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Dominican Republic

A. General

Veterinary public health services in the Dominican Republic have never achieved a significant level of development because neither human nor financial resources have been adequately available for such activities. The major veterinary emphasis has been placed on animal disease treatment rather than disease prevention, and the small number of sveilable veterinarians or technicians have been and are currently fully occupied in attempts to cope with the animal diseases of greatest immediate economic significance. A limited investigation of bovine brucellosis and tuberculosis indicates high incidences, but no program of significant scope for control or climination of these diseases is in operation. Veterinary supervision over teat inspection and food distribution or handling is cursory at best, and most of the actual work is undertaken by inadequately trained technicians who have little support in the way of facilities for laboratory diagnostic work.

As in most other Latin American areas, food handling and processing customs are often primitive, with casual attention, at best, to sanitary precautions.

The current expenditure for livestock development and veterinary services amounts

(15

to \$300,000, less than one-fourth of one-percent of the national budget. It is

quite obvious that only token attention can be directed to snimal health and

sanitation under such circumstances.

Current veterinery planning envisages public health activities related principally to brunellosis, and tuberculosis and tick control, and veterinery inspection of meet at the major slaughterhouses, chiefly one engaged in export of meat to Puerto Rico.

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B. Environmental factors affecting health

1. Topography and climate -- The Dominican Reputlic occupies about two-thirds of the island of Hispanicla, with the entire area, including off-shore islands, comprising about 19,000 square miles. About 1,662,066 acres provide suitable improved or natural pasture for livestock, and such land is fairly well distributed throughout the country with the exception of the higher mountain regions in the West. Reasonably equitable rainfall throughout the year makes permanent grazing possible. The year-round tropical climate is conducive to the development and perpetuation of a great variety of insert pests afflicting livestock, some of which are throlved in the transmission of monoses.

2)ciSocic acconomic pattern -- The lower and middle income groups in urban and rural areas have little concept of modern food sanitation. Storage and refrigerator facilities / for handling food, particularly livestock products, are not generally available.

Consequently, meat is consumed fresh, generally the day animals are slaughtered, and milk, when the is used, generally boiled. Such empirical practices are largely responsible for preventing widespread food-borne disease outbreaks.

3. Animal and plant life

a. Animal — The insects involved in the transmission of diseases among animals have never been accurately identified by veterinary authorities.

Nosquitoes are certainly involved in periodic epidemics of equine encephalomyelities, and a great variety of ticks are responsible for the transmission of such serious enimal diseases as enaplasmosis and piroplasmosis. Perasitic worms are known to be common in enimals, but species have never been accurately identified.

h. Mutrition

Recent reports mention noxious weeds as important causes of losses in livestock
bob, as in the case of snimal life, they remain unidentified.

b. Food supply and distribution — Consumption of livestock products in the Bominican Republic remains low in comparison to that of most other Letin American countries. With little possibility for immediate production increases and a continuing trend toward siphoning off available supplies for export, there is little hope of maintaining even the present low rate of consumption. Current plans to aid and stimulate livestock production will require some time for implementation, and even longer to show significant results. The constantly rising human population increases create further demands on available supplies. The possibility for nearly doubling the country's production of livestock products by effective disease control and improved animal nutrition exists, but considerably greater technical assistance and possibly financial support are essential for implementation.

establishments exist in the Republic, but only one, Mataderio Industrial, in

Santo Domingo (), has modern facilities and refrigerated coolers.

Others, which generally consist of a concrete floor covered by a roof with water

evailable, slaughters a few head of animals for local distribution. Sanitation

in all installations is minimal at best.

A proposal has been made for construction of three new packing plants, costing about \$600,000 each. The first of these is scheduled to be built in Higuey

(), in the eastern section of the country, but further blanning and study is necessary.

The dairy industry is undeveloped and milk consumption is lower in modern of the pasteurization plant has been established in Santo Domingo.

