this time.

* It was agreed that joint meetings on animal health and production might be considered for the future. However, any immediate change to such a format might dilute animal health efforts.

* If one Organization elects to take emergency action against an animal disease, the other Organizations should be so advised.

* The participants agreed that the meeting was very useful and expressed appreciation to USDA for having arranged for it.

SECOND CONSULTATION OF INTERNATIONAL ORGANIZATIONS ON ANIMAL HEALTH AND PRODUCTION IN THE AMERICAS

Dr. Yoshiro Ozawa
FAO
Rome, Italy

The II Consultation of International Organizations on Animal Health and Production in the Americas was convened by the Food and Agriculture Organization of the United Nations (FAO) on the premises of the Commission of the Agreement of Cartagena (JUNAC) which had kindly agreed to host the meeting, from 3 to 5 December in Lima, Peru.' FAO, IICA, JUNAC, PAHO, OIE and USDA participated at the meeting, and regrets were received from CIAT and OIRSA.

The participants were welcomed by Dr. Pablo Quevedo, Chief of the Agriculture Department of JUNAC, who explained the objectives and structure of the Agreement of Cartagena, its secretariat and the modality through which it cooperates with its member countries. Mr. Gerd H. Behrendt, FAO Representative in Peru, then inaugurated the meeting in the name of Mr. Edouard Saouma, Director-General of FAO, drawing attention to the importance of the event to facilitate greater collaboration with countries through better coordination of animal health and production programmes in Latin America and the Caribbean.

Dr. Y. Ozawa, Chief, Animal Health Service of FAO, expressed the Organization's appreciation to JUNAC for hosting the meeting and referred to the first consultation convened by the United States Department of Agriculture (USDA) in Washington, D.C., 23 and 24 January 1984. He briefly reviewed the conclusions of that meeting when it was also agreed that FAO convene this meeting.

The provisional agenda having been adopted, the chair was taken by the convening Organization (FAO). Dr. P. Auriol, Chief, Animal Production Service of FAO, introduced the working document on livestock development summarizing its most salient points, drew attention to the industry's great importance in the region and that some countries at present exporting meat will cease to do so while others will have less available for export and the dependence of others on imports to satisfy the needs of their populations will increase. He reviewed technical constraints which have to be overcome to improve productivity and drew attention to the important role the minor species such as poultry, pigs, sheep and goats can play to increase supplies and raise the income of the farmer short of capital, land and other resources. Attention was also drawn to deficiencies in animal health protection infrastructure, such as diagnostic laboratories, to constraints related to research, extension and training, inter-communication at various levels and the need for identifying and promoting opportunities for technical cooperation between developing countries.

During the ensuing general discussion, Dr. L. Blajan (OIE) drew attention to the importance of the camalidae within the concept of support to the small farm sector; Mr. Jara Almonte (IICA) reported on the small farm production systems developed in Central America through a multidisciplinary approach and the key role of the extensionist in transferring the systems and technology developed. The need for the strengthening and reorientation of curricula by teaching institutions, especially in Agricultural Colleges, was emphasized. Dr. Ozawa informed the meeting of FAO's intention to convene a consultation for this purpose in 1986 and suggested that perhaps this could be held jointly with IICA and PAHO which have also programmed similar meetings.

Dr. Primo Arambulo (PAHO) commented on the lack of integration of field and laboratory animal health services, which in many instances do not take full advantage of existing facilities and the data being generated by them for the planning process. Dr. Héctor Campos López, Director of IICA's Animal Health Program, welcomed the inclusion of animal production in the agenda and referred to his Organization's animal health and production plan for the year 2000. Dr. César Wandember (JUNAC) drew attention to the need for harmonization of animal health requirements to promote intercountry trade and summarized the Andean Animal Health Protection System established by the JUNAC to protect livestock industries.

The item on the agenda concerning meetings, seminars, workshops, training courses programmed for 1985, and publications, was introduced by the representatives of FAO, IICA, JUNAC and PAHO, submitting their respective lists with brief descriptions and explanations of regional and country level activities in respect of their objectives and scope. The JUNAC representative explained that its programme was related to the integration process of its member countries, with emphasis on food security plans at the national and Andean level. It was pointed out that meat and milk were of great importance in these plans. IICA also submitted a list of animal production and health projects, most at the country level, in which that Organization participates, and expressed interest in collaborating with the laboratory network being developed by FAO. PAHO's new approach and objectives outlined in "Health for all..." was explained, as was the magnitude and scope of its Veterinary Public Health Programme.

