pan american foot-and-mouth disease center

## VETERINARY PUBLIC HEALTH PROGRAM

# SITUATION OF THE FOOT-AND-MOUTH DISEASE CONTROL PROGRAMS IN SOUTH AMERICA, 1990

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# SITUATION OF THE FOOT-AND-MOUTH DISEASE CONTROL PROGRAMS SOUTH AMERICA 1990

## 1. SITUATION OF VESICULAR DISEASES.

### 1.1 General situation

The official foot-and-mouth disease control services in South America recorded 3839 foci of vesicular diseases in 1990. That record was 13% below the total for the previous year.

The rate of bovine herds affected was 0.92 per thousand, similar to the rates in preceding years. The risk of vesicular disease occurrence was therefore at the same level as those posted during the 1980's.

Samples for laboratory diagnosis were taken in 2095 foci (54%), out of which 1369 (65%) were identified as positive. Thus, the causal agent was identified in 36% of the total recorded foci. In 955 (70% of the positive samples) foot-and-mouth disease viruses were diagnosed. Of the latter, type O virus was diagnosed in 414 foci (41%); virus type A in 444 (46%), and type C in 97 (10%). In Colombia, the vesicular stomatitis viruses were once again, the most identified due to their epidemic proportions; they accounted for almost all the diagnoses of the disease realized on the South American continent. The New Jersey type was identified in 198 foci (48%) and Indiana in 216 (52%); this meant that the diagnoses of Vesicular Stomatitis increased from 17% in 1989 to 30% of the total diagnoses in 1990. This situation reflects a FMD to Vesicular Stomatitis ratio, expressed in terms of foci, of 2.3 to 1.

With respect to the previous year, in 1990 there was a decline in the morbi-mortality indicators in recorded foci wherein cattle were the most important species: populational morbidity was 4,2 x 10 thousand; internal morbidity was 9.0%; and lethality was 1.2%.

The occurrence of foot-and-mouth disease recorded in pigs, posted the following indicators: populational morbidity, 1,2 x 10,000; internal morbidity rate of 13.4%; lethality 27,3%; and mortality 3,4 per hundred thousand. This occurrence was mainly due to records of Argentina, Brazil and Colombia.

The most important events observed during the period in review were as follows:

**A. FREE AREA**

- The countries of North America, the Caribbean and Central America, continued free of foot-and-mouth disease. 306 foci of vesicular diseases were laboratory diagnosed in the countries of Central America and Mexico. 159 were the New Jersey virus, and 9 were Indiana type virus. Generally, the epidemiologic situation of vesicular stomatitis remained similar to that of the previous year. However, the number of recorded outbreaks was reduced in about 25%. The most significant reductions were observed in Guatemala and Mexico. The largest numbers of foci in this subregion are still being

recorded in El Salvador, Honduras and Mexico.

- In South America, Chile, Guyana, French Guaiana and Suriname, as well as the Argentine Patagonia and the Urabá Chocoano, in Colombia, maintained their disease-free status.

**B. AFFECTED AREA**

Taking into consideration the number of foci notified, the epidemiological picture has generally been favorable. However, the following epidemic episodes merit attention:

- The occurrence of Foot-and-Mouth Disease in the Departamentos of Ica, Junin and Ayacucho, in Peru, after 14 years of disease absence;

- In Ecuador, the number of foci reported increased by 33% in relation to the preceding period, particularly in the provinces of Loja, Cañar and Azuay, as the reflection of epidemic outbreaks that began in 1989.

- In Bolivia, more than twice the number of foci reported in 1989 were reported in 1990 in the area under program, i.e., Cochabamba and Santa Cruz;

- Brazil experienced an outbreak of virus type C at the end of the year in the southern part of the country (Santa Catarina and Rio Grande do Sul).

- The most outstanding events in Argentina were the occurrence of foot-and-mouth disease south of the Barrancas and Colorado rivers in the province of Rio Negro, which created a risk for the cattle in the province of Neuquén and on the Argentine-Chilean border. An epidemic outbreak occurred in the Rio Salado basin and spread to the fattening areas in the provinces of Buenos Aires, La Pampa, Santa Fé and Córdoba.

- Colombia, which has a very efficient epidemiological surveillance system, once again found that vesicular stomatitis was responsible for more than 50% of the diagnoses of vesicular diseases; this prodded the services to collect epidemiological data for studies on the prevalence of the disease in the country's endemic areas.

1.2 Situation by country

ARGENTINA

The 841 foci recorded in 1990 again reflected the high-occurrence tendency noted in 1989. In terms of when outbreaks occurred, 55% of the foci were concentrad in the months of March to June, and their geographic distribution was characterized by the appearance of an epidemic in the Salado River Basin; it later spread to the fattening regions in the provinces of Buenos Aires, La Pampa, Santa Fé and Cordoba. The disease also occurred south of the Barrancas and Colorado rivers in the Provinces of Buenos Aires and Rio Negro. Prompt measures of mandatory vaccination and control of animal

transit blocked the spreading of the disease to Neuquén, which would have created a risk for the situation in Chile.

Samples were collected in 533 of the recorded foci (63.4%), and yielded 196 confirmations of virus type O (62%), 115 of type A (36%) and five of type C (2%). Type O therefore maintained its prevalence over the others, as was observed in 1989. The identified subtypes were $O_1$, $C_3$ $A_{24}$ and $A_{81}$.

The indicators of morbi-mortality in cattle were slightly lower than in 1989: internal morbidity was 5.7%, populational morbidity was 7.7 per 10,000 and lethality was 0.9%.

BOLIVIA

According to the data presented by SENARB, 65 foci were recorded in the area under program (Cochabamba and Santa Cruz). That was therefore four times higher than in the preceding year. Also, 1 foci were reported in Beni and one in Chuquisaca.

Forty-one samples (62%) were collected from those foci; 17 were found positive. Most of the diagnoses confirmed virus type O, (13), while type A was isolated in four cases, reappearing for the first time in two years. The subtypes identified were $A_{24}$, and $O_1$, Virus type C was not detected.

The information gathered did not show any marked seasonal tendency, although the foci recorded between January and March were the most severe and spread the agent to other herds during the months of May and June.

The indicators of morbidity in the area under program indicate low levels of vaccine coverage; in some foci the internal morbidity rates rose to 100%. Generally, the populational morbidity reached 11,7 per ten thousand, and internal morbidity was 24,83%. Lethality was 2,99%. The foci involving pigs, especially in Cochabamba, showed internal morbidity rates of 12.2% and a lethality rate of 11%. The overall morbidity rate for the species in the area under program was 0,70 per ten thousand.

BRASIL

In relation to 1989, there was a 24% drop in the number of foci recorded in Brazil in 1990. Most of the episodes occurred during the second half of the year; of the 961 foci recorded, samples were collected in 261 (27%), which meant a significant decline in the laboratory diagnosis of foci when compared to 1989. Diagnosis indicated 43 (24%) virus type O, 43 (24%) virus type A, and an unusual occurrence of virus C diagnosed in 91 cases (51%). This was due to the epidemic situation recorded in the states of Santa Catarina and Rio Grande do Sul, during the last months of the year. Vesicular stomatitis was not diagnosed in the country in the period. The foot-and-mouth disease subtypes identified were $A_{24}$, $C_3$ and $O_1$.

The populational morbidity indicator for cattle was 2.3 per ten thousand, internal morbidity was 19.5%, and

lethality was 1.85%. All these levels were comparable to those posted in 1989. Pigs were significantly involved in some of the foci recorded during the year with rates as follows: 25% internal morbidity, 1 per ten thousand populational morbidity, and 32% lethality.

CHILE

Chile maintained its virus-free status in 1990. The action to prevent the reintroduction of the virus is based on a system of epidemiological surveillance and control at seaports, airports, borders, and places where animals or garbage and refuse are concentrated. Preventive measures are maintained in the mountain summer grazing lands by the limiting of a unpopulated zone, according to a criterion that characterizes the border regions as being of low, medium or high risk. In each of the regions certain differentiated levels of restriction are applied to govern the summer usage of the fields, whetеher by the local owners or by the livestock owners from the central and coastal sectors.

These actions continue to rely on the surveillance of the epidemiological situation on the Argentine side of the border, on the capability for advanced diagnosis of foot-and-mouth disease occurrence, and on the sanitary education of the communities involved in the problem.

COLOMBIA

A total of 1464 foci of vesicular diseases was recorded in 1990, representing a decline of 30% in relation to the preceding year. The highest occurrence was in the months of February, March, July and August, although the disease appeared in a persistent fashion throughout the year.

Geographically, foot-and-mouth disease has been recorded continuously in the departamentos of Antioquia, Cordoba, Santander, Meta, Cundinamarca and César. The most significant occurrence levels were posted in the first three departamentos, while Urabá Chocoano, near the border with Panama, continues free of the disease virus. Of the 450 grid squares into which Colombia is divided, 150 (33%) reported being affected by the disease.

Laboratory diagnosis material was collected on 1026 (71%) of the farms, and yielded 729 (71%) positive diagnoses. It is worthy of note that Indiana and New Jersey vesicular stomatitis viruses have been responsible for 215 and 181 (29 and 25%, respectively) of the foci diagnosed, whereas virus type A was identified in 250 (34%) and type O in 83 (11%) of the foci. This epidemic characteristic of vesicular stomatitis has encouraged the preparation of epidemiological studies on its presence in certain areas of the country. The subtypes identified were: $A_{24}$, $A_{27}$ and $O_1$.

During the year two areas considered as disease-free were affected: Tumaco, in the area under the agreement involving Colombia and Ecuador, and the Turbo sector, which is area 2 of the ICA-USDA Project. No presence of FMD had been reported in that latter area since 1980. The problem was,

however, eliminated in both areas through active surveillance, vaccination, control of outbreaks and of transit of cattle.

The internal morbidity rate in cattle reached 10%, overall morbidity was 8.8 per 10 thousand, and lethality was 0.8%. The internal morbidity rate in equines was about 2%.

ECUADOR

The situation observed in 1990 maintained the upward tendency observed in the preceding year. 163 foci were recorded, or 33% more than in 1989, a situation owing mainly to the epidemic occurrence in the provinces of Cañar and Azuay, in turn caused by the sources of infection brought in from the coastal region and in the province of Loja, as a reflection of what happened toward the end of 1989 in the Amazon region.

The disease was concentrated in the first three months of the year. Again, the long drought may have had an influence on the course of the disease.

Of the 53 foci in which the virus was identified (33% of the total of foci), 29 (83%) were diagnosed as virus type O, five (14%) as virus A, and one as Indiana type vesicular stomatitis (3%). The identified subtypes were $O_1$ and $A_{24}$.

Internal morbidity on bovine cattle properties (41%) was higher than recorded in 1989. The populational morbidity reached 11 per 10 thousand and lethality was 0.7%.

GUYANA

No vesicular diseases were reported during the year in review.

FRENCH GUYANA

No vesicular diseases were reported during the year in review.

PARAGUAY

The number of foot-and-mouth disease outbreaks reported in 1990 was lower than in 1989. Only 5 foci were identified in 1990 (10% of the total reported in 1989). Likewise, only 5 of the 173 grids were affected. The disease was identified in two municipalites in the western region (Caaguazu (1) and San Pedro (2)), and in the western region at Puerto Hayes (2). Samples for laboratory diagnosis were collected in all cases, yielding two diagnoses of virus type O at Puerto Hayes in the second half of the year. $O_1$ was the subtype identified.

In turn, the internal morbidity indicator rose 44% in relation to the preceding year. The populational rate was obviously lower: 0.05/0000. The rates for the other animal species are not indicative due to the small number of animals involved.

PERU

The occurrence of foot-and-mouth disease in 1990 reached epidemic proportions. Despite the economic difficulties faced throughout the year, 162 foci of vesicular diseases were detected, a significantly higher total than the 20 foci reported and identified in 1989. After more than 14 years free of the clinical presence of the disease, the departamentos of Ica, Junín and Ayacucho were affected from July to October by virus type O. Vesicular stomatitis was identified in Cajamarca and Amazonas.

The disease was identified in 17 of the 151 grid squares into which Peru is divided (11%).

Samples were collected in 89 foci (55%), of which 38 were found positive (43%), largely due to virus type O (32). Neither virus type A nor C was identified, but New Jersey type vesicular stomatitis was present in 6 foci (16%).

In the foci investigated an internal moribidty rate of 9.6% was noted for cattle, 6.0% for pigs and 8.0% for sheep, while the rate for goats was 25%. Lethality among pigs was 14%, and general morbidity remained at the 1989 level of 3.7 per ten thousand. Despite the epidemiological picture reported, the frequency indicators have been low.

SURINAME

No vesicular diseases were reported during the year in review.

URUGUAY

The 34 foci reported in 1990 meant a 45% decline in relation to the 62 foci reported in 1989. The disease was reported in only 20 of the 491 grid squares into which Uruguay is divided (4%). The temporal and geographic distribution of foot-and-mouth disease was comparatively lower, as it was concentrated in the departamentos of the Coastal Region, and in Cerro Largo and Maldonado in May and June. Those are the months of traditionally higher risk.

Samples for laboratory diagnosis were taken in 100% of the outbreaks, and virus type O was diagnosed in 13 (52%), type A in 11 (44%) and virus C in 1 (4%). There was no identification in nine cases. The reappearance of virus type A in Uruguay for the first time since 1987 was of significant epidemiological importance; it reappeared in the departamentos of Paysandu and Soriano. Both had been exposed to the foot-and-mouth disease type A epidemic occurring that year of 1987. Virus type O appeared in the departamento of Rocha for the first time since 1980. Its appearance was presumedly due to the movement of farmworkers and machinery in the rice-growing region of northern Uruguay. The subtypes identified were: $O_1$, Group $A_{81}$ related to $A_{24}$ and $C_3$.

The rates of internal and populational morbidity in cattle were respectively 2.7% and 0.6 x 10,000, represented by small herds without evidence of vaccination and among animals under 1 year of age. Pigs posted attack and morbidity

rates of 13.33% and 0.6 per ten thousand, and sheep had rates of 0.3% and 0.02 per ten thousand. No deaths were reported due to foot-and-mouth disease.

VENEZUELA

The 143 foci identified in 1990 meant a 35% decline in relation to 1989. 705 of the foci were recorded during the second half of the year. Geographically, the outbreaks were concentrated in the states of Monagas, Táchira, Cojedes Yaracuy and Portuguesa.

Samples for laboratory diagnosis were taken in 53 of the foci (37%), but only in 30 was a positive diagnosis yielded. Of the positive identifications, three were of virus type 0 (10%), 16 virus type A (53%) and 11 New Jersey vesicular stomatitis (21%). Despite the low number of diagnoses, the latter virus was distributed in 7 states. The subtypes identified were $0_1$ and $A_{24}$.

The indicators of morbidity in cattle were lower than in 1989, except for internal moribidity which was 9.5%. Populational morbidity declined to 2.3 per ten thousand, and lethality to 0.7%. The same thing happened with the rate related to pigs, which stood at 0.3 per ten thousand. Pigs were involved in only 5 of the 143 outbreaks recorded in 1990.

## 2. STATUS OF FOOT-AND-MOUTH-DISEASE CONTROL PROGRAMS IN SOUTH AMERICA - 1990.

### 2.1 General Situation

Most South American countries continue suffering from the economic crisis. As with previous years, the result has been that funds assigned to combating foot-and-mouth disease have often been either cut or kept the same year after year.

In 1990, in response to adjustments to the crisis and seeking to shore up mechanisms for justifying activities involving the control, eradication and prevention of foot-and-mouth disease based on goals set by the Hemispheric Plan for the Eradication of Foot-and-mouth Disease (PHEFA), the following advances have been made:

- Increased participation by various community groups that have the responsibility, commitment and authorization to work with these programs;

- Mobilization of material resources and authority that render operative strategies for eradication practicable;

- Linking of foot-and-mouth disease control, eradication and prevention activities to subregional processes for economic and social integration among countries as a means of facilitating trade interchange;

- Strengthening of operating procedures for field units. This step, in addition to ensuring more opportunities for decisionmaking and responses to the problems of

foot-and-mouth disease, will make it possible to have active community participation for each site regarding the programming, management and evaluation of activities involving foot-and-mouth disease control.

- Consolidation of concentrated efforts and coordination among countries in combating the disease through bilateral or multilateral agreements.

In the case of the Plata Basin agreement, there has been ongoing consolidation of the subregional organization of the eradication plan. A high degree of intercountry coordination has been attained, not only among veterinary services but also as regards participation by livestock raisers, who have asked to be included on the Committee for this agreement, fully backed by official sectors.

During 1990, the Plata Basin subregional plan made significant gains in vaccination techniques, through local or area programs, especially in Argentina and Uruguay. There was extensive participation by livestock raisers and private veterinarians in scheduling, administration and evaluation.

An extension of the area covered by this agreement is pending, which will include eastern Paraguay and the state of Santa Catarina in Brazil.

In regard to the Andean Area subregional project, coordination between JUNAC and the Pan American Foot-and-mouth Disease Center (PAFMDC) has been increasingly formalized as administrative support for developing subprojects contained in the above plan, based on the priority set by JUNAC (decision 255). Political backing was obtained at the 2nd Meeting of the Mixed Commission of the EEC, JUNAC and member nations, which approved the priority established by JUNAC for the subregional foot-and-mouth disease control and eradication project, with the EEC interested in its eventual financing.

Concerning the Amazon subregion, no significant advances were made in 1990.

In disease-free areas, the most relevant actions were oriented toward fortifying prevention programs and mobilizing political support by creating a Commission of Foot-and-mouth Disease-free Countries.

Coverage by these programs includes all of Argentina, Chile, Ecuador, Paraguay, Peru, Uruguay and Venezuela. For Bolivia, 44,4% of its area is covered, 50,9% of its overall herds, and 48,5% of its cattle herds. For Brazil, these percentages are 47.2%, 83.8% and 82.7%, while for Columbia they are 74.1%, 99.5% and 99.3%, respectively.

Total production of FMD vaccine for the region was 407,4 million doses, some 12 million less than for 1989.

Regarding 1989, the production of oil-adjuvanted vaccine rose by 87%, though output of saponinhydroxide vaccine dropped by 11%.