C. Diseases

2. Diseases of animals -- Critically low animal productivity is largely a result of widespread and uncontrolled disease and parasitism. The annual calf crop is less than half that normally expected under modern livestock producing systems, and the annual slaughter rate is no more than a quarter of that expected in the more advanced livestock producing areas. Although a part of these low yields are attributable to nutritional deficiencies, by far the greatest loss results from failure to control disease.

a. Prevalent enimal diseases

(1) Brucellosis - Brucellosis is probably the most immediate important disease in the Dominican Republic. The incidence has risen to over 50 percent in some herds, and the effect, other than that of public health significance, is to reduce the calf crop and seriously retard production. Although the rate of infection has probably not yet reached the overall rate mentioned above, it is bound to spread and continue to retard production. It is already so widespread that an eradication program by elimination of reactors is infeasible and an immediate massive vaccinetion program is essential to convergention agreets) brucelloston

(2) Tuberculosis -- Although only a small proportion of livestock has been tested, tuberculosis is obviously matte common. No information is available infection in cattle in relation to chains of concerning the relative significance of tuberculosis other than bowine. Consequently, organisms modered the practical approach to control is currently uncertain. Since milk is either pasteurized or boiled, under ordinary circumstances the threat of human infection is somewhat reduced.

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- disseminated throughout the livestock population, and ticks, which are ever present, eserve to perpetuate the disease. Anaplasmosis may also be transmitted by other biting insects. Brehman type animals are resistent to the disease and, to a cortain extent, to tick infestation. However, since an important phase of the country's livestock development plans call for rather intensive importation of European type animals, which are highly susceptible to these diseases, care must be exercised in protecting such stock or in selecting only young animals, in order that they might undergo prementation, before being added to range herds. These diseases will, undoubtedly, be a constant problem in dairy hords.
 - severe losses in all classes of livestock. In cattle particularly, pasteurellosis is a serious disease. It may be complicated by virus pneumonia. A great deal of treatment of questionable value is devoted to this condition. Apparently, little attention is given to improved management as a key factor in reducing losses from this syndrome.
- (5) Equine encephalomyelitis -- This disease appears periodically in the country, with occasional heavy losses among equines. Although the human form of the disease has been reported in 1963, veterinary authorities have noted no cases among horses and have conducted no serological tests to determine whether equines or birds are herboring the virus.
- (6) Hogeholers -- Hog cholers is enzootic in the country and vaccination duting a small proportion; the account formation is a sufficient, humanings, is practiced to some extent. Controls to prevent its spread are not enforced, and foundly alternative the possibility of spread through distribution and use of uncooked garbage is completely everlooked.

- (7) Newcastle disease -- Newcastle disease is widespread and a scrious cause of losses to the small poultry producer. The newly established broiler installations can manage to prevent this disease through regular vaccination.
- (8) Other smimal diseases -- Other important animal diseases include mastitis, blackleg, pullorum disease, chicken pox, coccidiosis and a host of 1/5/6/7/11/21/parasitic conditions.
- D. Medical organization and administration (Veterinary)
 - 1. Civilian
- a. Organization -- Veterinary services in the Dominican Republic, as all other government services, are in a transitional phase. The proposed organizational structure for the Directorate of Livestock, under the Secretary of State for Agriculture, calls for a Director General of Livestock Office, with responsibility for control and orientation of all livestock activities. These activities will be directed by the office of the Sub-director of Livestock, which will supervise

(2) Section of Laboratory of Animal Biology,

(2) n . Animal Health

(3) Livestock Development

(4) " Training and Information, Cink

(5) Poultry Production,

delineated. In actual current practice there are far too few veterinarians or trained technicians to carry out the necessary programs, and the inauguration of a new constitution will not materially change the situation.

The Laboratory of Animal Biology is scheduled to carry out diagnostic investigation for field services and arrange the importation of necessary veterinary supplies.

It may also prepare a limited amount of biologics locally and cooperate in the laboratory work required in certain goomotic diseases of interest to the national public health services.

The Animal Realth Section is to be concerned with the control of infectious livestock diseases and parasites, the application of animal health regulations and field programs, the prevention of disease introduction, supervision over livestock or livestock products, and export-import activities.

The Livestock Development Section is intended to stimulate production of milk, meat and other livestock products, take care of statistical reporting, carry out investigations related to breeding, nutrition and health, operate the artificial insemination programs, and organize livestock exhibitions.

The Training and Information Section is bet up to carry out an extension activity.

The Poultry Production Section is to be concerned with expanding poultry, meat and egg production, and collaborating with regional veterinary technicians in reducing infectious diseases and parasitic infestations.

of 26 provinces, only a few have established local veterinary services. Although enough veterinary medical technicians have been locally trained to provide some degree of voterinary services throughout the country, only a few areas have resident technicians. Theoretically, these veterinary medical technicians are intended to provide emergency services, conduct the routine disease preventive procedures and supervise the sanitary processing of meat at local abattoirs.