The representatives of IICA, PAHO and OIE explained that their respective COINSA II, RIMSA IV and VII Regional Conference of the OIE would be held sequentially from April 29 through 3 May 1985 in Brasilia, Brazil and was evidence of active coordination for the benefit of the countries.

Dr. Norvan Meyer (USDA) drew attention to foreign disease diagnosis training courses held by USDA to which participation by professionals from other countries can be arranged as could also be done for other courses provided prior arrangements are made. He indicated USDA's interest in examining the possibility of collaborating with the FAO planned seminar/simulation on avian influenza and new cattle disease to be held in Mexico. It was pointed out by various representatives that while considerable successful coordination efforts had been made at the country level, there was a long way yet to go at the regional level. The difficulty was due to the fact that efforts are not being made, as they should at the initial planning stage because of the difference in planning and budgetary cycles. Joint prior planning is therefore necessary. It was also pointed out that organizations should announce their intention to prepare a certain publication so as to promote harmonization of criteria and avoid duplication.

The necessity to hold a joint seminar or meeting on subjects related to trade and quarantine was expressed by some participants.

It was concluded that participating organizations would study the lists submitted and examine them for possible coordination and collaboration and where indicated will contact the convening organization concerned.

Existing animal disease information systems at the global, regional and subregional level were then reviewed by the participants. In respect of FAO's annual publication of the FAO/WHO/OIE Yearbook, information was provided on the inclusion of food and economic loss estimates and the efforts being made to computerize available data for the generation of printouts as needed in the future. The OIE's terms to reference were reviewed and its normative and informative functions explained. A distinction was made between its "ALERT" and periodic information modes. The former was in respect of the appearance of an outbreak of a disease of which a country had until then been free, while monthly information was on outbreaks of List A diseases, epizootiological information and information on meetings. The mechanism adopted to improve OIE's information system with a view to its computerization to allow more rapid compilation, analysis and dissemination of data was explained. The existing linkage between OIE, FAO and WHO to make available the information received from countries members of one but not the other organization, was pointed out.

At the regional level, PAHO's information system on vesicular disease, operated by the PAHO/PAFMDC in conjunction with information generated through neighbour country agreements through which vital information pertaining to border areas in generated, was discussed. Also discussed was JUNAC's system comprising an "ALERT" mechanism and three monthly reports concerning the Andean sub-region. Similarly, OIRSA has its own system for Central America, Mexico and Panama.

IICA informed the meeting of its intention to implement a very interesting Inter-American Animal Health Information and Surveillance System linked to CIDIA as recommended by its Governing Council. The system is meant to combine animal and plant disease, pest and plague information, in collaboration with USDA.

During the ensuing discussion there was a consensus that all concerned would collaborate and coordinate their activity in this field, in accordance with the norms established and being developed by the OIE and that member countries should continue established practices of direct notification of the organizations of which the country is a member. This was particularly relevant in respect of situations when there was need to attract initial emergency assistance, defined at the first Consultation held in Washington, as for example that of FAO's Technical Cooperation Programme.

It was recommended that:

> "For the unified information system on animal health being developed in the Americas to be effective, it must be fully compatible with that of the OIE, and the established practice of direct notification of the Organizations of which a country is a member should be continued."

Suggestions on future collaboration between organizations for the better utilization of available resources through possible pooling and thus preventing duplication were discussed in depth. Difficulties inherent in different planning, budgetary cycles, and the varying mechanisms currently employed to consult with member countries were mentioned. There was full consensus that closer collaboration between the Organizations and the coordination of their activities was not only desirable but was also mandatory. Consideration was given during the discussion to the possibility of specific technical subject matters, geographical or agro-ecological zones being given priority for concerted action. The mechanism employed by the participating organizations to provide collaboration to countries were reviewed.

In this connection it was recommended that:

"- International organizations developing activities related to sanitary and hygiene aspects of meat industry and trade orient their actions in this field in support of the member countries of the Agreement of Cartagena;

- Concerning training and education activities presented at the Consultation, international organization cordinate the execution of these events with aim to optimize the utilization of human resources and minimize the economic costs involved in the organization and carrying out of these activities; and

- International organizations send JUNAC their subregional programme of animal production and health activities so that they can be submitted to the Ministers of Agriculture of the member countries of the Agreement of Cartagena."