A total of 457,1 million doses was available for use by countries, of which 303,1 million pertained to oil-adjuvanted vaccine and 154,0 million to the aqueous type.

There were variations in the service infrastructure for countries. The number of operating field units went from 2,931 to 2,830, a 3.4% drop. This was basically the result of a change in the method for compiling information in Brazil, where units decreased from 1,899 to 1,871, and the fact that in Colombia data refers only to offices that report on animal-health activities.

A total of 10,910 workers were involved, or 16% less than the previous year's 12,918. Of this number, 10,149 were personnel assigned to field services, 359 to laboratories, and 402 to central offices. There were 3,213 professionals, with 7,697 technical and administrative assistants.

A total of 3,734 vehicles were reported as involved in foot- and-mouth disease activities, slightly beneath the 1989 figure.

Annual reports from Argentina, Bolivia and Uruguay omitted figures for public and/or private funds intended to cover operating and capital expenses relative to their programs. On the other hand, Paraguay reported only its public spending. It is very likely that in a number of cases contributions were underestimated. With Brazil, for example, public-sector contributions did not include spending by states for every member of the Federation. Six countries in the area reported US$ 78.4 million for combating foot-and-mouth disease, US$ 8.0 million as a public-sector contribution, and US$ 70.4 million from the private sector, the latter mainly for vaccine.

## 2.2 Situation of Countries

### ARGENTINA

With an area of 2,779,892 $km^2$ and some 300,000 herds of cattle, its livestock population is an estimated 46.9 million cattle. Moreover, based on the 1977 census, there are approximately 35.2 million sheep, 2.5 million swine and 3.1 million horses.

The foot-and-mouth disease program carried out by the National Animal Health Service (SENASA) and the Secretary of Agriculture, Livestock and Fisheries provides nationwide coverage, although only part of the country receives vaccination, with the following different strategies:

a) Vaccination every four months, using saponinhydroxide vaccine administered by the livestock raiser. There is a small amount of inspection by authorities.

b) Official vaccination programs utilizing oil-adjuvanted vaccine for foot-and-mouth disease, administered by official personnel hired by livestock-raising organizations that run these programs, though dependent on SENASA.

There was a notable increase in the latter activities during 1990, which were implemented in areas of extensive livestock raising. Vaccination coverage rose by some 30%, especially during the second half of the year. Approximately 16 million head are covered by this type of vaccination (36% of the population).

FMD vaccine produced by private laboratories totaled 17.8 million doses for the oil-adjuvanted type, and 118.5 million doses for the saponinhydroxide type. Every lot of vaccine produced was submitted to official quality control, which includes footpad generalization testing in cattle. Approval was given for field use of 16.5 million trivalent doses of oil-adjuvanted vaccine and 109.7 million trivalent doses of the saponinhydroxide type.

With the four-monthly vaccination plan for existing cattle, 28.77 million received three vaccine doses, 15.12 million received two doses, and 561,000 one dose.

The program was carried out by 315 local operating units (10 more than in 1989), distributed among 24 regions, and 1,496 vehicles as follows: 8 for laboratory use, 25 for central office use and 1,463 for regional use. This represents an increase of 610 vehicles for field units (70%) over the previous year.

Each local operating unit must therefore cover 8,825.0 $km^2$, with 939 herds and 148,835 cattle.

It was not possible to obtain up-to-date information on public and private funding intended for covering foot-and-mouth disease-related activities.

The international trade in animals, products and genetic material mainly involved the United States, Canada and Brazil as far as imports were concerned. Uruguay exported semen and embryos, as well as horses, poultry and other animals, as shown in Table 32.

Live animal exports to South America totaled 31,459 head, in addition to the marketing of embryos (Table 33). At the time the report was prepared, SENASA lacked up-to-date information regarding foreign trade in meat and milk.

Training during the year fundamentally consisted of four information-processing courses for 36 SENASA employees and others hired by Zone Commissions. There were three courses for promoters, intended for employees of official agencies involved. Fifty agents from official ranks attended an epidemiology course, in cooperation with Veterinary Science Schools, and there was one simulation course, "Introduction to Exotic Diseases," for 35 SENASA agents.

Owing to the new structure, the scheduling and implementation of health-education activities have been concentrated at the zone level. Estimates are that 1000 meetings have been held with livestock raisers, while central administration has prepared 40,000 copies of a folder published nationwide, sent 130,000 letters to producers, and

released information via communications media regarding progress made by programs in key areas. National coordination is based on the organization of Zone Animal Health Commissions comprised of private and government veterinary professionals. Elsewhere, livestock raisers have joined together in Administrative Councils - foundations, cooperatives, etc., from a legal standpoint - and one operating group hired to undertake actions under official supervision. At the provincial level, Provincial Animal Health Commissions operate regionally, adapting national control policies to regional strategies.

In regard to international coordination, particularly noteworthy are joint activities with PAFMDC, which has led to the signing of a number of agreements, including for Eradication of Foot-and-mouth Disease in the Plata Basin and in the mountain range along the Chilean border, the latter involving joint action in this area. Toward this end, two bilateral meetings were held in Neuquén and Mendoza in October and November to review health agreements on summer pasturing. Argentina has also signed health agreements with other bordering countries in an effort to coordinate strategies and actions so as to eradicate the disease in the near future.

BOLIVIA

Bolivia has an overall area of 1,098,581 $km^2$. According to estimates by the Ministry of Rural Affairs and Livestock Raising (MACA), there are 98,139 cattle herds and the following animal population: 5.4 million cattle; 9,4 million sheep; 2,1 million swine; 1,2 million goats, 1,5 million Camelidae, and slightly more than 904,000 horses.

The National Service for the Control of Foot-and-mouth Disease, Rabies and Brucellosis (SENARB) covers only the departments of Cochabamba and Santa Cruz, and these only partially (55,5% of the area, 19,3% of cattle herds and 14% of cattle). There is also sporadic assistance given to three provinces in Beni and certain areas of the department of Chuquisaca.

SENARB has 135 employees for carrying out its activities, of which 64 are assigned to 15 local operating units (5 in Cochabamba, 10 in Santa Cruz and 1 in Trinidad); 26 work at the Central Office, and the remaining 45 in three diagnostic laboratories in La Paz, Cochabamba and Santa Cruz. A breakdown of these employees by category shows 51 professionals, 44 technical assistants, and 40 administrative assistants. Bearing in mind the size of the area where operations take place in Bolivia, each operating unit covers an average of 32.484.4 $km^2$, 3.335 herds and 177.113 head of cattle.

SENARB has a vehicle fleet of 25 (24 cars and one motorcycle), of which 22 are found in local operating units, 1 at the central office, and 2 at laboratories.

Public sector funding totaled US$ 214,571, or 17% less than for 1989. There is no data regarding spending by the private sector.

Because the country does not manufacture FMD vaccine, it must be imported. Last year SENARB received a donation of 171,000 doses from PAFMDC. Private groups have a free-import system for which there is no government control; this vaccine is mainly obtained from Brazil.

A total of 146.313 vaccinations were recorded by SENARB during 1990, of which 26.808 were double doses and 103.392 were single-dose. Of the latter, 48% were administered in Beni. Another 16.113 vaccine doses were administered to cattle in strategic situations.

In its report, prepared pursuant to an agreement signed by MACA, the Beni Development Corporation (CORDEBENI), the Federation of Beni and Pando Livestock Raisers (FEGABENI) and the FAO for studying livestock development and the marketing of beef from eastern Bolivia, the FAO's Investment Center Mission has included the animal-health component prepared with the cooperation of PANAFTOSA/HPV.

The international trade in animals, products, byproducts and genetic material, according to Charts 32 and 33, was almost entirely limited to Brazil, Argentina and the United States. Of particular importance was the importing of 30,523 head of cattle from Brazil and the exporting of 91,855 head to the same country. Data relative to the marketing of beef and milk is not available. Finally, SENARB is coordinating with MACA and the Ministry of Health at the national level, and with various international agencies for technical and financial cooperation at the international level, such as The InterAmerican Institute for Agricultural Cooperation (IICA), FAO, JICA, CIAT, IDB, representatives of the PAHO/WHO, PanAmerican FMD and Zoonosis Centers (CEPANZO) and PAFMDC (in PAHO/WHO). It also maintains contact with animal-health services in various countries, mostly with its neighbors (Argentina, Brazil, Paraguay and Perú).

BRASIL

Brazil covers an area of more than 8.5 million $km^2$. The Brazilian Statistical Yearbook, published by the Brazilian Institute of Geography and Statistics (IBGE), together with data gathered by state animal-health services, provides the following information on livestock: 136.3 million head of cattle; 19.9 million sheep; 32.5 million swine; 10.8 million goats; 9.1 million horses and 19.9 million buffalos. There are nearly 2 million herds of cattle registered (1,936,260).

Through its operations in each state and State Secretariats of Agriculture, the Secretariat of Animal-Health Control (SDSA), in the National Secretariat of Agriculture and Livestock Control under the Ministry of Agriculture is responsible for the prevention and control of animal diseases, including foot-and-mouth disease, throughout the entire country. Nevertheless, the program for combating the latter in part of Brazil - 4.0 million $km^2$ - also has additional resources provided by the National Treasury for this specific purpose, which come from an external loan and where there is an anti-FMD program that is quantitatively and qualitatively better developed. There are 1.6 million herds and 112.7

million cattle in this area, both figures representing approximately 85% of the national total.

Last year 188 million doses of vaccine were produced, or 7,7 million less than for the previous year. Of this amount, 41.0 million was of the oil-adjuvanted type and 147.0 million of the saponinhydroxide type. One-hundred percent of the lots of both vaccine types was submitted to official quality control, including footpad generalization and C-Index testing for cattle. Of the vaccine submitted to control, 86,7% of the oil-adjuvanted type and 92,7% of the aqueous type was approved and released for use. Average per-dose price for the former type was US$ 0.47 and US$ 0.27 for the latter.

As part of a scheduled vaccination program, 70.73 million cattle were vaccinated (20% less than for the previous year); of this number, 41.3 million received three doses, 20.4 million two doses and approximately 9 million one dose. There were also 19,800 sheep and goats vaccinated. Moreover, 681,385 strategic vaccinations were administered, covering the above animals as well as swine.

Turning to imports of animals, animal products and genetic material, 14,630 breed cattle were brought in during 1989, mainly from Uruguay, the United States, Canada, Argentina and the United Kingdom, in addition to 61,500 cattle from Uruguay and Bolivia for slaughtering. There were also 1,744 horses imported, mostly from Uruguay, Argentina and the U.K. Other imports included sheep, mainly from Uruguay, Argentina and the U.S.; swine, mostly from the U.K.; 485,014 ampules of cattle and horse semen; cattle embryos, especially from North America, France and Switzerland. The country's report does not contain data relative to animal and animal-product exports.

As support for animal-health activities, with priority assigned to those involving foot-and-mouth disease, there were 1,871 local operating units with 6,035 employees. Of the latter, 2,009 are professionals, 3,080 technical assistants and 946 administrative assistants. Added to these are 43 professionals, 52 technical assistants and 60 administrative assistants involved in vaccine quality control and the diagnosis of vesicular diseases at 6 laboratories. There is a total of 1,726 vehicles (1.698 cars and similar vehicles, and 29 motorcycles), used to transport the above personnel.

Federal funds, excluding wages and salaries, totaled US$ 3,665,303 for the central office and states. Of this amount, US$ 3,593,404 corresponds to the Project for Control of Animal Diseases, with financing from the IBRD and US$ 71,898 from budgetary funds. Virtually all of this money (96%) went for operating expenses.

Figures pertaining to other public resources, much higher than the above and corresponding to contributions by state secretariats, were not provided. Private contributions for purchasing vaccines totaled US$ 58.6 million, an estimate based on the fact that all vaccine released (189 million doses) was sold.

There is a permanent program for technical and administrative training. In 1990, the following courses were held: 3 on health education; one on epidemiology; the 1st Course on Zoonosis Health Emergencies; and the 9th Course on Health Education and Social Communications.

Concerning international and national coordination, the Secretariat of Animal-Health Control maintained close and permanent relations with various international agencies that provide technical cooperation in this area, including OIE, ICA, FAO and PAHO/WHO, as well as PAFMDC and CEPANZO (PAHO/WHO). Agreements were also maintained with bordering countries. Domestically, of particular note were relations with research institutes, universities and several rural organizations, mainly livestock raisers.

COLOMBIA

According to the First National Agriculture and Livestock Survey, Colombia has an area of 1,141,748 km$^2$. There are an estimated 726,609 farms with cattle and an animal population consisting of 22.3 million head of cattle, 1.53 million sheep, 2.2 million swine, 2.36 million horses and 1,237,000 goats.

The Colombian Agriculture and Livestock Institute (ICA), under the Ministry of Agriculture, is the agency in charge of directing and implementing the National Project for the Control of Foot-and-mouth Disease and other vesicular illnesses. This program covers almost the entire country, except for the Putumayo Intendencia and the Comisarias of Guainia, Guaviare, Vaupés and Vichada, where there are virtually no domestic livestock species or else are very difficult to reach.

In response to the characteristics of cattle and swine production as well as of foot-and-mouth-disease ecosystems, priorities have been established for combating the disease. These are protection and expansion of disease and virus-free areas and areas where livestock is the most widely marketed, whether based on extraction or processing, and areas bordering neighboring countries. Differentiated strategies are applied in each case, depending on its epidemiological situation.

Along these lines, so as not to simply control but also eradicate foot-and-mouth disease in the medium term in parts of the departments of La Guajira, Cesar and Magdalena, the foot-and- mouth-disease campaign, as requested by the Ministry of Agriculture, prepared a project intended to eliminate clinical cases of the disease in 5 years, in addition to controlling brucellosis and bovine rabies. The first phase of this project should be implemented in northeastern Colombia, using resources that may possibly be donated by the United States.

A feature of the project is that it encourages co-management of the administration of programmed activities, owing to the trend toward decentralization fostered by the state.

All foot-and-mouth-disease operations are carried out through a tecnical-administrative organization that dedicates 30% of its time to controlling foot-and-mouth disease. The workforce consists of 144 professionals, 407 technical assistants, and 300 administrative assistants, located in 144 local operating units. Diagnoses are made at the central level by 4 professionals and 4 assistants.

The vehicle fleet consists of 162 automobiles/campers and 242 motorcycles, of which 60 and 180, respectively, are assigned to the ICA-USDA Cooperative Program, with the remainder owned by employees who participate in the campaign.

Public funding (US$ 2.86 million) was 44.0% less than the US$ 5.04 million obtained in 1989. Almost all of this money was applied at the regional level for campaign operating expenses.

Private-sector contributions, an estimated US$ 8.3 million, correspond to money spent by livestock raisers on vaccine (US$ 0.46 per dose of the oil-adjuvanted type and US$ 0.32 for the saponinhydroxide type), plus the cost of administering the vaccine (an average of US$ 0.07 per dose). The number of vaccinations recorded increased to 15.88 million.

Available vaccine in 1990 was 23,621,170 doses, of which 17,855,615 were of the bivalent oil-adjuvanted type, produced by the LAVERLAM and VECOL Laboratories. A total of 5,759,555 doses of saponinhydroxide vaccine had been manufactured by the end of 1989, which were used for the last time during 1990.

Seventy percent of oil-adjuvanted vaccine produced was submitted to official quality control (testing for sterility, innocuity, physical-chemical properties, and protection against foodpad generalization in cattle); there were no rejections. Saponinhydroxide vaccines produced in 1989 were submitted to quality control, with 63.7% being approved.

PANAFTOSA/HPV sent 6,000 doses of trivalent oil-adjuvanted vaccine for administering in the area covered by the Colombian- Brazilian agreement. Vaccination is carried out halfyearly in northwestern Antioquia, Sucre, Bolivar, Atlantico, the foothill plain (department of Meta), Nariño (Colombian-Ecuadorian agreement), and in areas of the Bogota Savanna and Ubate and Chiquinquira Valleys. For the last time, in specific areas a four-monthly plan was followed, to be changed to a halfyearly schedule using oil-adjuvanted vaccine. In the Amazon "trapezium," vaccination takes place once a year.

Epidemiological surveillance based on a system of national coverage is still one of the main components of the program. Particularly noteworthy along these lines is the participation by other non-governmental services and agencies, creating a true network of informants in the system for reporting animal diseases.

Approximately 2.6 million animals susceptible to vesicular diseases were mobilized and sent to ranches,

slaughterhouses and fairs during the year. There was international trade in livestock with Venezuela, with 2,614 cattle and 346 horses exported to Ecuador, the United States, Panama, Peru, the Dominican Republic and Venezuela.

Exports of 7,412 tons of beef and 24,993 tons of mutton were shipped to the Netherlands Antilles, Peru, Venezuela and Curaçao. During this same year, 161 cattle, 372 horses, 374 swine, 400,158 one-day-old chicks, 11,750 young turkeys, 201,811 ampules of cattle semen, and 207 tons of milk were imported. These imports mainly came from Germany, the United States, Argentina, Chile, France, the Netherlands, Panama, Peru, Venezuela, the United Kingdom, Czechoslovakia, New Zealand, Poland, Brazil, Canada and Switzerland.

Personnel training followed the same lines as for the previ ous year. Four veterinarians were sent to the Pan American Foot- and-mouth Disease Center for training in the diagnosis of foot- and-mouth disease, production of monoclonal antibodies, and the development and application of the ELISA Technique.

Throughout the year there were intense, ongoing efforts to disseminate materials and provide health education in order to encourage and maintain effective community participation in support of the program. Toward this end, 248 formal courses were given in 1990, with 2,466 people attending, along with 1,778 meetings attended by 75,528 people, in addition to widespread dissemination activities.

The Foot-and-mouth Disease Control Program maintained permanent coordination with similar groups and organizations, domestically as well as abroad. At home, this mainly involved representatives from livestock-raisers associations, vaccine-manufacturing laboratories, dealers in biological material, the Ministry of Agriculture, the Farm Savings Bank, Departmental Secretariats of Agriculture and Development, and various centers of higher education.