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Veterinarians at headquarters in Santo Domingo are responsible for port and sirport requirements for import and export certification of livestock and livestock

b. Legal controls

(1) Licensure -- The director of live tock is responsible for determining

qualifications for veteriory service and no formal licensing system exists.

(2) Quarantine - I series of decress in past years have placed

quarantine and inspection of livestock requirements within the responsibility of the Secretary of State for Agriculture. | The latest Law No. 4030, January 1963, prohibits the importation of poultry (except baby chicks) in an effort to prevent infectious poultry diseases. 14/5/8/11/20/22/2h/

- (3) Inspection A regulation No. 1688, April 1956, established sanitary control of meat and meat by-products as a function of the Secretary of State for Public Health. The regulations are adequate but aside from cursory inspection and control in the city of Santo Domingo, little effort is made to inspect or enforce sanitary handling of livestock products.
- c. Professional medical organization (veterinary) -- No veterinary professional society exists in the Dominican Republic.
- d. Medical research (veterinary) conducted. adequately trained veterinary personnel nor acceptable facilities for conducting research.
- f. Emergency medical services (veterinary) -- No organized emergency veterinary medical services exist. The current veterinary force could not react effectively in the case of a serious epidemic or animal disease threat

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Military veterinary organization -- No military veterinary service exists in the Dominican Republic

Medical menpower (veterinary)

The Birector of Livestock Development has currently 26 individuals trained in the Dominican Republic or other Latin American countries on his staff. This represents about 60 percent of the veterinarians in the Dominican Republic, and the only segment of the profession. hith any degree of effective competence. Theoretically, these veterinarians are assigned principally to regions or provinces, or to major slaughterhouses. In practice, several reside in Santo Domingo or other reasonably large municipalities, and seldom are available for other than routine vaccination or inspection work in the field. Three or four are engaged in veterinary training or laboratory diagnostic work in Santo Domingo. The number of veterinarians is greatly inadequate, and without considerable outside assistance there is little hope for expanding efficient veterinary services. The Department of Veterinary Medicine, formed in the College of Agriculture in 1955, originally had four Spanish veterinarians, and the Dominican Albunantino trained in Colombia, on its staff. The number has dwindled to one full-time and a few part-time instructors, and there have been frequent interruptions in the training 1/1/5/8/11/19/23/
courses. Training has never achieved minimal accomptable standards. F. Veterinary medical facilities -- Only one veterinary laboratory, located near Santo Domingo, exists in the Dominican Republic. Current equipment and facilities limit the extent of disgnostic and investigational work, but plans are underway to obtain some modern equipment and improve facilities. | Flans are also contemplated for establishment of 30 breeding stations, some of which will operate artificial

insemination units under supervision of veterinary technicians. One of the most

critical current problems in the veterimary service is lack of mobility, few

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individuals having vehicles for field services.

government can, with current personnel and facilities, undertake significant

biological production, and supplies will need to be imported for some time.

25 Parameters of the cattle population of veterinary

25 Parameters of the cattle population and facilities, undertake significant

Reference data - Not included in this report.

- I. Comments on principal sources
- is extremely meager, simply because virtually no detailed reports have been produced in the Dominican Republic or elsewhere on veterinary or animal health problems.

 Disease incidence has been investigated only for a few conditions and not in significant scope. Veterinary activities in regard to health have been neglected.

 No surveys are available regarding the identification of parasites or insects.

 Estimates of existing conditions, suggested in a few reports, are substantiated through conversation with technical assistance personnel and local veterinarians currently on duty in the country.

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 - 5) Nieves, M.A., R. Remon, and P. Gasper. "Past, present and future cooperative programs in the Dominican Republe." International Development Services Inc. Santo Domingo. 1962. (Unclassified)
 - 6. U.S. Agency for International Development Technical Assistance Officers and Dominican Republic Veterinary Officials. Personal communications.
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NIS 85 Section L5

A. General

Colombia has a great potential as a livestock producing country; presently, however, its livestock is of poor quality and large areas of land suitable for animal raising are not utilized. Veterinary services, which are under the direction of the Ministry of Agriculture, are lax and inefficient; and efforts to educate farmers and ranchers on the importance of proper animal disease control and livestock management are neglected. Other factors responsible for the low standard of the Colombian livestock industry are, a government austerity program restricting the import of high quality breeding stock, government restrictions on meat exports preventing the establishment of foreign markets, and high prices of feed concentrates. Furthermore, contraband marketing of good quality beef cattle to Venezuela to obtain higher prices diverts supplies for home consumption. The Ministry of Agriculture has recognised the significance of an efficient livestock industry and, in addition to accepting the assistance of internal organizations for special projects, has amounced its intention to carry out extensive disease control campaigns. However, progress beyond the planning stage is, in most instances, inapparent.