Efforts are needed to coordinate already planned activities such as:

i) The Consultation programmed by FAO, PAHO and IICA on education and training in the field of animal health and production.

ii) IICA's interest in collaborating with the FAO Expert Consultation on tick eradication programmed for 1986.

iii) Activities related to ectoparasite control.

iv) Activities related to exotic disease prevention and control.

v) Activities related to support veterinary diagnostic laboratories.

IICA suggested that coordination of activities would be facilitated if organizations participated at each other's meetings and extended an invitation to that effect.

Mention was made of the possibility of undertaking joint ventures which should be identified, planned, financed and executed jointly. this could lead to a realistic pooling of human and financial resources of the international organizations. In this connection it was mentioned that this had already been initiated between IICA, OIRSA and USDA in Central America. "The OIE suggested that, in training activities in information service development, a collaboration should take place between the OIE, FAO, IICA and OPS; this collaboration is already facilitated by the FAO, WHO and IICA's membership of the OIE animal health information system group."

As far as animal production was concerned, the desire and need for coordinated joint activities and/or ventures was recognized and the corresponding need for planning well in advance of project formulation emphasized.

It was recommended to:

"Promote close contacts between animal production and health specialists of international organizations so that they coordinate activities through joint programming, assignment of responsibilities and execution of tasks; and

Encourage the establishment of regional/subregional networks of training/research institutions based on the concept of technical cooperation between developing countries and appropriate technology, in order to accelerate animal production through better coordination of research and training activities and the effective transfer of technology between participating countries."

An Analysis of the meat production and processing sector was presented by Dr. Auriol (FAO).

Constraints to the development of the sector were analyzed and a phased action programme based on the concept of TCDC was proposed. Assistance for the establishment of a regional meat training centre in the Dominican Republic and a review of the possibility of holding seminars and national training courses in Costa Rica and Honduras will be examined by FAO in 1985. It is also proposed that the FAO-sponsored Expert Consultation on Problems and Constraints to Meat Development to be held in 1986, should assist in drawing up medium and long-term programmes as part of an overall joint effort.

During the ensuing discussions emphasis was placed on the need for consumer production by raising sanitary standards of medium and small slaughterhouses, marketing systems which give more incentives to producers, and the need to improve the quality of products and production systems to obtain better access to foreign markets. JUNAC described its efforts to harmonize regulations governing the industry and the OIE emphasized the urgency to involve private enterprise in this process. It was agreed that the whole production and transformation process must be taken into account when compiling and analyzing the data necessary for planning for future development. IICA reported that its programme provided for simultaneous development of all the components of the industry, while FAO explained its planning process through modelling of the basis of feed resources available, species involved, demand and supply variables for both meat and milk.

It was concluded that the recommendations already made in respect of future collaboration between organizations were pertinent.

Future inter-agency consultations

It was recommended that:

"The III Consultation of International Organizations be scheduled for the day immediately following the IICA COINSA II, the VII Regional Conference of the OIE and PAHO RIMSA IV, to be held sequentially from 29 April to 3 May 1985 in Brasilia, Brazil. The consultation to be convened jointly by IICA and PAHO.

The purpose of this consultation is to:

i) Analyze the recommendations made at the COINSA, OIE and RIMSA meetings in order to identify possible joint ventures;

ii) Determine whether additional areas of collaboration are possible during 1985; and

iii) Submit and discuss lists of seminars, meetings, training courses and publications planned for 1986 for possible coordination."

It was recommended that:

"IICA Convene the IV Consultation of International Organizations on Animal Health and Production in the Americas at its headquarters in San José (Costa Rica) early in 1986. The agenda for this meeting will be agreed on in Brasilia in May 1985."

APPENDIX I

CONSULTATION OF INTERNATIONAL ORGANIZATIONS ON ANIMAL HEALTH AND PRODUCTION IN THE AMERICAS

Lima, Peru, 3-5 December 1984

PROVISIONAL AGENDA

1. Opening of the Consultation - Opening statement.
2. Adoption of the Agenda.
3. Livestock development in Latin America and the Caribbean.
4. Meetings and training activities on animal health and production for 1985.
5. Improvement of animal disease information systems in Latin America and the Caribbean.
6. Future collaboration on technical subjects and geographical areas on animal health.
7. Future collaboration on technical subjects and geographical areas on animal production.
8. Meat industry development in Latin America and the Caribbean.
9. Future inter-agency consultation.
10. Adoption of recommendations.

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0 2 JUN 199			

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