Internationally, regarding neighboring countries - Brazil and Ecuador - with whom it has signed border agreements, as well as the European Economic Community, OIE, JUNAC, IICA, FAO and the PAHO, of particular importance is the continuation of the Cooperative Project with the U.S. Department of Agriculture (ICA-USDA Agreement).

CHILE

Foot-and-mouth disease prevention forms part of a preventive project for exotic diseases being carried out by the Livestock Protection Division of the Agriculture and Livestock Service (SAG), which covers the entire country (757,720 $km^2$). According to official figures, there are 189,044 cattle herds in the country, with 3.37 million head of cattle; 4.95 million sheep; 1.13 million goats; 1.1 million swine; 126,000 Camelidae and 444,000 horses.

In addition to foot-and-mouth disease preventive measures, the project is also designed to combat other exotic ailments. This is based on applying an epidemiological

surveillance and control system at ports, airports, borders, areas with high animal density and garbage dumps.

Chile continues to be a country free of vesicular disease (foot-and-mouth disease and vesicular stomatitis). So as to avoid contact between Chilean and Argentinan livestock in continguous summer-pasturing fields in the Andes Mountains, during the 1990-91 season the same strategy was employed as for the previous season, based on creating an unpopulated strip along the Chilean side of the mountain range.

A series of supplementary measures were taken aimed at early diagnosis of the disease, along with setting requirements for bringing livestock back down from the mountains and controlling fairs and slaughterhouses, to include health education, logistical support and the training of personnel for dealing with emergencies.

Elsewhere, the reported occurrence of episodes in the province of Mendoza led to the maintaining of strict preventive measures. For the second year in a row, three epidemiological zones were created, for maximum, average and low risk, each with its own conditions for livestock use. With the first type, only owners are permitted to use the mountain "gateway" fields; with the second, use by owners and villagers is permitted, and in the third instance, animals may be brought up from the central and coast sector. This plan is backed up by the police.

Preventive actions are undertaken in the 12 regions into which the country is divided, drawing from resources in the 56 local operating units, the central office and the central laboratory. These human, physical and financial resources are not intended solely for foot-and-mouth disease, but instead are used for all projects under the Livestock Protection Subprogram, be it on a national or regional basis. Veterinarians and agricultural experts are hired temporarily to assist in the control of summer pasturing between November and April.

Estimates for 1990 show that US$ 435,200 in public funds were provided for foot-and-mouth disease programs on the national and regional level. Of this amount, US$ 296,000 went for operating expenses, including the temporary hiring of veterinarians and agricultural experts referred to in the previous paragraph.

The following in-country courses were held for veterinarians during 1990: Analysis of results of summer pasturing (35 participants); Epidemiology (1 participant); and the ELISA Technique for VIA and Vesicular Stomatitis (6 participants).

Six veterinarians received training at the international level: Three at the 4th Regional Course on Exotic Diseases; one at the seminar on methods for integrating foot-and-mouth-disease eradication programs (PAFMDC/PAHO); and two at the Zoonosis Epidemiology Course (PAFMDC/PAHO).

Health-education activities continued, aimed at gaining support from community groups involved in summer pasturing. Toward this end, education focused on two groups -- Chilean customs officials and livestock owners in the "gateway" fields -- in order to tighten standards for the unpopulated strip and strengthen measures to be adopted in the case of the illegal entry of animals. With the second group, emphasis was placed on symptoms of the disease and the importance of cooperation.

In conjunction with the Ministerial Regional Secretariat of Education, a 5-year project is being carried out in the 8th Region involving animal-health education in the schools. Under supervision of SAG, the project is striving to develop a favorable attitude among schoolchildren toward health measures adopted by the Service. The following coverage was achieved in 1990: 87 schools, 163 teachers trained, and 4,002 students participating in educational units. In addition, 120 talks and meetings were held, with 3,015 people in attendance.

In regard to controlling the transit of animals and animal byproducts, the country is governed by 3 legal entitities, with 42 international barriers along with specialized personnel who receive regular training, most of whom work exclusively in this area. As far as domestic movement is concerned, there are no restrictions pertaining to foot-and-mouth disease.

The following were leading livestock-related imports: 12,256 MT of milk, mostly from Argentina, New Zealand and Poland; 2,979.2 MT of beef, mainly from Argentina and Paraguay; 161,054 doses of semen from the U.S., Canada, Britain and New Zealand; and 12 sheep, 199 horses, 206 swine and 22 cattle from various countries.

The following exports were also recorded: 833 alpacas, 43 llamas, 1 sheep, and 103 horses, as well as 10,420.3 MT of mutton, 12.2 MT of beef and 1,549.03 MT of milk.

The country engages in permanent coordination at both the national and international level. The former involves universities; Health Services and the Institute of Public Health; the Office of Agricultural Planning; agriculture and livestock associations and cooperatives; Ministries of Defense, Education and Foreign Affairs; The Department of Borders and Boundaries; law-enforcement agencies, and various other agricultural services. Included among international organizations are the FAO, OIE, IICA, the Pirbright and Plum Island Reference Laboratories, SELAB and the PAHO/WHO PAFMDC.

International animal-health agreements with Argentina and Peru have been maintained. A meeting was held with Peru, pending since 1987. A meeting was also held in Santiago with Argentina to discuss various matters related to foot-and-mouth disease and the international trade in livestock and fishery products. As stipulated in the current agreement, two meetings of the 4th and 5th Argentinan-Chilean Regional Commissions were held.

ECUADOR

The country has an area of 267,000 $km^2$. Official statistics report 248,000 livestock farms, some 4.0 million head of cattle, 1.3 million sheep, 2.0 million swine, 298,000 goats and 826,000 horses. The National Animal-Health Program, which includes the prevention, control and eradication of foot-and-mouth disease, covers the entire country. Within it are 61 local operating units distributed in 5 regions, serving an average area of 4,377 $km^2$, 4,063 livestock owners and 65,531 head of cattle.

Personnel distribution is as follows: 35 employees at the central office (10 professionals, 11 technical assistants and 14 administrative assistants), and 299 in the various regions (77 professionals, 197 technical assistants and 25 administrative assistants). The vehicle fleet numbers 32, all at the central office.

Funding for the Animal-Health Program totaled US$ 798,878, of which US$ 616,550 went for operating expenses and US$ 70,126 for capital spending. US$ 112,202 was spent on vaccine, for which the service maintains a revolving fund.

During the year, the country manufactured and controlled 317,350 doses of bivalent saponinhydroxide vaccine (Izquieta Perez Laboratory). Some 600,000 doses of oil-adjuvanted vaccine were imported from PAFMDC, and 380,000 doses from the Colombian laboratory LAVERLAM. Total vaccine of both types available was therefore 1,297,350 doses.

Saponinhydroxide vaccine is mainly administered in the southern Andean and eastern provinces, as well as in the area of influence pertaining to the producing laboratory (provinces of Guayas, Los Rios and El Oro), with 260,765 doses of this type being recorded. Oil-adjuvanted vaccine is used mostly in the following areas: the province of Esmeraldas and the cantons of El Carmen (province of Manabi) and Santo Domingo de los Colorados (province of Pichincha), considered to be primary endemic areas; in the northern and central Andean provinces; and in the Amazon province of Napo. During the year, however, vaccination using the oil-adjuvanted type was extended to the entire country with the exception of Azuay. This coverage was made possible by an additional 380,000 doses imported from Colombia, giving a total of 900,034 doses of this type administered, all involving cattle.

There are major deficiencies in health control during the transporting of animals, particularly along the coast. Here the only requirement for obtaining an animal-transport permit is a vaccination certificate. This procedure was in effect throughout 1990, under which 281,148 cattle, 581,301 sheep and 77,473 swine were transported. Along the same lines, authorization was given to import 143 cattle from the U.S., 74 horses from Colombia, Peru, Costa Rica, Argentina and the U.S., as well as 39,310 ampules of semen.

Veterinary personnel received the following training: One veterinarian, in the production of FMD vaccine at the Pan American Foot-and-mouth Disease Center; 5 veterinarians, in

dealing with foot-and-mouth disease foci (simulation at Ipiales, Colombia); 55 veterinarians and 89 veterinary assistants, in epidemiological surveillance and the submitting of specimens for lab diagnosis. The program also sent 1 professional to the PAFMDC Seminar on methods for integrating foot-and-mouth-disease eradication programs.

The program maintains permanent coordination with the Ministry of Public Health through the Izquieta Perez Laboratory in Guayaquil, the National Council on Science and Technology (CONACYT), and the National Semen Company (ENDES), as well as with a number of rural and educational groups.

On the international level, there is close coordination with the PAHO, with technical cooperation from the PAFMDC and CEPANZO, OIE, IICA, FAO and JUNAC as well. A meeting was held regarding the border animal-health agreement with Colombia/Ecuador/PAHO/WHO.

GUYANA

The Republic of Guyana has an area of 214,969 $km^2$ and a population of 758,619 based on the 1980 Census. According to the FAO Production Yearbook, vol. 42, estimated livestock in 1988 was as follows: 210,000 cattle, 185,000 swine, 120,000 sheep, 77,000 goats and 3,000 horses.

Guyana is a foot-and-mouth disease-free country, and officially a member of COSALFA since 1979 (Res. I of the 6th Regular COSALFA Meeting). It has participated in and actively supported start-up of the "Hemispheric Plan for the Eradication of Foot-and-mouth Disease" (PHEFA), and is a member of the Hemi spheric Committee for Eradication of the disease (COHEFA), serving as a representative for Caribbean governments.

In 1990, it hosted a Seminar on Veterinary Public Health and Animal-Health Surveillance Systems, sponsored by the PAHO in coordination with the Ministry of Agriculture and the Guyana Agency for Education in Health Sciences, Environment and Food Policies, with 30 professionals in attendance. This Seminar included discussions of the possibility of implementing the vesicular-disease surveillance system as proposed by PANAFTOSA, in two regions of the country. Special attention was given to the risk of the disease entering from Roraima, owing to construction of a roadway between Boa Vista and Georgetown. For this reason, Region 9, which borders on Brazil, was selected as the area for installing the system. This project will be supplemented by a protection plan for the border area, so as to prevent the disease from entering the country.

PARAGUAY

SENACSA is responsible for activities related to foot-and- mouth disease throughout the country. Paraguay has an area of 406,752 $km^2$; based on official data from 1990, there were 248,930 herds with 8.2 million cattle, as well as 456,000 sheep, 2.4 million swine, 148,000 goats and 335,000 horses.

There are 57 Regional Offices supporting its activities, distributed in 16 health zones. Of its 499 employees, 175 are assigned to the central office, 43 to the laboratory and 281 work in the health zones. Of this total number, 134 are professionals, 217 are technical assistants and 148 are administrative assistants. The vehicle fleet numbers 71, with 27 automobiles and 44 motorcycles.

Public funds budgeted for 1990 totaled US$ 2,693,800, of which US$ 2.5 million (56%) went for current expenses and the remaining 44% to capital spending. Of the total amount budgeted (US$ 2.1 million), approximately 35.6% was in payment for services rendered at the central office, 47% at the regional level (field operations) and 17% for laboratory work.

Vaccinations are carried out regularly, based on a schedule that varies according to the type of vaccine used. Saponinhydroxide vaccine is administered every four months, while the oil- adjuvanted type is administered halfyearly (for cows under the age of two years), or yearly (for those over two). The latter type is mainly used in the following areas: along the border with Argentina and Brazil; in certain areas of the departments of Central, Neembucú, Alto Paraná, Misiones, Itapúa, Canendiyú and Concepción; the southeastern border of the virus-free area in the municipalities of Nueva Asunción, Chaco and Amambay; in the Mennonite colonies; at dairy farms in the Asunción dairy basin; and in areas surrounding fairs, auctions and expositions, as well as around the Central Laboratory.

All saponinhydroxide vaccine used is produced in the country by private laboratories, with a joint output of 7,756,050 trivalent doses. Part of the oil-adjuvanted type is also produced in the country (5,121,540 doses), with an additional 1,168,850 doses imported from PAFMDC. The average annual price for oil- adjuvanted vaccine was US$ 0.47, and US$ 0.26 for the saponinhydroxide type.

All vaccine was submitted to quality control by SENACSA, with MPI testing in unweaned mice, and SN and FGT in cattle. Exports involved 20,000 doses of saponinhydroxide vaccine to Bolivia.

Vaccination coverage of cattle achieved in 1990 was 74.7% for the eastern region and 36.2% for the west.

SENACSA has outfitted 30 permanent control posts in places where cattle are required to pass. In special circumstances, it also operates "mobile controls," all dedicated to checking the health of livestock in transit.

The international trade in animals for 1990 was as follows: 679 cattle entered the country form Argentina and Uruguay, along with 1,836 sheep, 1,580 horses, 18,534 doses of semen and 218 cattle embryos. Leading livestock exports were 99,617 MT of meat and 304 MT of cheese to Brazil, and 215 cattle to Bolivia.

SENACSA has carried out a number of training activities, mainly intended for field and laboratory technical

personnel: Livestock Company Management (25 participants); 1st National Zoonosis Seminar (22 participants); Seminar on Epidemiology (21 participants); and the National Course on Biosafety (25 participants).

At the international level, 6 program employees received training in areas related to vaccine production and control, exotic diseases, zoonosis surveillance; legislation involving foot-and-mouth disease-free areas; and diagnostic pathology.

Health-education activities at the field level in 1990 were administered by zone and regional veterinarians, supported by the Health Education Division. Thirty-three talks were held, one TV program was produced, radio broadcasts served to disseminate announcements prior to vaccination, and printed material was prepared.

SENACSA maintains permanent contact with various national organizations, including the Ministry of Agriculture and Livestock, the Minister of Public Health and Social Welfare, the Paraguayan Rural Association, the School of Veterinary Sciences, the Rural Welfare Institute, national laboratories, the National Livestock Development Commission, and the Livestock Fund, as well as police and military organizations.

Noteworthy at the international level is the close relation ship with PAHO/WHO and their Foot-and-mouth Disease Center in Rio de Janeiro, Brazil, and Zoonosis Center in Buenos Aires, Argentina. There are other contacts with the IICA, OIE, GTZ and JICA, as well as serving on various international commissions such as COHEFA, RIMSA, and COINSA, and as an observer on the Technical Commission for Eradicating Foot-and-mouth Disease in the Plata Basin.

PERU

The area of the country measures 1,282,120 $km^2$. With 463,182 cattle farms, the animal population is as follows: 3.39 million cattle, 13.1 million sheep, 2.1 million swine, 1.7 million goats, 3.5 million Camelidae, and 1.2 million horses.

There is nationwide coverage by the Foot-and-mouth Disease Control and Eradication Program, located in the Office of Livestock Health, a division of the General Livestock Office under the Ministry of Agriculture. Nevertheless, due to a series of domestic problems, mainly of a financial and administrative nature, activities to be carried out by this Program have been severely limited for some time.

The country is divided into 24 Departmental Agricultural Units; all together, they have 135 local operating units for animal-health activities, including those related to vesicular diseases. There are 520 employees, of which 98 are professionals, 384 technical assistants and 38 administrative assistants. The vehicle fleet consists of 62 automobiles and 178 motorcycles.

An estimated US$ 85,577 in public funds were allotted to the program for combating foot-and-mouth-disease, all of which went for operating expenses -- 83% at the regional level and the remainder for various activites at the central level. The private sector contributed US$ 37,500, mostly for acquiring vaccine. These figures do not include budgetary and financial amounts related to the national production of FMD vaccine, for which the Ministry of Health is responsible (National Institute of Health - INS). With technical and financial support from the PAHO/WHO, PAFMDC and the IICA, the INS produced 113,840 doses of oil- adjuvanted vaccine, which was submitted to in-country quality control using guinea pigs (DPC50). As a supplement to the national output of vaccine, the Ministry of Agriculture authorized the importing of 541,250 doses of the oil-adjuvanted type, from the PAHO/WHO through the Pan American Foot-and-mouth Disease Center.

During 1990, owing to the sharp increase in the number of foci, attempts were made to increase coverage by using oil-adjuvanted vaccine once a year. A strategic vaccination plan was also employed at 23 farm units, where 324,718 cattle were vaccinated, 90% of which was administered by official vaccinators.

Health education and extension activities were extremely limited due to financial reasons.

Imports for 1990 included 8,844 cattle, mainly from Panama, the United States and Brazil, as well as 450 small ruminants susceptible to foot-and-mouth disease. In addition, 40,530 doses of cattle semen were imported from the U.S. and Canada, 354 doses of hog semen from Germany and Canada, and 4,281 MT of meat from Colombia and the U.S. Exports involved 217 horses to North, Central and South America.

The program has maintained coordination with the National Institute of Health, livestock associations, Schools of Veterinary Medicine, and the Veterinary College.

There was international coordination with PAHO/WHO representatives in Peru and with PAFMDC and CEPANZO pertaining to this organization, as well as with JUNAC, OIE, FAO, IICA and animal-health authorities from various countries, mainly with bordering ones. In regard to the latter, the 6th Border Meeting was held, pursuant to health agreements signed with Bolivia, as well as the 6th Meeting of the Peru-Chile Border Commission.

URUGUAY

The country has an area of 160,737 $km^2$. With 52,204 livestock producers, its estimated livestock population is 8,761,000 cattle and 25,220,000 sheep.

The foot-and-mouth disease control program covers the 19 departments representing the country's political and administrative divisions. It has 417 employees, of whom 11 work in the central office (8 professionals and 3 administrative assistants), 60 in laboratories (13 professionals and 47 technical and administrative assistants),

and 346 in the field (60 professionals and 286 technical and administrative assistants). The program has 87 automobiles and 69 motorcycles.

October saw the completion of the last vaccination period using the saponinhydroxide type, with preference given to lowrisk properties and suppliers of milk for exporting. This cycle was directly controlled by the official service through the training of private veterinarians, covering 4,015 farms and 986,012 cattle. Vaccination coverage using the conventional type totaled 6.69 million doses. During the period established for using oil-adjuvanted vaccine, approximately 1,190,000 doses of vaccine were administered, including vaccine produced in the country and imported from the PAFMDC.

Training involved the preparation of personnel for changing the national vaccination strategy and included workshops for updating the skills of veterinarians and assistants. A short course was also held on "Health Education in Animal-Health Activities," attended by 18 technicians.