B. Environmental factors affecting health

1. Topography and climate -- large sections of Colombia's diverse topographical areas are ideally suited for livestock production. In seasons it is not affected by drought or flood, the area of the low, tropical llanes provides luxuriant pasture for beef cattle. The northern lowlands and cosstal tropical areas also support considerable

beef cattle. The alluvial valleys at 2.5 - 4 thousand feet and plateaus at elevations of up to 7500 feet running north to south through central and western Colombia,

are well ouited for dairy cattle raising.

2. Socio-economic pattern -- Efficient livestock management and animal disease control are hampered by the attitudes of farmers and livestock owners. An attitude of extreme resignation causing a reluctance to improve existing conditions is prevalent among the Colombian farm population. Many believe human as well as animal diseases to be inevitable and refuse to adopt control measures. Ranchers frequently regard the raising of cattle as a sideline or weekend occupation, leaving herds in the hands of personnel that have neither the background nor the training necessary for successful cattle raising.

4. Mutrition

- b. Food supply and distribution Consumption of all types of meat in Colombia is below the level recommended by the Food and Mutrition Board of the Mational Academy of Sciences National Research Council. High meat and egg prices make it necessary for most consumers to utilize a diet of starches and other cheap foods.

 Milk and dairy products are frequently unavailable due to an outmoded and inefficient milk distribution system. Improved animal disease control and management as well as a better milk distributing system are key factors in utilizing the country's great potential as producer of meat and dairy products, thereby increasing the availability of these commodities for the Colombian consumer.
- c. Food sanitation, storage and technology -- The meat produced in most Colombian slaughterhouses is low in sanitary standards and quality. The Colombian Cattlemen's Association, in cooperation with various government agencies, is developing

plans for the rehabilitation of approved slaughterhouses and the construction of canning factories in order to take advantage of a potential export market for canned and processed meat.

C. Diseases

2. Diseases of animals -- A high incidence of various serious animal diseases is a main factor in retarding the development of an efficient livestock industry in Colombia. The government has become increasingly aware of the economic importance of animal diseases and has initiated several control programs. Its efforts, however, are severely hampered by ignorance and an uncooperative attitude on the part of many livestock owners. Hamagement practices, as applied to disease control, are extremely poor in many parts of the country. Another factor hindering efficient disease control is the high cost of vaccines, sera and pharmaccuticals, a large proportion of which must be imported from Europe or the United States due to inadequate local $\frac{3}{h} \frac{h}{19} \frac{19}{20} \frac{21}{39}$ production.

a. Prevalent animal diseases

- (1) Foot-and-mouth disease Foot-and-mouth disease is the most important cattle disease in Colombia. Two virus strains, "O" and "A", have been isolated. The Colombian veterinary authorities, with assistance from the Pan American Foot-and-Houth Disease Center, are attempting to control the disease through vaccination, and quarantine measures; reportedly 300,000 heads of cattle are being vaccinated monthly. However, the uncooperative attitude of livestock owners, which, above all, is responsible for the unauthorized movement of cattle, makes it unlikely that the disease will be eradicated or even controlled in the foreseeable future.
- (2) <u>Bovine brucellosis</u> -- Reports vary as to distribution and incidence of bovine brucellosis: The Ministry of Agriculture reports the disease to be confined

to certain regions, while the Ministry of Health considers bowing brucellosis to be enzootic throughout the country. The two ministries also disagree on the incidence of brucellosis, the Ministry of Agriculture believing 20 percent of the dairy cattle to be infected, while the Ministry of Health estimates the incidence to be $\delta = 2\delta$ percent. This difference in reporting an important monomous indicates that there is little cooperation between veterinary and medical authorities.

The Ministry of Agriculture recommends the use of Frucella abortus strain 19 vaccine for both female and male dairy cattle of all ages. However, since the cost of vaccination has to be borne by the cattle owners, it seems doubtful whether the Ministry's recommendation will be followed to any large extent. Colombian veterinarians feel that brucellosis mainly affects the European breeds of cattle and that the native (criollo) cattle is relatively resistant.

- (3) <u>Bovine tuberculosis</u> -- Recently (1960) veterinary authorities recognized the importance of tuberculosis in dairy cattle and adopted a program for the control of this disease. In the course of the program it is intended to tuberculin test, free of charge, all dairy cattle over 2 years of age and to limit the sale of milk to that obtained from herds certified to be free from tuberculosis. The incidence of tuberculosis in beef cattle is probably considerably lower than in dairy cattle.
- (h) <u>Tick-borns diseases</u> -- Although anaplasmosis (<u>Anaplasma marginale</u>) and piroplasmosis (<u>Babesia bigemina</u>) are of considerable significance to the Colombian cattle industry, little is being done to control these diseases. Reportedly, the only measure designed to combat tick-borns diseases is some effort at tick control through dipping and spraying. Piroplasmosis is most common in the hot low regions of the country, but cattle build up a resistance and the animals primarily affected are those

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intermittently brought down from higher elevations and those imported from abroad.

- (5) Helminth infections -- Internal parasite infections are an compresent problem in Colombia. Gastro-intestinal helminthoses and verminous bronchitis are widespread throughout the country, while disstomatosis occurs mainly in the llanos. Cysticercosis is very common in swime and to a somewhat lesser extent in cattle, sheep and goats. Although no data regarding echinococcosis (hydatidosis) are available, this condition is probably rather common among domesticated as well as wild animals in Colombia, as it is in most countries of this region.
- (6) Arthropod infestations Various species of ticks and biting-flies affect livestock in Colombia. The most serious problem, however, is a condition called "muche" or "torsola", which primarily affects cattle. "Nuche," a myiasis caused by the larvae of the cestrid fly Dermatobia hominis, does extensive damage to hides and is responsible for considerable losses in milk and meat production.
- (7) Rabies -- Rabies is important in both dogs and cattle. Rowine rabies is mostly of the vampire but type. The control of rabies lies largely in the hands of the medical authorities, which conduct vaccination of dogs and cattle and also have set up demonstration centers for rabies control in several cities. Reports indicate that, in 1957/58, hh,212 doses of canine vaccine were prepared, while only 3,275 dogs were actually vaccinated, indicating a doubtful effectiveness of rabies control.
- (8) Hog cholera -- Hog cholera is widespread among swine in Colombia; it is the most important single limiting factor to the development of swine production.

 The extensive feeding of uncooked garbage plays an important role in the perpetuation of the disease. Faccination is hardly practiced, since the vaccine has to be imported making its price prohibitive.

- (9) Other diseases -- Other significant animal diseases in Colombia arc, bovine mantitis, trichonomiasis, paratuberculosis, anthrax, blackleg, malignant edema, pasteurollosis, and calcium and phosphorus deficiencies. The existence of diseases such as fowl pox, Newcastle disease, infectious corysa, pullorum, fowl typhoid and coccidiosis, is a serious obstacle to any development of poultry production in Colombia.
- D. Veterinary organisation and administration

1. Civilian

a. Organization -- Most veterinary services at the rational level are provided through four departments of the Ministry of Agriculture: (1) Department of Agricultural Services, (2) Department of Agricultural Investigation, (3) Cauca Valley Extension Department, and (h) The Zooprophylactic Institute. The Department of Agricultural Gervices, responsible for field and quarantine services, is composed of six sections: (1) Animal Mutrition, (2) Milk Control, (3) Disease Control, (h) Anti-Foot-and-Mouth Disease Compaign, (5) Reproductive Disease and Artificial Incomination, and (6) Sheep and Minor Livestock Development. The Department of Agricultural Investigation, primarily concerned with dairy and beef cattle, conducts investigations in the fields of disease control, nutrition, and artificial insemination. The Cauca Valley Extension Department utilises the services of four veterinarians in its agriculture and livestock improvement program.

The responsibilities of the Ministry of Health include the direction of rabies control measures and monoses investigation, as well as the su ervision of food sanitation. The Ministry employs five veterinarians.

International or animations maintain lisison at various levels with agencies of the Colombian veterinary services.

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b. Veterinary legal controls

- (1) Licensure -- Veterinarians graduating from a Colombian veterinary school receive a "Licenciatura" (veterinary diploma). Presentation of a thesis and successful completion of a special examination are required for the degree of "Doctor en Medicina y Zootecnia" (Doctor of Veterinary Medicina).
- (2) Quarantine The Ministry of Agriculture has established regulations prohibiting the import of livestock and poultry from countries having certain smimal diseases. On occasions these regulations have been eased to permit the entry of small numbers of selected breeding stock as well as baby chicks and hatching eggs.