Epidemiological research was carried out to evaluate the extent of viral activity in regions characterized as possibly endemic, prior to implementing a plan for vaccinating with oil- adjuvanted vaccine. Another study has been planned for evaluating the persistence of infection in foci discovered in 1989.

In May of 1990, approval was given to a regulatory decree pursuant to the new law for the control and eradication of foot- and-mouth disease. Of particular note is the characterization of "risk property" wherein vaccinations are certified by veterinarians trained by the official service, and the declaration of risk areas when real or potential risk is reported in the country and its border areas.

A decree was also adapted for regulating the production of FMD vaccines. In regard to the international trade in animals, products and genetic material, in 1990 the following imports were recorded: 1,574 cattle from Argentina; 586 horses from the U.S., Argentina and Brazil; 138 sheep, almost all from Argentina, and 116 swine, as well as 65,392 ampules of semen and 101 embryos, both from cattle.

Exports consisted of 16 cattle, mainly to Argentina; 209,000 sheep, especially to Saudi Arabia; and 30,003 horses, to Chile and Argentina. By the same token, the report refers to the exporting of 233,377 MT of beef to several countries, including Brazil, Israel, Iraque, Saudi Arabia, Egypt, the U.S., the Canary Islands, Singapore, Cuba and the EEC. An estimated 32,600 MT of milk was also exported.

VENEZUELA

The country has an area of 912,050 $km^2$. Based on official figures there are 105,735 herds with 10.8 million cattle. There are also 2.64 millon swine, 1.29 million goats, 351,000 sheep, 557,000 horses and almost 14,000 buffalos. The latter figure comes from a survey carried out by the Ministry of Agriculture and Livestock Raising (M.A.C.) in 1983.

Although the combating of foot-and-mouth disease does not involve the same focus throughout the country, its prevention and control, as with other animal diseases, is the responsibility of the Office of Animal Health in the above Ministry.

The workforce includes 400 employees, of which 15 are assigned to the central office and the remaining 385 (181 professionals, 55 technical assistants and 149 administrative assisants) work at the 22 State Agriculture and Livestock Development Units (UEDA), distributed in 150 local operating units. The latter covers an average area of 6,080 $km^2$, 705 herds and 72,206 cattle. For carrying out animal-health control operations, there is a vehicle fleet of 134 automobiles. Public-sector funding for operating expenses, not including salaries and wages, totaled US$ 487,100.00, of which slightly more than half (55%) was allotted for regional use and the remainder to the central office. Private-sector contributions were calculated to be US$ 3.2 million, with 83% used in purchasing vaccine.

An official resolution halted the use of modified live-virus vaccine; only the oil-adjuvanted type is now being administered. Vaccinations have for the most part been carried out through the private sector. There is currently an agreement between the Ministry and the National Federation of Livestock Raisers for acquiring, distributing and storing vaccine at Regional Livestock-Raiser Associations equipped for refrigeration. This vaccine was produced by PAFMDC, the Merrieux and Coopers laboratories in Brazil, and a national laboratory. Some 9.82 million doses of vaccine were available during the year, in addition to the 568,500 doses of modified live-virus vaccine produced at the beginning of the year.

Vaccine imported from Brazil was controlled by the official national agency and approved by PAFMDC. Upon arriving in the country, it was submitted to testing for innocuity, sterility and titer. Vaccine imports from Colombia were confiscated due to failure to comply with health requirements.

As regards the international trade in animals, livestock products and genetic material, import records highlight the trade in items not susceptible to foot-and-mouth disease, with an exception made for 124 cattle from Colombia and 84 hogs from Canada. Exports were along the same lines, with the exception of 1,620 goats sent to Aruba.

With cooperation from the PAFMDC, a project was prepared in 1990 for the first stage of eradicating foot-and-mouth disease within 5 years. It is to be presented to an outside source of funding in order to gain a larger commitment from the productive sector. Highlights of personnel training were as follows: 7 people took part in the Master's Program in Preventive Veterinary Medicine in Zulia; a course was held for 25 veterinarians on the use of oil-adjuvanted vaccine, with the cooperation of the National Agro-livestock Research Fund (FONAIAP) and PAFMDC; 42 veterinarians participated in a course on principles of epidemiology; and 28 highschool graduates attended a course on Program Administration.

National and international coordination projects have also been maintained. Domestically, this mostly involved the Ministries of Development, Treasury, Health and Social Security, Foreign Affairs, Domestic Relations, Environment and Natural Resources, as well as the National Hygiene Institute, the National Agriculture and Livestock Research Fund, the National Racetrack Institute, and various Venezuelan universities -- mainly those with fields of study or specialities related to farming and livestock raising -- along with representative agencies for rural producers, and vocational schools.

At the international level, there was coordination with the IICA and PAHO, agencies with which Venezuela currently maintains agreements for technical cooperation, as well as with OIE, FAO and JUNAC, along with border countries with which border health agreements have been signed (Brazil, Colombia and Guyana).

## 3. INFORMATION SYSTEM AND CONTINENTAL SURVEILLANCE FOR VESICULAR DISEASES: RESULTS AND FUNCTIONING

### 3.1 Introduction

As with previous years, there was follow-up of the behavior of vesicular diseases in South American countries through a set of indicators that make it possible to characterize and interpret the degree of their occurrence and how virus types behave. For such purposes, the historical series of the occurrence of vesicular diseases has been utilized, which the Pan American Foot-and- mouth Disease Center (PAFMDC) has gathered in its data bank. This allows for an interpretation of the significance of weekly occurrences based on affected quadrants and the frequency of affected herds, with totals and by virus type according to the political and administrative subdivision of each country.

On the other hand, Chart 5 shows the months in which the frequency recorded for herds affected by some type of disease has clearly surpassed the expected frequencies, for each country on the continent. It deals with situations that may be considered as epidemiologically significant, or openly epidemic.

### 3.2 Functioning in South America

This heading involves an evaluation of the operational functioning of communications within the Continental Epidemiological Data System, especially in regard to the regular flow of information between national animal-health services in South America and PAFMDC.

#### 3.2.1 Alert Warnings

During 1990, 130 alert warnings were sent via telex to various countries in the area, owing to the appearance of vesicular episodes close to the border of neighboring countries, and due to the appearance of the disease where it had not previously occurred. The breakdown was as follows:

Argentina (17); Bolivia (12); Brazil (9); Colombia (13); Chile (05); Ecuador (12); Paraguay (08); Peru (12); Uruguay (14); and Venezuela (28).

### 3.2.2 Weekly communiques regarding the presence of vesicular diseases by quadrant

Personnel in national programs utilize a map of each South American country that has been divided into quadrants based on geographical coordinates. This map serves as a basis for weekly telex reports on the presence of vesicular diseases (regardless of the number of episodes). A numerical code is utilized for indicating the week involved as well as affected quadrants where clinical cases of these diseases have been observed.

Telex notifications sent by the various countries are entered in the PAFMDC epidemiological computer database. PAFMDC publishes a Weekly Epidemiological Report that provides every country on the continent with timely information, making it possible to increase epidemiological surveillance in the area. This Report is also distributed to other countries and international agencies, in South America and elsewhere.

a) Reception of communiques

For the first time ever, there was 100% reception of weekly communiques from South American countries during 1990. Figures for previous years are as follows: 1989 (99%); 1988 (98%); 1987 (98.8%); 1986 (98.7%); 1985 (99.8%); 1984 (98%); 1983 (99.6%); 1982 (97%); 1981 (96%); 1980 (99%); and 1979 (97%). It should nevertheless be realized that in certain countries in the region, as has been pointed out in previous years, a somewhat abnormal situation is taking place, whereby several weekly reports are compiled into a single one, with consequent repercussions on their timeliness and subsequent publication.

b) Rate of publication

Considering the weekly reports received, the weekly epidemiological reports published by PAFMDC did not include 100% of the epidemiological weeks reported. This is because PAFMDC, taking into account the intent of the weekly communique, does not publish weekly reports that are delayed past a certain point, except when they may contain additional information regarding weeks that have been previously published (Chart 42). Nevertheless, beginning with the first weekly bulletin on the occurrence of vesicular diseases in 1991, PAFMDC has decided to publish every report received, regardless of its timeliness, which will therefore enhance the publication of data concerning the final weeks of the year.

c) Timeliness of weekly communiques

For 1990, the average lapse in days for receipt by PAFMDC of telexes containing weekly data on the presence or absence of vesicular disease episodes was extremely high (Chart 42), particularly in the case of Peru (70) and Argentina (21). From an overall standpoint, there was consequently an average of 14 days between the closing out of the epidemiological week and publication of data, incompatible with the rapid handling of epidemiological information required for the monitoring and surveillance of the behavior of an acute disease that spreads easily. This situation becomes even more critical when one bears in mind the time taken to provide countries with the Epidemiological Report.

3.2.3 Monthly information regarding episodes of vesicular diseases and their laboratory diagnosis

This data refers to the number of herds affected, based on each country's political and administrative divisions, as well as episodes when specimens have been gathered for carrying out laboratory diagnosis.

a) Rate of reception and publication

The rate of reception for 1990 (86%) was the lowest in recent years. This was mainly due to the failure to receive a single monthly report from Peru and 3 from Uruguay. On the other hand, publication was 100%, an improvement over 1989 with 92% and the first time this level had been reached since 1987 (Chart 43). It should nevertheless be taken into account that PAFMDC has published, as additional information, delayed monthly reports received from countries. Colombia was the only country whose information for the respective month was published in the Monthly Report throughout the year.

At the same time, the growing delay in receiving data from certain countries (Chart 44) lengthened the amount of time between the closing out of the month and the publication of the respective monthly report by PAFMDC, which improved the publication rate. In other words, countries should attempt to send in their information more quickly.

b) Delays in the monthly report

In 1990, the time of delay in sending the Monthly Epidemiological Report from each country to PAFMDC (Chart 44) dropped for Brazil and increased for Argentina, Bolivia and Venezuela relative to the previous year. Moreover, for the latter two countries, delays were excessive inasmuch as the expected objectives of this type of data are concerned.

### 3.3.4 Support from the Vesicular Disease Diagnostic Laboratory (LADIVES) in Panama

The Panamanian Vesicular Disease Diagnostic Laboratory (LADIVES) continues to operate normally. Every month it sends PAFMDC the results of virus typing, indicating the department or province where the episode involving the typed virus has occurred.

## 3.4 Utilization of Continental Information and Vesicular-Disease Epidemiological Surveillance System for other diseases

During recent years, the Continental Information and Epidemiological Surveillance System coordinated by PAFMDC has been supported by most Latin American countries as regards the sending of weekly telexes based on grid maps for suspected cholera-like swine diseases and syndromes compatible with Equine Encephalomyelitis (EE) in horses.

### 3.4.1 Notification System for suspected diseases clinically similar to Swine Cholera: PAFMDC/PAHO/IICA

This is a joint project between the PAHO/PAFMDC and the In terAmerican Institute for Agricultural Cooperation (IICA), involving the gathering and dissemination of information relative to swine cholera. The IICA publishes an annual report containing this information.

### 3.4.2 Notification System for syndromes compatible with Equine Encephalomyelitis (EE) in horses: CEPANZO/PAFMDC/PAHO

This is a joint project between the PanAmerican Foot-and-mouth Disease and Zoonosis Centers (CEPANZO), involving the dissemination of information relative to Equine Encephalomyelitis in horses through PAFMDC's Weekly Epidemiological Report on the presence of vesicular diseases. In its second year of activity, countries have been including in their weekly communiques sent to PAFMDC information regarding the quadrants where horses have been observed with neurological syndromes compatible with equine encephalomyelitis. It is likely that the volume of data published is low, due to the fact that most countries do not have specific projects for the surveillance and control of equine encephalomyelitis. On the other hand, this situation will tend to improve as national programs are developed and current data sources for vesicular disease are increasingly utilized.

## 3.5 Recommendations

a) The epidemiological information system should be maintained and improved, since it is a valuable support mechanism for programs as well as being one of the most successful undertakings regarding animal health in South America. No effort should be spared to keep it operating smoothly and efficiently.

b) Development of surveillance systems should be strengthened at the local level.

Generally speaking, the monthly information system continues to suffer from the same shortcomings noted for previous years. In some cases delays in sending material to PAFMDC have been crucial, seeing that lapses of more than 30 days should be considered as inappropriate. Once again there has been a shortage of epidemiological observations needed for interpreting data, as well as a lack of locating virus types on the grid map. Some countries have altered the format of their monthly communiques, rendering it difficult to compile information due to the lack of standardization required for the monthly report on vesicular diseases.

### 3.2.4 Surveillance activities: Laboratory confirmation

For South America in 1990, specimens were taken from 55% of herds with animals showing clinical signs of vesicular disease in order to obtain a laboratory diagnosis. Argentina, Bolivia, Colombia, Paraguay and Uruguay exceeded the average in this area. In general, the rate of specimen collection improved in comparison to 1987 (Chart 45).

Virus types were identified in only 36% of the herds presenting clinical signs of vesicular disease, meaning there was no improvement relative to previous years. Generally speaking, rates are low -- very low for some countries, including those reporting few vesicular episodes. In regard to episodes when specimens were collected, however, in 65% of the cases it was possible to identify the causative agent, a figure that ranged from 40% to 74% depending on the country.

As has been pointed out, it is necessary to upgrade the monthly communique regarding the subtype of active viruses, as well as locating them on the quadrant map.

## 3.3 Functioning in Central America

This section contains an evaluation of the operative functioning of communications within the Continental Information and Epidemiological Surveillance System, between national animal-health services for Central American countries and Mexico and PAFMDC, the latter being the agency in charge of coordinating this system.

### 3.3.1 Weekly communique on the presence of vesicular disease by quadrant

The map of each country in this part of the American continent has also been divided into quadrants based on geographical coordinates. These maps serve as a basis for weekly telexed reports on the appearance of vesicular diseases (regardless of the number of episodes). The same as with South America, a numerical code is utilized for indicating the week involved as well as affected quadrants.

a) Rate of reception

During 1990, the rate at which communiques were received from Central American countries (other than Belize and Honduras, which sent no reports) rose to 98% in comparison with the 94% for 1989.

The lowest rates for reporting countries were recorded for Guatemala and Panama. The average number of weekly communiques received by the six countries submitting reports was 51 (Chart 46).

b) Rate of publication

Considering reports received, epidemiological weeklies were not always published since PAFMDC does not publish weekly information that arrives with a certain delay (Chart 46).

c) Timeliness of weekly communiques

In general, for 1990 there was less delay in submitting weekly communiques than in 1989. With the exception of Nicaragua, every reporting country either maintained or shortened the delay in sending weekly reports to PAFMDC (Chart 48).

3.3.2 Monthly information regarding episodes of vesicular diseases and their laboratory diagnosis

This data refers to the number of herds affected, based on each country's political and administrative divisions, as well as herds affected when specimens have been gathered for carrying out laboratory diagnosis, based on virus type identified. In 1990, with the exception of Mexico, basic data for preparing the monthly report published by PAFMDC has been taken from monthly reports on results issued by the Panamanian laboratory LADIVES. These reports were received at PAFMDC headquarters between 18 and 71 days from the end of the month to which data pertain, with an average delay of 30 days. The variation for Mexico was 18 to 42 days, or an average of 19 days. Eleven reports with results were received from LADIVES, and all twelve from Mexico. Every report was published.

3.3.3 Surveillance activities: Laboratory confirmation

The following is a summary of the report submitted by LADIVES on "Technical Aspects Relative to Diagnosis," pertaining to the period between March 1 and December 31, 1990. For this period, the laboratory analyzed a total of 329 samples from 250 vesicular episodes or occurrences where it was possible to collect samples (Chart 24). LADIVES managed to identify the virus type in 62% of the episodes. For the region as a whole, the average time lapsed between the onset of the episode until the livestock raiser's alert sent to the closest veterinarian varied from 4 days in Panama to 8.5 days in El Salvador. Between notification and sample collecting the variation ranged from 1.0 day (Nicaragua and Costa Rica) to 3.5 days (Honduras). The average time delay between the onset of the episode and receipt of the 1st results varied from 17 days (Guatemala) to 5.5 - 9.5 days for the remaining countries.

On the other hand, Mexico was successful in identifying the agent in 32% of vesicular episodes when samples were gathered (Chart 24).

c) Eliminate delays in sending weekly and monthly reports to PAFMDC.

d) Ensure that data generated by the system is not only timely but also reliable, and that it is communicated on the basis of standard procedures.

e) Expand the use of data, as an objective basis for the epidemiological characterization of foot-and-mouth disease and for making changes in objectives and strategies for combating it, as well as for forecasts, recognition and follow-up of epidemic situations and their solution.

f) Provide data on a monthly basis regarding virus subtypes identified and their location on the map. This requires permanent integration of field and laboratory work.

g) In the case of epidemic situations, keep PAFMDC continuously informed, because it is the reference agency for consultations by neighboring countries, international organizations, and other countries. A complete report should be submitted at least weekly, not only showing quadrants affected but also the number of foci and their type by quadrant. Should a variant appear, indicate the quadrants where it has been identified. Omitting information regarding proven foci is a serious mistake that damages the reliability and credibility of veterinary services.

h) Encourage increased integration of laboratories and epidemiological specialists at the central level and in the field, so that accurate information may be furnished regarding types and subtypes and their repercussions on the epidemiology of foot-and-mouth disease.

i) Utilize epidemiological information in operating field units. Field veterinarians will therefore be able to act based on knowledge of how the disease behaves in their area and its relationship with other areas of the country, making disease prevention and control more effective and efficient.

j) Send PAFMDC field samples regularly for analysis by the reference laboratory.

k) Put seroepidemiological data to timely use, which will make it possible to detect serological and immunological variations regarding active strains in the field; implement corrective health measures that are timely and effective.

l) Closer attention must be paid to the preparation of data sent in each year for use in the report on "the situation of foot-and-mouth disease and its prevention in countries." Based on problems noted in reports, most countries sending information to COSALFA fail to exercise the necessary care, with preparation having been reduced to a routine procedure.

FIGURE 1. DISTRIBUTION OF THE NUMBER OF WEEKS WITH OCCURRENCE OF VESICULAR DISEASES, BY COORDINATES SOUTH AMERICA - 1990

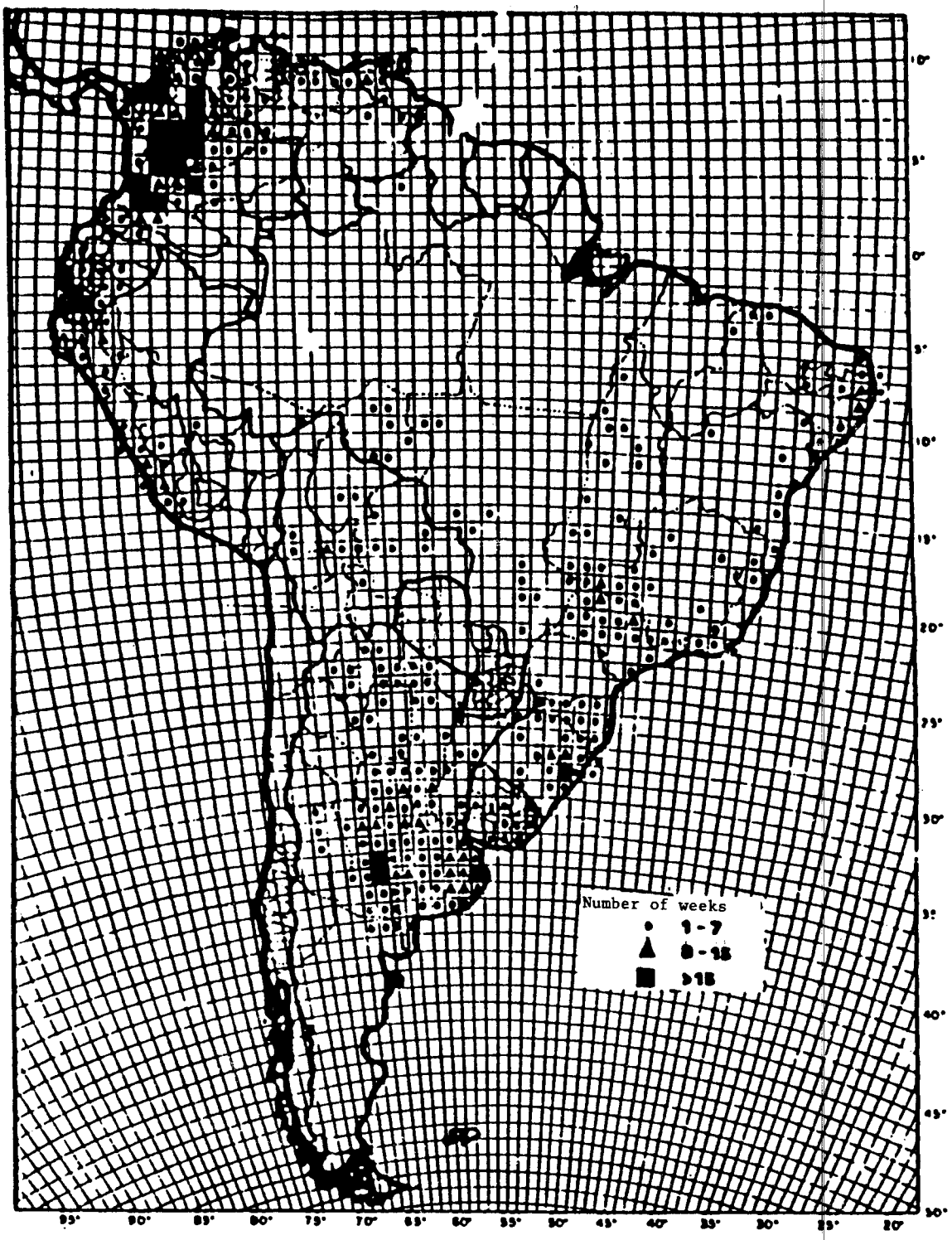

TABLE 1. Number of affected herds by vesicular disease,and causal agent. South America,1990.

| Country | Affected Herds | Affected Herds Sampled | Diagnosis | | | | |
|---|---|---|---|---|---|---|---|
| | | | Foot-and-Mouth | | | Vesicular | Stomatitis |
| | | | O | A | C | New Jersey | Indiana |
| Argentina | 841 | 533 | 196 | 115 | 5 | 0 | 0 |
| Bolivia /1 | 66 | 41 | 13 | 4 | 0 | 0 | 0 |
| Brazil | 961 | 261 | 43 | 43 | 91 | 0 | 0 |
| Colombia /2 | 1,464 | 1,026 | 83 | 250 | 0 | 181 | 215 |
| Ecuador | 163 | 53 | 29 | 5 | 0 | 0 | 1 |
| Paraguay | 5 | 5 | 2 | 0 | 0 | 0 | 0 |
| Peru | 162 | 89 | 32 | 0 | 0 | 6 | 0 |
| Uruguay | 34 | 34 | 13 | 11 | 1 | 0 | 0 |
| Venezuela/3 | 143 | 53 | 3 | 16 | 0 | 11 | 0 |
| Total | 3,839 | 2,095 | 414 | 444 | 97 | 198 | 216 |

Notes: Chile, Suriname, Guyana and French Guiana are Vesicular Diseases-free countries.
/1 BOL - Includes 1 outbreak in the area not covered by the official program.
/2 COL - Includes 87 outbreaks without identification of affected species.
/3 VEN - Includes 40 outbreaks without identification of affected species.

TABLE 2. Affected herds by foot-and-mouth disease based on virus type by country and year. South America, 1984-1990.

| Country | Virus Type | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 |
|---|---|---|---|---|---|---|---|---|
| Argentina | O | 90 | 10 | 30 | 23 | 95 | 103 | 196 |
| | A | 6 | 5 | 11 | 486 | 35 | 39 | 115 |
| | C | 348 | 288 | 315 | 27 | 5 | 4 | 5 |
| Bolivia | O | 3 | 6 | 3 | 0 | 0 | 2 | 13 /1 |
| | A | 8 | 0 | 11 | 12 | 13 /1 | 0 | 4 |
| | C | 1 | 3 | 0 | 1 | 4 /2 | 4 | 0 |
| Brazil | O | 82 | 127 | 126 | 94 | 92 | 71 | 43 |
| | A | 144 | 113 | 102 | 161 | 91 | 72 | 43 |
| | C | 19 | 25 | 17 | 13 | 19 | 28 | 91 |
| Chile | O | 13 | 0 | 0 | 135 | 0 | 0 | 0 |
| | A | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Colombia | O | 164 | 98 | 167 | 100 | 268 | 280 | 83 |
| | A | 78 | 402 | 276 | 73 | 153 | 542 | 250 |
| | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ecuador | O | 13 | 5 | 6 | 2 | 2 | 23 | 29 |
| | A | 29 | 16 | 19 | 11 | 15 | 9 | 5 |
| | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Paraguay | O | 22 | 1 | 4 | 3 | 2 | 30 | 2 |
| | A | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | C | 6 | 7 | 0 | 0 | 0 | 0 | 0 |
| Peru | O | 0 | 7 | 0 | 0 | 1 | 0 | 32 |
| | A | 4 | 11 | 17 | 10 | 6 | 2 | 0 |
| | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Uruguay | O | 10 | 15 | 2 | 2 | 2 | 17 | 13 |
| | A | 0 | 0 | 1 | 115 | 0 | 0 | 11 |
| | C | 6 | 3 | 28 | 5 | 6 | 24 | 1 |
| Venezuela | O | 18 | 31 | 13 | 20 | 6 | 9 | 3 |
| | A | 7 | 16 | 8 | 6 | 10 | 34 | 16 |
| | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Notes: /1 BOL - Includes 3 outbreaks (1988) and 1 outbreak (1990) in the department of Chuquisacaca, not covered by SENARB.
/2 BOL - Includes 1 outbreak in the departament of Beni, not covered by SENARB.

TABLE 3. Field Foot-and-Mouth Disease Virus subtypes identified. South America, 1990.

| | | | |
|---|---|---|---|
| Argentina | $O_1$ | $A_{81}$, $A_{24}$ | $C_3$ |
| Bolivia | $O_1$ | $A_{24}$ | - |
| Brazil | $O_1$ | $A_{24}$ | $C_3$ |
| Colombia | $O_1$ | $A_{24}$, $A_{27}$ | - |
| Ecuador | $O_1$ | $A_{24}$ | - |
| Paraguay | $O_1$ | - | - |
| Peru | $O_1$ | - | - |
| Uruguay | $O_1$ | $A_{81}$ /1 | $C_3$ |
| Venezuela | $O_1$ | $A_{24}$ | - |

Note: Chile, Suriname, Guyana and French Guiana are vesicular diseases - free countries.
/1 Group $A_{81}$ correlated with $A_{24}$

TABLE 4. Strains used for production foot-and-mouth disease vaccine. South America, 1990.

| Countries | Virus Strains | | |
|---|---|---|---|
| | O | A | C |
| Argentina | $O_1$ Caseros-Arg/67 o $O_1$ Campos-Br/58 | $A_{79}$ - Arg/79 y $A_{81}$ - Arg/87 | $C_3$ Arg/85 |
| Brazil | $O_1$ Campos-Br | $A_{24}$ Cruzeiro-Br/55 y $A_{79}$ Venezuela-Br/76 | $C_3$ Indaial-Br/71 |
| Colombia | $O_1$ Campos | $A_{24}$ Cruzeiro | - |
| Ecuador | $O_1$ Campos | $A_{24}$ Cruzeiro | - |
| Paraguay | $O_1$ Campos | $A_{24}$ Cruzeiro | $C_3$ Resende-Br/55 |
| Peru | $O_1$ Urubamba-Peru/63 | $A_{24}$ Cruzeiro | $C_3$ Resende |
| Uruguay | $O_1$ Campos | $A_{24}$ Cruzeiro | $C_3$ Resende |
| Venezuela | $O_1$ Campos | $A_{24}$ Cruzeiro | - |
| | | $A_{32}$ Venezuela/70 | - |

Source: Data from National Veterinary Services and PFMDC Laboratory of Reference.

Note: Chile, Surinam, Guyana y French Guiana are vesicular Diseases - free countries.

TABLE 5. Recorded frequency of vesicular diseases affected herds significantly greater than the exprcted frequencies. South America, 1990.

| Months | Argentina | Bolivia | Brazil | Colombia | Ecuador | Paraguay | Peru | Uruguay | Venezuela |
|---|---|---|---|---|---|---|---|---|---|
| January | | O,A | | A,NJ,I | O | | NJ | | NJ |
| February | O | O,A | | O,A,NJ,I | O | | O,NJ | C | NJ |
| March | O | O | C | O,A,NJ,I | A | | O | O | NJ |
| April | O,A | | | O,A,NJ,I | O | | O | | A |
| May | O | O | | A,NJ,I | I | | O | O,A | A,NJ |
| Juny | O,A | | | A,NJ,I | O | | O | O,A | A |
| July | O | | | O,A,NJ,I | | O | O | | |
| August | O | | | A,NJ,I | O | | O | | |
| September | O,A | | | A,NJ,I | | | | | A,NJ |
| Octuber | O,A | | C | O,A,NJ,I | | | O | | A,NJ |
| November | O,A | | C | A,NJ,I | O | | | | A,NJ |
| December | O,A | | C | A,NJ,I | O | | | | |

Notes: Chile, Suriname, Guyana and French Guiana are Vesicular Diseases-free countries.

TABLE 6. Vesicular disease morbidity in cattle. South America, 1990.

| Country | Herds /a | | Population /a | | | | Rates | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Total | Affected | Total (x 1000) | In affected herds | Diseased | Deaths | Affected Herds (0/00) | Population morbility (0/000) | Internal morbility (0/0) | Lethality (0/0) |
| Argentina | 295,897 | 819 | 46,883.0 | 630,879 | 36,316 | 332 | 2.77 | 7.75 | 5.76 | 0.91 |
| Bolivia | 50,021 | 63 | 2,656.7 | 12,544 | 3,115 | 93 | 1.26 | 11.73 | 24.83 | 2.99 |
| Brazil | 1,622,233 | 953 | 112,742.7 | 132,606 | 25,895 | 479 | 0.59 | 2.30 | 19.53 | 1.85 |
| Colombia | 723,753 | 1,345 | 22,141.9 | 194,235 | 19,630 | 150 | 1.86 | 8.87 | 10.11 | 0.76 |
| Ecuador | 247,855 | 163 | 3,997.4 | 10,752 | 4,418 | 31 | 0.66 | 11.05 | 41.09 | 0.70 |
| Paraguay | 248,930 | 5 | 8,253.9 | 932 | 409 | 3 | 0.02 | 0.50 | 43.88 | 0.73 |
| Peru | 463,182 | 162 | 3,396.0 | 13,053 | 1,263 | 0 | 0.35 | 3.72 | 9.68 | 0.00 |
| Uruguay | 52,204 | 34 | 8,761.4 | 20,361 | 557 | 0 | 0.65 | 0.64 | 2.74 | 0.00 |
| Venezuela | 105,735 | 100 | 10,831.0 | 26,438 | 2,501 | 18 | 0.95 | 2.31 | 9.46 | 0.72 |
| Total | 3,809,810 | 3,644 | 219,664.0 | 1,041,800 | 94,104 | 1,106 | 0.96 | 4.28 | 9.03 | 1.18 |

Notes: /a Covered by program
Chile, Surinam, Guyana and French Guiana are Vesicular Diseases-free countries.

TABLE 7. Vesicular disease morbidity in swine. South America, 1990.

| Country | Population | | | | Rates | | |
|---|---|---|---|---|---|---|---|
| | Total (x 1000) | In affected herds | Diseased | Deaths | Population morbidity (0/000) | Internal morbidity (0/0) | Lethality (0/0) |
| Argentina | 2,531.7 | 13,276 | 1,750 | 381 | 6.91 | 13.18 | 21.77 |
| Bolivia | 2,126.5 | 1,218 | 148 | 17 | 0.70 | 12.15 | 11.49 |
| Brazil | 32,479.7 | 12,319 | 3,140 | 1,022 | 0.97 | 25.49 | 32.55 |
| Colombia | 2,187.0 | 7,219 | 844 | 240 | 3.86 | 11.69 | 28.44 |
| Ecuador | 2,092.1 | 120 | 31 | 1 | 0.15 | 25.83 | 3.23 |
| Paraguay | 2,444.0 | 18 | 12 | 0 | 0.05 | 66.67 | 0.00 |
| Peru | 2,141.9 | 2,323 | 139 | 19 | 0.65 | 5.98 | 13.67 |
| Uruguay | 230.0 | 98 | 13 | 0 | 0.57 | 13.27 | 0.00 |
| Venezuela | 2,639.7 | 9,206 | 84 | 0 | 0.32 | 0.91 | 0.00 |
| Total | 48,872.6 | 45,797 | 6,161 | 1,680 | 1.26 | 13.45 | 27.27 |

Notes: Chile, Suriname, Guyana and French Guiana are Vesicular Diseases-free countries.

TABLE 8. Vesicular disease morbidity in sheep. South America, 1990.

| Country | Population | | | | Rates | | |
|---|---|---|---|---|---|---|---|
| | Total (x 1000) | In affected herds | Diseased | Deaths | Population morbidity (0/00) | Internal morbidity (0/0) | Lethality (0/0) |
| Argentina | 35,237.6 | 83,488 | 11,509 | 58 | 3.27 | 13.79 | 0.50 |
| Bolivia | 9,413.1 | 70 | 15 | 0 | 0.02 | 21.43 | 0.00 |
| Brazil | 19,859.6 | 3,365 | 489 | 90 | 0.25 | 14.53 | 18.40 |
| Colombia | 1,527.9 | 2,346 | 41 | 0 | 0.27 | 1.75 | 0.00 |
| Ecuador | 1,329.0 | 90 | 3 | 0 | 0.02 | 3.33 | 0.00 |
| Paraguay | 456.0 | 5 | 0 | 0 | 0.00 | 0.00 | 0.00 |
| Perú | 13,060.0 | 128 | 10 | 0 | 0.01 | 7.81 | 0.00 |
| Uruguay | 25,220.0 | 22,644 | 60 | 0 | 0.02 | 0.26 | 0.00 |
| Venezuela | 351.2 | 5 | 1 | 0 | 0.03 | 20.00 | 0.00 |
| Total | 106,454.4 | 112,141 | 12,128 | 148 | 1.14 | 10.81 | 1.22 |

Notes: Chile, Suriname, Guyana and French Guiana are Vesicular Diseases-free countries.

TABLE 9. Vesicular disease morbidity in goats. South America, 1990.

| Country | Population | | | | Rates | | |
|---|---|---|---|---|---|---|---|
| | Total (x 1000) | In affected herds | Diseased | Deaths | Population morbidity (0/000) | Internal morbidity (0/0) | Lethality (0/0) |
| Argentina | 3,100.0 /1 | 2,234 | 254 | 0 | 0.82 | 0.00 | 0.00 |
| Bolivia | 1,226.7 | 19 | 10 | 0 | 0.00 | 0.00 | 0.00 |
| Brazil | 10,791.9 | 33 | 0 | 0 | 0.00 | 0.00 | 0.00 |
| Colombia | 1,237.3 | 642 | 0 | 0 | 0.00 | 0.00 | 0.00 |
| Ecuador | 298.3 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 |
| Paraguay | 148.0 | 23 | 10 | 0 | 0.68 | 43.48 | 0.00 |
| Peru | 1,740.1 | 1,323 | 334 | 0 | 0.00 | 0.00 | 0.00 |
| Uruguay | 12.0 /1 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 |
| Venezuela | 1,285.0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 |
| Total | 19,839.3 | 4,274 | 608 | 0 | 0.31 | 14.23 | 0.00 |

Notes: Chile, Suriname, Guyana and French Guiana are Vesicular Diseases-free countries.
/1 ARG,URU - Figure taken from country's report to COSALFA XV.