 Ocnerally, however, there has been little opportunity to test the effectiveness of these regulations, since an austerity program in effect since 1956 has severely restricted imports.
- (3) Veterinary inspection -- Enforcement of an attention to most inspection in departmental and municipal slaughterhouses is lax. There is little evidence of condemnation of diseased slaughter animals or unsanitary meat products. Furthermore, livestock owners frequently slaughter animals, particularly swine, claudestinely to avoid payment of tax levied for processing carcasses in approved establishments.
- c. Professional veterinary medical organization The Colombian Veterinary
 Hedical Association (Association Colombiana de Medicos Veterinarios) apparently has
 little influence on veterinary activities in the country. Information regarding the
 Association's organization and membership is unavailable.
- d. Veterinary research There is no evidence of significant veterinary research being done in Colombia. Staff members at the two veterinary schools and at the

National Zooprophylactic Institute are merely engaged in disease investigations and are conducting little, if any, original research. In December 1959, the Ministry of Agriculture completed plans for the building of an animal disease research laboratory on the campus of the National University in Ecceta. The Rockefeller Foundation has donated \$150,000 for use in the next three years to buy equipment and books for the laboratory.

- f. Emergency veterinary services The Ministry of Agriculture has authority to conscript veterinarians for animal disease control campaigns. In the past, however, such campaigns have not been appreciably successful.
- 2. Military veterinary organization -- The Colombian army maintains a veterinary service; however, no information concerning organization and activities of the 20/ service is available.

E. Veterinary menpower

The present veterinary manpower in Colombia, if utilized properly, would be adequate for vastly improved enimal disease control and public health activities.

However, expansion of the Colombian livestock industry would require a larger veterinary force. Ineffective governmental guidance, uneven distribution of veterinarisms, and lack of interest on part of livestock owners, are major factors responsible for the poor results of disease control programs. The standard of veterinary education is relatively low in Colombia. The two veterinary schools at Bogota (h - hom - 7h-05m) and Manisales (5-05m - 75-32m), which are components of universities falling under the jurisdiction of the Ministry of Education, suffer from a lack of adequate equipment and library facilities. Many faculty members cannot devote sufficient time to teaching duties because of the necessity to seek outside employment to augment their income.

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Veterinarians can obtain a public health degree at the School of Hygiene of the Mational University in Bogota. The school, currently understaffed, plans to increase its faculty in the future.

V. Veterinary medical facilities

The six laboratories of the Department of Research and Diagnosis of the Mational Zooprophylactic Institute perform most of the animal diagnostic work in Colombia.

Laboratories are located in Bogota, the headquarters of the Institute, and in Tunja, Bucaramanga, Santa Marta, Medellin and Cali. The Ministry of Agriculture maintains

29 livestock stations throughout the country to provide a breeding and dipping service for farm animals. Each station is supervised by an animal husbandry technician or veterinarian who advises farmers on matters of animal health and management.

Veterinary clinics are planned for each of the stations in order to provide better facilities for minal treatment. Purebred sires are maintained at the Tibaitata agricultural experiment station in Bogota for the collection of seman, which is distributed to various areas of Colombia for field use.

O. Veterinary medical supplies and materials

Veterinary biological supplies are produced by government as well as private laboratories. The well-equipped Production Department of the National Zooprophylactic Institute produces the bulk of the country's foot-and-mouth disease vaccine. Canina and bovine rabies vaccine is produced by the National Institute of Hygiene. Private laboratories are under government control and may supply certain biologics from time to time under contract. Most pharmaceuticals and some biologics are imported from Europe and the United States and are distributed through normal commercial $\frac{12}{13}$ $\frac{15}{32}$ channels.

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Ministry of Education Ministry of Agriculture Ministry of Health Veterinary Faculties International Rockefeller Veterinary Services at Cooperation Foundation Bogota and Manizales Administration Cauca Valley Department of Department of Zooprophylactic Extension Agricultural Agricultural Institute Department Investigation Services 1. Dairy a) Disease control b) Nutrition Production Veterinary Mutrition Section c) artificial Department Services Insemination 2. Meat Milk Control a) Disease Section control Research and Diagnosb) Nutrition tic Department Disease Control Section Administrative Department Foot-and-Mouth Disease Commission Reproductive Disease and Artificial Insemination Section Sheep and Minor Livestock Development Section

Figure 1: Organization of Veterinary Services, Colombia- 1959.

Sources: 13/15/37/