TABLE 10. Vesicular disease morbidity in horses. South America, 1990

| Country | Population | | | | Rates | | |
|---|---|---|---|---|---|---|---|
| | Total (x 1000) | In affected herds | Diseased | Deaths | Population Morbidity (0/000) | Internal Morbidity (0/0) | Lethality (0/0) |
| Argentina | 3,073.5 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 |
| Bolivia | 904.1 | 47 | 0 | 0 | 0.00 | 0.00 | 0.00 |
| Brazil | 9,102.7 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 |
| Colombia | 2,365.0 | 6,367 | 126 | 0 | 0.53 | 1.98 | 0.00 |
| Ecuador | 826.1 | 268 | 30 | 0 | 0.00 | 0.00 | 0.00 |
| Paraguay | 334.1 | 15 | 0 | 0 | 0.00 | 0.00 | 0.00 |
| Peru | 1,213.1 | 44 | 0 | 0 | 0.00 | 0.00 | 0.00 |
| Uruguay | 437.0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 |
| Venezuela | 557.4 | 8 | 3 | 0 | 0.00 | 0.00 | 0.00 |
| Total | 18,813.0 | 6,749 | 159 | 0 | 0.08 | 2.36 | 0.00 |

Notes: Chile, Suriname, Guyana and French Guiana are Vesicular Diseases-free countries.

TABLE 11. Monthly distribution of Vesicular Diseases affected herds. South America, 1990.

| Country | Months | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Agu | Sep | Oct | Nov | Dec | Total |
| Argentina | 13 | 11 | 104 | 134 | 119 | 105 | 65 | 40 | 122 | 79 | 25 | 24 | 841 |
| Bolivia /1 | 7 | 12 | 12 | 0 | 17 | 11 | 4 | 2 | 0 | 1 | 0 | 0 | 66 |
| Brazil | 57 | 35 | 70 | 59 | 71 | 92 | 95 | 137 | 44 | 49 | 157 | 95 | 961 |
| Colombia | 206 | 211 | 114 | 40 | 69 | 100 | 126 | 131 | 108 | 117 | 104 | 138 | 1,464 |
| Ecuador | 41 | 26 | 14 | 9 | 13 | 12 | 10 | 9 | 7 | 3 | 6 | 13 | 163 |
| Paraguay | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 5 |
| Peru | 9 | 8 | 18 | 22 | 15 | 14 | 7 | 31 | 13 | 16 | 0 | 9 | 162 |
| Uruguay | 0 | 1 | 2 | 0 | 22 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 34 |
| Venezuela | 21 | 7 | 1 | 7 | 8 | 20 | 14 | 15 | 20 | 15 | 13 | 2 | 143 |
| Total | 354 | 312 | 335 | 271 | 334 | 363 | 322 | 366 | 314 | 280 | 306 | 282 | 3,839 |

Notes: Chile, Suriname, Guyana and French Guiana are Vesicular Diseases-free countries.
/1 BOL - Includes 1 outbreak in the area not covered by the official program.

TABLE 12. Monthly distribution of FMD affected herds. Virus type "O".
South America, 1990.

| Country | Months | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | |
| Argentina | 0 | 2 | 18 | 48 | 35 | 25 | 6 | 7 | 19 | 21 | 11 | 4 | 196 |
| Bolivia | 1 | 1 | 5 /1 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 |
| Brazil | 6 | 3 | 1 | 6 | 7 | 8 | 3 | 5 | 2 | 1 | 0 | 1 | 43 |
| Colombia | 6 | 31 | 11 | 7 | 1 | 3 | 8 | 6 | 4 | 3 | 2 | 1 | 83 |
| Ecuador | 8 | 5 | 1 | 3 | 1 | 2 | 1 | 2 | 1 | 0 | 1 | 4 | 29 |
| Paraguay | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 2 |
| Peru | 0 | 3 | 3 | 8 | 3 | 5 | 2 | 3 | 0 | 3 | 0 | 2 | 32 |
| Uruguay | 0 | 0 | 2 | 0 | 8 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 13 |
| Venezuela | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| Total | 22 | 45 | 41 | 72 | 62 | 47 | 21 | 23 | 26 | 28 | 14 | 13 | 414 |

Notes: Chile, Suriname, Guyana and French Guiana are Vesicular Diseases-free countries.
/1 BOL - Includes 1 outbreak in the area not covered by the official program.

TABLE 13. Monthly distribution of FMD affected herds. Virus type "A". South America, 1990.

| Country | Months | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| Argentina | 0 | 1 | 1 | 5 | 6 | 24 | 6 | 13 | 33 | 16 | 5 | 5 | 115 |
| Bolivia | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| Brazil | 3 | 2 | 3 | 1 | 4 | 3 | 5 | 8 | 1 | 7 | 6 | 0 | 43 |
| Colombia | 49 | 32 | 24 | 7 | 16 | 22 | 16 | 19 | 17 | 11 | 16 | 21 | 250 |
| Ecuador | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 5 |
| Paraguay | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Peru | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Uruguay | 0 | 0 | 0 | 0 | 7 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 11 |
| Venezuela | 1 | 0 | 0 | 1 | 1 | 3 | 1 | 0 | 3 | 5 | 1 | 0 | 16 |
| Total | 55 | 37 | 29 | 14 | 34 | 56 | 28 | 40 | 54 | 39 | 30 | 28 | 444 |

Notes: Chile, Suriname, Guyana and French Guiana are Vesicular Diseases-free countries.

TABLE 14. Monthly distribution of FMD affected herds. Virus type "C".
South America, 1990.

| Country | Months | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| Argentina | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 5 |
| Bolivia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Brazil | 0 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 5 | 58 | 24 | 91 |
| Colombia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ecuador | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Paraguay | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Peru | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Uruguay | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Venezuela | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 2 | 2 | 1 | 2 | 0 | 0 | 1 | 2 | 5 | 58 | 24 | 97 |

Notes: Chile, Suriname, Guyana and French Guiana are Vesicular Diseases-free countries.

TABLE 15. Monthly distribution of Vesicular Stomatitis affected herds. New Jersey type. South America, 1990.

| Country | Months | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| Argentina | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bolivia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Brazil | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Colombia | 16 | 11 | 7 | 2 | 8 | 11 | 24 | 22 | 17 | 22 | 21 | 20 | 181 |
| Ecuador | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Paraguay | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Peru | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| Uruguay | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Venezuela | 1 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 3 | 2 | 1 | 0 | 11 |
| Total | 20 | 16 | 8 | 2 | 9 | 11 | 24 | 22 | 20 | 24 | 22 | 20 | 198 |

Notes: Chile, Suriname, Guyana and French Guiana are Vesicular Diseases-free countries.

TABLE 16. Monthly distribution of Vesicular Stomatitis affected herds. Indiana type. South America, 1990.

| Country | Months | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| Argentina | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bolivia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Brazil | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Colombia | 25 | 30 | 11 | 2 | 10 | 14 | 14 | 16 | 13 | 19 | 20 | 41 | 215 |
| Ecuador | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Paraguay | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Peru | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Uruguay | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Venezuela | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 25 | 30 | 11 | 2 | 11 | 14 | 14 | 16 | 13 | 19 | 20 | 41 | 216 |

Notes: Chile, Suriname, Guyana and French Guiana are Vesicular Diseases-free countries.

TABLE 17. Monthly distribution of cattle herds affected by Vesicular Diseases. South America, 1990.

| Country | Months | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| Argentina | 13 | 11 | 101 | 125 | 117 | 102 | 62 | 40 | 121 | 78 | 27 | 22 | 819 |
| Bolivia /1 | 7 | 11 | 12 | 0 | 15 | 11 | 4 | 2 | 0 | 1 | 0 | 0 | 63 |
| Brazil | 57 | 35 | 70 | 59 | 71 | 90 | 92 | 136 | 42 | 49 | 157 | 95 | 953 |
| Colombia | 194 | 195 | 105 | 36 | 67 | 90 | 114 | 124 | 106 | 104 | 93 | 117 | 1,345 |
| Ecuador | 41 | 26 | 14 | 9 | 13 | 12 | 10 | 9 | 7 | 3 | 6 | 13 | 163 |
| Paraguay | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 5 |
| Peru | 9 | 8 | 18 | 22 | 15 | 14 | 7 | 31 | 13 | 16 | 0 | 9 | 162 |
| Uruguay | 0 | 1 | 2 | 0 | 22 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 34 |
| Venezuela | 17 | 3 | 1 | 7 | 7 | 16 | 8 | 9 | 13 | 12 | 5 | 2 | 100 |
| Total | 338 | 291 | 323 | 258 | 327 | 344 | 298 | 352 | 302 | 263 | 289 | 259 | 3,644 |

Notes: Chile, Suriname, Guyana and French Guiana are Vesicular Diseases-free countries.
/1 BOL - Includes 1 outbreak in the area not covered by official program.

TABLE 18. Monthly distribution of cattle herds affected by FMD. Virus type "O". South America, 1990.

| Country | Months | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| Argentina | 0 | 2 | 18 | 48 | 35 | 25 | 6 | 7 | 19 | 21 | 11 | 4 | 196 |
| Bolivia | 1 | 1 | 5 /1 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| Brazil | 6 | 3 | 1 | 6 | 7 | 8 | 3 | 5 | 2 | 1 | 0 | 1 | 43 |
| Colombia | 6 | 31 | 10 | 6 | 1 | 3 | 8 | 6 | 4 | 2 | 2 | 1 | 80 |
| Ecuador | 8 | 5 | 1 | 3 | 1 | 2 | 1 | 2 | 1 | 0 | 1 | 4 | 29 |
| Paraguay | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 2 |
| Peru | 0 | 3 | 3 | 8 | 3 | 5 | 2 | 3 | 0 | 3 | 0 | 2 | 32 |
| Uruguay | 0 | 0 | 2 | 0 | 8 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 13 |
| Venezuela | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| Total | 22 | 45 | 40 | 71 | 61 | 47 | 21 | 23 | 26 | 27 | 14 | 13 | 410 |

Notes: Chile, Suriname, Guyana and French Guiana are Vesicular Diseases-free countries.
/1 BOL - Includes 1 outbreak in the area not covered by the official program.

TABLE 19. Monthly distribution of cattle herds affected by FMD. Virus type "A". South America, 1990.

| Country | Months | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| Argentina | 0 | 1 | 1 | 5 | 6 | 24 | 6 | 13 | 33 | 16 | 5 | 5 | 115 |
| Bolivia | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| Brazil | 3 | 2 | 3 | 1 | 4 | 3 | 5 | 8 | 1 | 7 | 6 | 0 | 43 |
| Colombia | 49 | 31 | 24 | 7 | 16 | 21 | 15 | 18 | 17 | 11 | 16 | 18 | 243 |
| Ecuador | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 5 |
| Paraguay | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Peru | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Uruguay | 0 | 0 | 0 | 0 | 7 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 11 |
| Venezuela | 1 | 0 | 0 | 1 | 1 | 3 | 1 | 0 | 3 | 5 | 1 | 0 | 16 |
| Total | 55 | 36 | 29 | 14 | 34 | 55 | 27 | 39 | 54 | 39 | 30 | 25 | 437 |

Notes: Chile, Suriname, Guyana and French Guiana are Vesicular Diseases-free countries.

TABLE 20. Monthly distribution of cattle herds affected by FMD. Virus type "C". South America, 1990.

| Country | Months | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| Argentina | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 5 |
| Bolivia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Brazil | 0 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 5 | 58 | 24 | 91 |
| Colombia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ecuador | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Paraguay | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Peru | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Uruguay | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Venezuela | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 2 | 2 | 1 | 2 | 0 | 0 | 1 | 2 | 5 | 58 | 24 | 97 |

Notes: Chile, Suriname, Guyana and French Guiana are Vesicular Diseases-free countries.

TABLE 21. Monthly distribution of cattle herds affected by Vesicular Stomatitis. New Jersey type. South America, 1990.

| Country | Months | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| Argentina | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bolivia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Brazil | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Colombia | 15 | 10 | 7 | 2 | 8 | 11 | 23 | 22 | 16 | 22 | 21 | 18 | 175 |
| Ecuador | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Paraguay | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Peru | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| Uruguay | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Venezuela | 1 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 3 | 2 | 0 | 0 | 10 |
| Total | 19 | 15 | 8 | 2 | 9 | 11 | 23 | 22 | 19 | 24 | 21 | 18 | 191 |

Notes: Chile, Suriname, Guyana and French Guiana are Vesicular Diseases-free countries.

TABLE 22. Monthly distribution of cattle herds affected by Vesicular Stomatitis. Indiana type. South America, 1990.

| Country | Months | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| Argentina | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bolivia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Brazil | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Colombia | 25 | 28 | 11 | 2 | 10 | 13 | 13 | 15 | 13 | 19 | 20 | 39 | 208 |
| Ecuador | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Paraguay | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Peru | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Uruguay | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Venezuela | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 25 | 28 | 11 | 2 | 11 | 13 | 13 | 15 | 13 | 19 | 20 | 39 | 209 |

Notes: Chile, Suriname, Guyana and French Guiana are Vesicular Diseases-free countries.

TABLE 23. Monthly distribution of affected cattle by vesicular diseases.South America, 1990.

| Country | Months | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| Argentina | 1,038 | 389 | 2,379 | 5,458 | 5,712 | 5,506 | 3,460 | 1,420 | 4,645 | 4,404 | 918 | 987 | 36,316 |
| Bolivia | 130 | 578 | 1,549 | 0 | 341 | 116 | 278 | 23 | 0 | 100 | 0 | 0 | 3,115 |
| Brazil | 1,010 | 804 | 1,716 | 2,685 | 1,654 | 1,727 | 776 | 3,420 | 1,051 | 2,205 | 7,512 | 1,335 | 25,895 |
| Chile | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Colombia | 3,510 | 3,354 | 2,013 | 417 | 840 | 1,020 | 1,622 | 1,290 | 1,287 | 1,306 | 1,541 | 1,430 | 19,630 |
| Ecuador | 914 | 428 | 144 | 603 | 460 | 307 | 96 | 668 | 294 | 21 | 278 | 205 | 4,418 |
| Paraguay | 0 | 320 | 0 | 0 | 0 | 40 | 18 | 0 | 0 | 0 | 1 | 30 | 409 |
| Peru | 27 | 167 | 173 | 233 | 123 | 120 | 86 | 250 | 20 | 56 | 0 | 8 | 1,263 |
| Uruguay | 0 | 3 | 3 | 0 | 290 | 261 | 0 | 0 | 0 | 0 | 0 | 0 | 557 |
| Venezuela | 545 | 0 | 0 | 60 | 9 | 596 | 87 | 143 | 395 | 483 | 130 | 53 | 2,501 |
| Total | 7,174 | 6,043 | 7,977 | 9,456 | 9,429 | 9,693 | 6,423 | 7,214 | 7,692 | 8,575 | 10,380 | 4,048 | 94,104 |

Notes: Chile, Suriname, Guyana and French Guiana are Vesicular Diseases-free countries.

TABLE 24. Number of Vesicular Stomatitis affected herds, by country and virus type. Central America y Mexico, 1990.

| Country | Vesicular Stomatitis | | No Diagnosis (Negative) | Total |
|---|---|---|---|---|
| | New Jersey | Indiana | | |
| Belice | 2 | 0 | 1 | 3 |
| Costa Rica | 21 | 0 | 10 | 31 |
| El Salvador | 53 | 1 | 25 | 79 |
| Guatemala | 7 | 0 | 3 | 10 |
| Honduras | 42 | 0 | 44 | 86 |
| México | 17 | 1 | 38 | 56 |
| Nicaragua | 10 | 1 | 11 | 22 |
| Panamá | 7 | 6 | 6 | 19 |
| Total | 159 | 9 | 138 | 306 |

TABLE 25. Coverage of FMD control programs. South America, 1990.

| Country | Area ($Km^2$) | | Cattle Herds | | Cattle Population (x 1000) | |
|---|---|---|---|---|---|---|
| | Total | Under Program | Total | Under Program | Total | Under Program |
| Argentina | 2,779,892 | 2,779,892 | 295,897 | 295,897 | 46,883.0 | 46,883.0 |
| Bolivia | 1,098,581 | 487,266 | 98,139 | 50,021 | 5,475.9 | 2,656.7 |
| Brazil | 8,508,832 | 4,019,501 | 1,936,260 | 1,622,233 | 136,287.4 | 112,742.7 |
| Chile | 757,820 | 757,820 | 189,044 | 189,044 | 3,371.1 | 3,371.1 |
| Colombia * | 1,141,748 | 846,154 | 726,609 /1 | 723,753 | 22,301.7 | 22,141.9 |
| Ecuador | 267,000 | 267,000 | 247,855 | 247,855 | 3,997.4 | 3,997.4 |
| Paraguay | 406,752 | 406,752 | 248,930 | 248,930 | 8,253.9 | 8,253.9 |
| Perú | 1,282,120 | 1,282,120 | 463,182 | 463,182 | 3,396.0 | 3,396.0 |
| Uruguay | 160,737 | 160,737 | 52,204 | 52,204 | 8,761.4 | 8,761.4 |
| Venezuela | 912,050 | 912,050 | 105,735 | 105,735 | 10,831.0 | 10,831.0 |
| Total | 17,315,532 | 11,919,292 | 4,363,855 | 3,998,854 | 249,558.8 | 223,035.1 |

Notes: * Figures taken from "PRIMERA ENCUESTA NACIONAL AGROPECUARIA - 1989."
/1 COL - Does not include figures from Vaupés.

TABLE 26. Foot-and-mouth disease vaccination. Number of vaccinated animals. South America, 1990.

| Country | Systematic vaccination | | | | | Strategical-tactical vaccinations | | |
|---|---|---|---|---|---|---|---|---|
| | Cattle (x 1000) | | | Sheep/Goats | | | | |
| | 3 Doses | 2 Doses | 1 Dose | Nº of Animals (x 1000) | Fraction of Doses | Cattle | Swine | Sheep/ /Goats |
| Argentina | 28,773.4 | 15,125.4 | 561.3 | 1,424.4 | ... | 0 | 0 | 0 |
| Bolivia | 0.0 | 26.8 | 103.4 /1 | 0.0 | | 16,113 | 0 | 0 |
| Brazil | 41,349.7 | 20,410.6 | 8,972.2 | 19.8 | ... | 658,803 | 19,777 | 2,805 |
| Colombia /2 | 6,967.1 | 8,907.1 | 4.3 | 0.0 | | 779,716 | 0 | 0 |
| Ecuador | 0.0 | 691.1 | 951.9 | 0.0 | | 0 | 0 | 0 |
| Paraguay | 2,491.6 | 812.5 | 1,681.1 | 0.0 | | 0 | 0 | 0 |
| Perú | 0.0 | 0.0 | 0.0 | 0.0 | | 324,718 | 0 | 0 |
| Uruguay | 7,126.7 | 595.0 | 0.0 | 0.0 | | 40,000 | 300 | 35,000 |
| Venezuela | ... | ... | ... | ... | ... | ... | ... | ... |

Notes: Chile, Suriname, Guyana and French Guiana are Vesicular Diseases-free countries.
/1 BOL - Includes 4,280 doses of oil-adjuvanted vaccine administered in the area covered by the border agreement with Perú.
/2 COL - The vaccination scheme based on the administration of hydroxide vaccine every four months was applied for the last time.
/3 ECU - Includes 260,765 doses of saponin hydroxide vaccine produced in the country.
... Data not available.

TABLE 27. Production, control, international commercialization and availability of FMD oil and saponin hidroxide vaccines in doses x 1000 by country. South America, 1990.

| Country | Type of Vaccine | Produced | Controlled | Approved | Exported | Imported | Available |
|---|---|---|---|---|---|---|---|
| Argentina | Oil | 23,365.0 | 23,365.0 | 21,472.5 | 0.0 | 0.0 | 21,472.5 |
| | Saponin | 127,568.5 | 127,568.5 | 120,380.1 | 0.0 | 0.0 | 120,380.1 |
| | Total | 150,933.5 | 150,933.5 | 141,852.6 | 0.0 | 0.0 | 141,852.6 |
| Bolivia | Oil | 0.0 | 0.0 | 0.0 | 0.0 | ... | ... |
| | Saponin | 0.0 | 0.0 | 0.0 | 0.0 | ... | ... |
| | Total | 0.0 | 0.0 | 0.0 | 0.0 | ... | ... |
| Brazil | Oil | 40,974.9 | 40,974.9 | 35,542.1 | 100.0 | 0.0 | 38,959.0 * |
| | Saponin | 147,028.9 | 147,028.9 | 136,497.2 | 2,000.0 | 0.0 | 149,281.7 * |
| | Total | 188,003.8 | 188,003.8 | 172,039.3 | 2,100.0 | 0.0 | 188,240.7 |
| Colombia | Oil | 23,048.8 | 15,925.6 | 15,925.6 | 680.0 | 6.0 /1 | 17,861.6 * |
| | Saponin | 0.0 | 2,867.9 | 1,829.6 | 0.0 | 0.0 | 5,759.6 * |
| | Total | 23,048.8 | 18,793.5 | 17,755.2 | 680.0 | 6.0 | 23,621.2 |
| Ecuador | Oil | 0.0 | 0.0 | 0.0 | 0.0 | 980.0 | 980.0 |
| | Saponin | 317.4 | 317.4 | 317.4 | 0.0 | 0.0 | 317.4 |
| | Total | 317.4 | 317.4 | 317.4 | 0.0 | 980.0 | 1,297.4 |
| Paraguay | Oil | 5,121.6 | 3,758.2 | 3,758.2 | 0.0 | 1,168.9 | 5,024.0 * |
| | Saponin | 7,756.1 | 7,756.1 | 7,756.1 | 0.0 | 0.0 | 7,756.1 |
| | Total | 12,877.7 | 11,514.3 | 11,514.3 | 0.0 | 1,168.9 | 12,780.1 |
| Perú | Oil | 113.8 | 113.8 | 113.8 | 0.0 | 541.3 /1 | 655.1 |
| | Saponin | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Total | 113.8 | 113.8 | 113.8 | 0.0 | 541.3 | 655.1 |
| Uruguay | Oil | 9,318.1 | 9,318.1 | 9,084.1 | 0.0 | 717.8 | 9,801.9 |
| | Saponin | 18,243.5 | 20,416.3 ** | 20,416.3 | 1,393.0 | 0.0 | 19,023.3 |
| | Total | 27,561.6 | 29,734.4 | 29,500.4 | 1,393.0 | 717.8 | 28,825.2 |
| Venezuela | Oil | 4,000.0 | 4,000.0 | 4,000.0 | 0.0 | 3,800.0 | 9,250.0 * |
| | Saponin | 568.6 | 568.6 | 568.6 | 0.0 | 0.0 | 568.6 |
| | Total | 4,568.6 | 4,568.6 | 4,568.6 | 0.0 | 3,800.0 | 9,818.6 |
| Total | Oil | 105,942.2 | 97,455.6 | 89,896.3 | 780.0 | 7,214.0 | 154,004.1 /2 |
| | Saponin | 301,483.0 | 306,523.7 | 287,765.3 | 3,393.0 | 0.0 | 303,086.8 |
| | Total | 407,425.2 | 403,979.3 | 377,661.6 | 4,173.0 | 7,214.0 | 457,090.9 |

Notes:
- * Includes vaccine stocks as of 31 December 1989.
- ** Includes lots of vaccine produced in 1989 and controlled in 1990.
- /1 COL and PER - vaccine produced by PAFMDC.
- /2 Includes 50,000 vaccine doses in stock at the PAFMDC for use in the event that an emergency situation may occur in CHILE.
- ... Data not available.

TABLE 28. Inventory of human resources/a. Foot-and-mouth disease programs. South America, 1989-1990.

| Country | 1989 | | | | 1990 | | | |
|---|---|---|---|---|---|---|---|---|
| | Total | Central | Laboratory | Field | Total | Central | Laboratory | Field |
| Argentina | 1,565 | 34 | 146 | 1,385 | 1,409 | 57 | 35 | 1,317 /1 |
| Bolivia | 135 | 26 | 45 | 64 | 135 | 26 | 45 | 64 |
| Brazil | 7,726 | 62 | 291 | 7,373 | 6,190 | 55 | 155 | 5,980 |
| Chile | 188 | 5 | 3 | 180 | 115 /2 | 4 | 5 | 106 |
| Colombia | 1,070 /3 | 54 | 16 | 1,000 | 891 | 22 /4 | 16 /5 | 853 /6 |
| Ecuador | 300 | 37 | 25 | 238 | 334 | 35 | ... | 299 |
| Paraguay | 513 | 201 | 32 | 280 | 499 | 175 | 43 | 281 |
| Perú | 521 | 2 | ... | 519 | 520 | 2 | ... | 518 |
| Uruguay | 500 | 9 | 68 | 423 | 417 | 11 | 60 | 346 |
| Venezuela | 400 | 15 | ... | 385 | 400 | 15 | ... | 385 |
| Total | 12,918 | 445 | 626 | 11,847 | 10,910 | 402 | 359 | 10,149 |

Notes: a/ In some countries, personnel do not work exclusively in FMD programs.
/1 ARG - Does not include 127 Veterinarians and 865 vaccination agents contracted especifically to work in official vaccination programs.
/2 CHI - Includes veterinarians and agricultural technicians contracted for service in control of the summer highland pastures. Does not include technical assistants carrying out inspection duties on imports in ports, airports and frontier posts.
/3 COL/1989 - Includes 149 Diagnostic Service staff as follows: 45 professionales, 49 technical assistants and 55 administrative clerks that work 10% of the time for FMD programs. Includes the staff of the Colombia-Ecuador Agreement and the Barranquilla quarantine station.
/4 COL - Six staff members work full time; the remaining 12 work 40 percent of the time.
/5 COL - LANIP and CEISA staff working full time in the programs.
/6 COL - Includes Animal Health staff participating at least 30% of the time in specific FMD activities.
... Data not available.

TABLE 29. Foot-and-mouth disease control program resources/a. South America, 1990.

| Country | Operating field units | Human resources | | | | | |
|---|---|---|---|---|---|---|---|
| | | Professionals | | | Others | | |
| | | Central | Lab. | Field | Central | Lab. | Field |
| Argentina /1 | 315 | 22 | 13 | 256 | 35 | 22 | 1,061 |
| Bolivia | 15 | 6 | 18 | 27 | 20 | 27 | 37 |
| Brazil | 1,871 | 33 | 43 | 1,976 | 22 | 112 | 4,004 |
| Colombia /2 | 140 /* | 10 | 7 | 167 | 12 | 9 | 686 |
| Chile /3 | 56 | 2 | 2 | 43 | 2 | 3 | 63 |
| Ecuador | 61 | 10 | ... | 77 | 25 | ... | 222 |
| Paraguay | 47 | 48 | 22 | 64 | 127 | 21 | 217 |
| Peru | 135 | 1 | ... | 97 | 1 | ... | 421 |
| Uruguay | 40 | 8 | 13 | 60 | 3 | 47 | 286 |
| Venezuela | 150 | 11 | ... | 177 | 4 | ... | 208 |
| Total | 2,830 | 151 | 118 | 2,944 | 251 | 241 | 7,205 |

Notes: /a In some countries, staff are not assigned exclusively to FMD programs.
/* Refers to offices reporting on animal health events.
/1 Does not include staff with contracts for official vaccination duties (865 Vaccination Agents; 127 Veterinarians)
/2 Of the human resources at headquarters, six staff members work full-time with the FMD program while the rest dedicated approximately 40% of their time. In the field Animal Health staff dedicate 30% of their time to the to specific FMD activities. Laboratory staff were from LANIP and CEISA, working full time with the FMD program.
/3 Includes Veterinarians and Agricultural technicians contracted for activities in summer feedlots. Does not include Technical assistants with inspection duties of imports in seaports, airports and frontierports.
...Date not available.

TABLE 30. Inventory of Vehicles (cars and motorcycles). FMD control programs. South America, 1990.

| Country | 1989 | | | | 1990 | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Area Km² | Total | Cars | Motorcycles | Total Area Km² | Total | Cars | Motorcycles |
| Argentina | 2,779,892 | 881 | 881 | 0 | 2,779,892 | 748 | 748 | 0 |
| Bolivia | 250,650 | 25 | 24 | 1 | 487,266 | 25 | 24 | 1 |
| Brazil | 4,166,145 | 1,688 | 1,659 | 29 | 4,019,501 | 1,726 | 1,698 | 28 |
| Chile | 757,820 | 23 | 23 | 0 | 757,820 | 18 | 18 | 0 |
| Colombia | 846,154 | 430 /1 | 218 | 212 | 846,154 | 404 /2 | 162 | 242 |
| Ecuador | 275,000 | 37 | ... | ... | 267,000 | 32 | ... | ... |
| Paraguay | 406,752 | 91 | 47 | 44 | 406,752 | 71 | 27 | 44 |
| Peru | 1,282,120 | 240 | 62 | 178 | 1,282,120 | 240 | 62 | 178 |
| Uruguay | 162,500 | 162 | 83 | 79 | 160,737 | 156 | 87 | 69 |
| Venezuela | 911,930 | 314 | 314 | ... | 912,050 | 314 | 314 | 0 |
| Total | 11,838,963 | 3,891 | 3,311 | 543 | 11,919,292 | 3,734 | 3,140 | 562 |

Notes: /1 COL - Includes 20 mobile units and 2 trucks.
/2 COL - Of these, 60 pick-up trucks and 180 motorcycles were assigned to the ICA-USDA Cooperative Program. The rest of vehicles were privately-owned by FMD program staff.
...Data not available.

TABLE 31. Private and public expenditures ( 000 Us$). FMD Programs. South America, 1990.

| Country | Total | Public | | | Private |
|---|---|---|---|---|---|
| | | Operating | Capital | Total | |
| Argentina | ... | ... | ... | ... | ... |
| Bolivia | ... | 214.6 | 0.0 | 214.6 | ... |
| Brazil | 62,282.1 | 3,592.5 | 72.8 | 3,665.3 /1 | 58,616.8 /# |
| Chile | 435.2 | 296.3 | 20.0 | 316.3 | 118.9 /2 |
| Colombia | 11,129.7 | 2,718.1 | 144.1 | 2,862.2 | 8,267.5 /* |
| Ecuador | 798.9 | 616.6 | 70.1 | 686.7 | 112.2 /# |
| Paraguay | ... | 1,504.8 | 1,189.0 | 2,693.8 | ... |
| Peru | 85.6 | 48.1 | 0.0 | 48.1 | 37.5 /# |
| Uruguay | ... | ... | ... | ... | 5,284.2 /# |
| Venezuela | 3,720.6 | 258.7 | 228.4 | 487.1 /3 | 3,233.5 /* |
| Total | 78,452.1 | 9,249.7 | 1,724.4 | 10,974.1 | 75,670.6 |

Notes:
/* Refers to expenses associated with the purchase and application of vaccines.
/# Does not include the cost of administering vaccines.
/1 BRA - Expenditure by all Federal Government units.
/2 CHI - Payment for 385,000 monovalent O1 doses requested from PAFMDC during the 1987 emergency, which were not administered.
/3 VEN - Refers to Animal Health.
... Data not available.

TABLE 32. Cattle, meat, milk, embryos and semen imports. South America, 1990.

| Importing country | Country of origin | Number of cattle | Semen (doses) | Embryos | Meat (m.t.) | Milk (m.t.) |
|---|---|---|---|---|---|---|
| Argentina | AUSTRALIA | - | 23,867 | - | - | - |
| | CANADA | - | 17,875 | - | - | - |
| | NEW ZEALAND | - | 500 | - | - | - |
| | USA | 17 | 20,867 | 270 | - | - |
| Bolivia | BRAZIL | 30,523 | - | - | - | - |
| | USA | - | 14,205 | - | - | - |
| Brazil | ARGENTINA | 2,952 | 100 | - | - | - |
| | BOLIVIA | 91,390 | - | - | - | - |
| | CANADA | 1,000 | 80,263 | 821 | - | - |
| | CUBA | 400 | - | - | - | - |
| | DENAMARK | - | 1,000 | - | - | - |
| | FRANCE | 74 | 4,355 | 133 | - | - |
| | GERMANY | 24 | 7,995 | - | - | - |
| | ITALY | 27 | 40,006 | - | - | - |
| | NEW ZEALAND | 136 | 4,900 | - | - | - |
| | PARAGUAY | 49,500 | - | - | - | - |
| | SWITZERLAND | - | 2,225 | 186 | - | - |
| | UNITED KINGDOM | 68 | 5,510 | 48 | - | - |
| | URUGUAY | 49,549 | - | - | - | - |
| | USA | 2,100 | 337,840 | 1,694 | - | - |
| Chile | ARGENTINA | - | - | - | 2,160.0 | 1,785.0 |
| | BELGIUM | - | - | - | - | 123.0 |
| | CANADA | 20 | 26,523 | - | - | 37.0 |
| | CZECHOSLOVAKIA | - | - | - | - | 47.0 |
| | ENGLAND | - | 9,400 | - | - | - |
| | FRANCE | - | - | - | - | 100.0 |
| | GERMANY FED. | - | - | - | - | 24.0 |
| | HONDURAS | - | - | - | - | 46.0 |
| | IRELAND | - | - | - | - | 60.0 |
| | NETHERLANDS | - | - | - | - | 887.0 |
| | NEW ZEALAND | - | 3,400 | - | - | 6,135.0 |
| | PARAGUAY | - | - | - | 757 | - |
| | POLAND | - | - | - | - | 2,820.0 |
| | SWEDEN | - | - | - | - | 11.0 |
| | SWITZERLAND | - | - | - | - | 111.0 |
| | URUGUAY | - | - | - | 62.0 | 70.0 |
| | USA | 2 | 121,619 | - | 0.2 | - |
| Colombia | GERMANY, USA | 161 | - | - | - | - |
| | GERMANY, BRAZIL, CANADA, FRANCE, SWITZERLAND Y USA | - | 201,811 | - | - | - |
| | CZECHOSLOVAKIA, NEW ZEALAND, POLAND Y USA | - | - | - | - | 207.0 |

continues

TABLE 32. Cattle, meat, milk, embryos and semen imports. South America, 1990.

continued

| Importing country | Country of origin | Number of cattle | Semen (doses) | Embryos | Meat (m.t.) | Milk (m.t.) |
|---|---|---|---|---|---|---|
| Ecuador | BRAZIL | ... | ... | ... | ... | ... |
| | CANADA | - | 500 | - | - | - |
| | ENGLAND | - | 10,000 | - | - | - |
| | USA | 143 | 28,810 | - | - | - |
| Paraguay | ARGENTINA | 106 | - | - | - | - |
| | COSTA RICA | - | 1,000 | - | - | - |
| | GERMANY | - | 3,465 | - | - | - |
| | USA | - | 18,574 | 218 | - | - |
| | URUGUAY | 573 | - | - | - | - |
| Peru | ARGENTINA | - | - | - | 122.0 | - |
| | BOLIVIA | - | - | - | 63 | - |
| | BRAZIL | 2,060 /1 | - | - | - | - |
| | CANADA | 80 | 2,880 | - | - | - |
| | COLOMBIA | 400 | - | - | 4,281.0 | - |
| | CUBA | 500 | - | - | - | - |
| | PANAMA | 4,000 | - | - | - | - |
| | PARAGUAY | - | - | - | 3 | - |
| | USA | 2,514 | 37,650 | - | 521.0 | - |
| Uruguay | ARGENTINA | 1,574 | 50 | 53 | - | - |
| | CANADA | - | 25,474 | 48 | - | - |
| | ENGLAND | - | 635 | - | - | - |
| | FRANCE | - | 520 | - | - | - |
| | GERMANY | - | 2,000 | - | - | - |
| | USA | - | 31,952 | - | - | - |
| Venezuela | COLOMBIA | 194 | - | - | 348.2 | - |
| | CURACAO | - | - | - | - | 14.0 |
| | DENAMARK | - | - | - | - | 334.5 |
| | ENGLAND | - | 350 | - | - | |
| | HOLAND | - | - | - | - | 134.4 |
| | NEW ZEALAND | - | - | - | - | 3,961.2 |
| | USA | 32 | - | - | - | - |

Notes: /1 BRA - Includes 710 Buffalos.

TABLE 33. Swine imports. South America, 1990.

| Importing country | Country of origin | Number of pigs | Semen (doses) |
|---|---|---|---|
| Argentina | USA | 31 | - |
| Bolivia | - | - | - |
| Brazil | DENAMARK | - | 36 |
| | GERMANY | - | 230 |
| | UNITED KINGDOM | 969 | - |
| | USA | - | 90 |
| Chile | CANADA | - | 46 |
| | USA | 171 | 66 |
| | ENGLAND | 35 | - |
| Colombia | GERMANY, UNITED KINGDOM Y USA | 374 | - |
| Ecuador | - | - | - |
| Paraguay | - | - | - |
| Peru | CANADA | 74 | 96 |
| | GERMANY FED. | 30 | 258 |
| | USA | 47 | - |
| Uruguay | ARGENTINA | 30 | - |
| | BRAZIL | 86 | - |
| Venezuela | CANADA | 84 | - |

TABLE 34. Sheep imports. South America, 1990.

| Importing country | Country of origin | Number of sheeps | Semen (doses) |
|---|---|---|---|
| Argentina | URUGUAY | 6 | - |
| Bolivia | - | - | - |
| Brazil | ARGENTINA | 1 | - |
| | AUSTRALIA | 1 | - |
| | CANADA | 58 | - |
| | FRANCE | 27 | - |
| | URUGUAY | 60,235 | - |
| | USA | 349 | - |
| Chile | ARGENTINA | 12 | - |
| Colombia | - | - | - |
| Ecuador | - | - | - |
| Paraguay | ARGENTINA | 376 | - |
| | BRAZIL | 151 | - |
| | URUGUAY | 1,309 | - |
| Peru | - | - | - |
| Uruguay | ARGENTINA | 123 | - |
| | AUSTRALIA | 8 | 4,761 |
| | BRAZIL | 37 | - |
| Venezuela | - | - | - |

TABLE 35. Goats imports. South America, 1990.

| Importing country | Country of origin | Number of goats |
|---|---|---|
| Argentina | - | - |
| Bolivia | - | - |
| Brazil | - | - |
| Chile | - | - |
| Colombia | - | - |
| Ecuador | - | - |
| Paraguay | - | - |
| Peru | USA | 1 |
| Uruguay | - | - |
| Venezuela | - | - |

TABLE 36. Horses imports. South America, 1990.

| Importing country | Country of origin | Number of horses | Semen (doses) |
|---|---|---|---|
| Argentina | BRAZIL | 2 | - |
| | CHILE | 10 | - |
| | NEW ZEALAND | 1 | - |
| | URUGUAY | 126 | - |
| | USA | 92 | - |
| Bolivia | ARGENTINA | 230 | - |
| Brazil | ARGENTINA | 175 | - |
| | AUSTRIA | 6 | - |
| | BELGIUM | 2 | - |
| | CHILE | 13 | - |
| | DENAMARK | 58 | - |
| | FRANCE | 6 | - |
| | GERMANY | 3 | 48 |
| | POLAND | 3 | - |
| | UNITED KINGDOM | 25 | - |
| | URUGUAY | 882 | - |
| | USA | 568 | - |
| Chile | ARGENTINA | 142 | - |
| | BRAZIL | 11 | - |
| | FRANCE | 4 | - |
| | GERMANY FED. | 5 | |
| | PERU | 5 | |
| | URUGUAY | 9 | - |
| | USA | 23 | - |
| Colombia | ARGENTINA, CHILE, FRANCE, GERMANY, NETHERLANDS, PANAMA, PERU, USA and VENEZUELA | 372 | - |
| Ecuador | ARGENTINA | 13 | - |
| | COLOMBIA | 4 | - |
| | COSTA RICA | 5 | - |
| | GERMANY | 20 | - |
| | PERU | 9 | - |
| | USA | 13 | - |
| Paraguay | ARGENTINA | 570 | - |
| | BRAZIL | 4 | - |
| | URUGUAY | 1,006 | - |
| Peru | ARGENTINA | 132 | - |
| | BRAZIL | 12 | - |
| | GERMANY FED. | 14 | - |

continues

TABLE 36. Horses imports. South America, 1990.

continued

| Importing country | Country of origin | Number of horses | Semen (doses) |
|---|---|---|---|
| Perú (cont'd) | CANADA | 12 | - |
| | CHILE | 31 | - |
| | COLOMBIA | 8 | - |
| | COSTA RICA | 3 | - |
| | ECUADOR | 11 | - |
| | ENGLAND | 14 | - |
| | IRELAND | 4 | - |
| | MEXICO | 4 | - |
| | PANAMA | 4 | - |
| | URUGUAY | 6 | - |
| | USA | 185 | - |
| | VENEZUELA | 9 | - |
| Uruguay | ARGENTINA | 556 | - |
| | BRAZIL | 11 | - |
| | PARAGUAY | 11 | - |
| | USA | 7 | - |
| | VENEZUELA | 1 | - |
| Venezuela | ARGENTINA | 37 | - |
| | ARUBA | 5 | - |
| | COLOMBIA | 4 | - |
| | ECUADOR | 3 | - |
| | GERMANY | 3 | - |
| | PERU | 11 | - |
| | PUERTO RICO | 3 | - |
| | USA | 237 | - |

TABLE 37. Cattle,meat,milk and semen exports. South America, 1990.

| Exporting Country | Importing origin | Number of cattle | Semen (doses) | Meat (m.t.) | Milk (m.t.) |
|---|---|---|---|---|---|
| Argentina | BOLIVIA | 39 | - | - | - |
| | BRAZIL | 2,935 | - | - | - |
| | PARAGUAY | 132 | - | - | - |
| | URUGUAY | 21 | - | - | - |
| Bolivia | BRASIL | 91,855 | - | - | - |
| | PERU | 5,000 | - | - | - |
| Brazil | ... | ... | ... | ... | ... |
| Colombia | NETHERLANDS ANTILLES, PERU and VENEZUELA | - | - | 7,412.0 | - |
| | VENEZUELA | 2,614 | - | - | - |
| Chile | BOLIVIA | - | - | - | 44.0 |
| | BRAZIL | - | - | - | 1,405.0 |
| | ISLAS MALVINAS | - | - | 0.2 | - |
| | PARAGUAY | - | - | - | 25.0 |
| | PERU | - | - | - | 36.0 |
| | PUERTO RICO | - | - | - | 15.0 |
| | SWEDEN | - | - | - | 2.0 |
| | TAHITI | - | - | 12.0 | * |
| | USA | - | - | - | 22.0 |
| Ecuador | ... | ... | ... | ... | ... |
| Paraguay | ARGENTINA | 6 /1 | - | - | - |
| | BOLIVIA | 215 | - | - | - |
| | BRAZIL | 2 | - | 9,961.7 | 304.0 |
| Peru | - | - | - | - | - |
| Uruguay | ANGOLA | - | - | 1,740.0 | - |
| | ARGELY | - | - | 4709 | - |
| | ARGENTINA | 16 | - | - | - |
| | BRAZIL | 7,466 | - | 74,770.0 | - |
| | CANARY ISLANDS | - | - | 4,974.0 | - |
| | CUBA | - | - | 2,153.0 | - |
| | EGYPT | - | - | 8,786.0 | - |
| | E.E.C | - | - | 37,659.0 | - |
| | HONG-KONG | - | - | 2,217.0 | - |
| | IRAQ | - | - | 3,491.0 | - |
| | ISRAEL | - | - | 19,073.0 | - |
| | PARAGUAY | 431 | - | - | - |
| | SAUDI ARABIA | - | - | 4,343.0 | - |
| | SINGAPORE | - | - | 3,120.0 | - |

continues

TABLE 37. Cattle,meat,milk and semen exports. South America, 1990.

continued

| Exporting Country | Importing origin | Number of cattle | Semen (doses) | Meat (m.t.) | Milk (m.t.) |
|---|---|---|---|---|---|
| Uruguay (Cont'd) | USA | - | - | 12,810.0 | - |
| | USSR | - | - | 4,980.0 | - |
| | W/O ESPECIFICATION | - | - | 22,243.0 | 32,600.0 /3 |
| Venezuela | ARUBA | - | 1,880 | 1,513.2 | - |
| | COLOMBIA | 615 | - | - | - |
| | CURACAO | 250 | - | 178.0 | |

Notas: * Less than 0,1 m.t.
/1 Includes 4 cattle for temporary exports.
/2 Cheese Tones.
/3 Figures estimate by exporting country.

TABLE 38. Swine exports. South America, 1990.

| Exporting country | Importing country | Number of pigs | Meat (m.t.) |
|---|---|---|---|
| Argentina | - | - | - |
| Bolivia | - | - | - |
| Brazil | ... | ... | ... |
| Chile | ARGENTINA | - | 852.00 |
| | ISLAS MALVINAS | - | 0.04 |
| Colombia | - | - | - |
| Ecuador | ... | ... | ... |
| Paraguay | - | - | - |
| Peru | BOLIVIA | 18 | - |
| Uruguay | - | - | - |
| Venezuela | COLOMBIA | 10,612 | - |
| | CURAZAO | 87 | - |

CUADRO 39. Sheep exports. South America, 1990.

| Exporting country | Importing country | Number of sheeps | Meat (m.t.) |
|---|---|---|---|
| Argentina | CHILE | 38 | - |
| | PARAGUAY | 266 | - |
| | URUGUAY | 102 | - |
| | USA | 6 | - |
| Bolivia | - | - | - |
| Brazil | ... | ... | ... |
| Chile | ARGENTINA | 1 | 3,122.0 |
| | ENGLAND | - | 284.0 |
| | FRANCE | - | 131.0 |
| | GERMANY FED. | - | 279.0 |
| | IRAQ | - | 1,999.0 |
| | ISLAS MALVINAS | - | 0.1 |
| | ITALY | - | 306.0 |
| | NETHERLANDS | - | 169.0 |
| | PERU | - | 643.0 |
| | PORTUGAL | - | 499.0 |
| | SAUDI ARABIA | - | 520.0 |
| | SPAIN | - | 1,403.0 |
| | UNITED ARAB. EMIRATES | - | 213.0 |
| Colombia | CURACAO | - | 24,993.0 |
| Ecuador | ... | ... | ... |
| Paraguay | - | - | - |
| Peru | - | - | - |
| Uruguay | ARGELY | - | 4038.0 |
| | ARGENTINA | 2 | - |
| | BRAZIL | 5,583 | 3,178.0 |
| | E.E.C | - | 6,839.0 |
| | IRAQ | - | 6,416.0 |
| | PARAGUAY | 321 | - |
| | SAUDI ARABIA | 204,000 | 5,838.0 |
| Venezuela | CURACAO | 266 | - |

TABLE 40. Goats exports. South America, 1990.

| Exporting country | Importing country | Number of goats |
|---|---|---|
| Argentina | - | - |
| Bolivia | - | - |
| Brazil | ... | ... |
| Chile | - | - |
| Colombia | - | - |
| Ecuador | ... | ... |
| Paraguay | - | - |
| Peru | - | - |
| Uruguay | - | - |
| Venezuela | ARUBA | 1,620 |
| | CURACAO | 6,505 |

TABLE 41. Horse exports. South America, 1990.

| Exporting country | Importing country | Number of horses |
|---|---|---|
| Argentina | AUSTRALIA | 28 |
| | ENGLAND | 266 |
| | FRANCE | 77 |
| | GERMANY | 53 |
| | ITALY | 78 |
| | SWITZERLAND | 12 |
| | URUGUAY | 112 |
| | USA | 328 |
| Bolivia | - | - |
| Brazil | ... | ... |
| Chile | ARGENTINA | 3 |
| | BRAZIL | 9 |
| | ENGLAND | 8 |
| | FRANCE | 6 |
| | GERMANY FED. | 14 |
| | PANAMA | 9 |
| | PERU | 5 |
| | USA | 49 |
| Colombia | DOMINICAN REPUBLIC, ECUADOR, PANAMA, USA and VENEZUELA | 346 |
| Ecuador | ... | ... |
| Paraguay | ARGENTINA | 3 |
| | BRAZIL | 8 /1 |
| | URUGUAY | 12 |
| Peru | ARGENTINA | 20 |
| | CHILE | 5 |
| | ECUADOR | 61 |
| | EL SALVADOR | 8 |
| | HONDURAS | 23 |
| | MEXICO | 1 |
| | PANAMA | 5 |
| | USA | 78 |
| | VENEZUELA | 16 |
| Uruguay | ARGENTINA | 1853 |
| | BRAZIL | 1706 |
| | CHILE | 1150 |
| | PARAGUAY | 548 |
| | USA | 1 |

continues

TABLE 41. Horse exports. South America, 1990.

continued

| Exporting country | Importing country | Number of horses |
|---|---|---|
| Venezuela | ARUBA | 24 |
| | BOLIVIA | 3 |
| | CURACAO | 8 |
| | DOMINICAN REPUBLIC | 8 |
| | USA | 14 |

Notes: /1 Includes 3 horses for temporary exportation.

TABLE 42. Continental information and Epidemiological Surveillance System for Vesicular Diseases Weekly reports of outbreaks by map grid squares. Reception level and "delays". South America, 1990.

| Country | Weekly reports | | | | Days of delays /c | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Received | | Published/a | | Until receipt/b | | | Rec.-publication | | | Total /d | | |
| | No. | % | No. | % | Md | Mx | Mn | Md | Mx | Mn | Md | Mx | Mn |
| Argentina | 52 | 100 | 51 | 98 | 21 | 68 | 11 | 2 | 7 | 0 | 24 | 70 | 7 |
| Bolivia | 52 | 100 | 51 | 98 | 11 | 45 | 3 | 3 | 6 | 0 | 17 | 49 | 6 |
| Brazil | 52 | 100 | 52 | 100 | 10 | 13 | 7 | 4 | 8 | 0 | 14 | 21 | 10 |
| Colombia | 52 | 100 | 52 | 100 | 6 | 17 | 4 | 1 | 10 | 0 | 7 | 21 | 6 |
| Ecuador | 52 | 100 | 52 | 100 | 10 | 32 | 5 | 4 | 11 | 0 | 14 | 34 | 7 |
| Paraguay | 52 | 100 | 52 | 100 | 4 | 7 | 0 | 3 | 7 | 1 | 7 | 10 | 6 |
| Peru | 52 | 100 | 46 | 88 | 70 | 106 | 19 | 4 | 14 | 2 | 78 | 120 | 41 |
| Uruguay | 52 | 100 | 51 | 98 | 5 | 25 | 0 | 2 | 8 | 0 | 7 | 28 | 6 |
| Venezuela | 52 | 100 | 52 | 100 | 5 | 11 | 0 | 3 | 11 | 0 | 7 | 21 | 6 |

Notes:
/a - Number of weekly reports published in proportion to those received.
/b - Time between last day of week covered by report and its receipt by PAFMDC.
/c - Md = Median; Mx = Maximum; Mn = Minimum. All time lengths are days.
/d - Median times calculated between deadline date of week report and publication of report. This figures only includes "delays" of published weekly reports on the "FOOD AND MOUTH DISEASE AND VESICULAR STOMATITIS - EPIDEMIOLOGICAL REPORT".

TABLE 43. Continetal Information and Epidemiological Surveillance System for Vesicular Diseases. Monthly reports on affected herds and diagnosis, by countries. Level of reception and publication. South America, 1990.

| Country | No. received | No. published | Months not received |
|---|---|---|---|
| Argentina | 12 | 12 | - |
| Bolivia | 12 | 12 | - |
| Brazil | 12 | 12 | - |
| Colombia | 12 | 12 | - |
| Ecuador | 12 | 12 | - |
| Paraguay | 12 | 12 | - |
| Peru | 0 | 0 | 12 |
| Uruguay | 9 | 9 | 3 |
| Venezuela | 12 | 10 | - |

TABLE 44. Continental Information and Epidemiological Surveillance System for Vesicular Diseases. Monthly reports."Delays" (days) in receipt. South America, 1990.

| Country | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Median | RANGE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Argentina | 127 | 99 | 32 | 15 | 12 | 51 | 20 | 59 | 29 | 22 | 35 | 21 | 30.5 | 12-127 |
| Bolivia | 48 | 26 | 151 | 121 | 161 | 131 | 121 | 90 | 102 | 71 | 56 | 25 | 96 | 25-161 |
| Brazil | 78 | 55 | 58 | 37 | 41 | 33 | 56 | 32 | 32 | 78 | 28 | 32 | 39 | 28-78 |
| Colombia | 40 | 30 | 32 | 23 | 33 | 32 | 24 | 32 | 31 | 26 | 35 | 23 | 32 | 23-40 |
| Ecuador | 48 | 48 | 37 | 31 | 48 | 34 | 34 | 87 | 57 | 26 | 35 | 32 | 36 | 26-87 |
| Paraguay | 28 | 70 | 33 | 28 | 25 | 26 | 22 | 24 | 25 | 22 | 45 | 44 | 27 | 22-70 |
| Peru | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | | |
| Uruguay | ... | 36 | 18 | 9 | 6 | 4 | 101 | 70 | 40 | 7 | ... | ... | 38 | 4-101 |
| Venezuela | 55 | 27 | 65 | 35 | 190 | 160 | 129 | 147 | 117 | 86 | 56 | 25 | 75.5 | 25-190 |
| Mediana | 48 | 42 | 35 | 30 | 37 | 34 | 45 | 65 | 36 | 26 | 35 | 25 | | |

Note: ... Not received.

TABLE 45. Epidemiological surveillance activities: Indicator of laboratory confirmation of affected herds by Vesicular Disease. South America, 1990.

| Country | Affected herds | | | Percentage | | |
|---|---|---|---|---|---|---|
| | Total | Sampled | W/posit. diagnosis | With sampled | W/posit. diagnosis | of posit. diagnosis |
| Argentina | 841 | 533 | 316 | 63 | 38 | 59 |
| Bolivia | 66 | 41 | 17 | 62 | 26 | 41 |
| Brasil | 961 | 261 | 177 | 27 | 18 | 68 |
| Colombia | 1,464 | 1,026 | 729 | 70 | 50 | 71 |
| Ecuador | 163 | 53 | 35 | 33 | 21 | 66 |
| Paraguay | 5 | 5 | 2 | 100 | 40 | 40 |
| Perú | 162 | 89 | 38 | 55 | 23 | 43 |
| Uruguay | 34 | 34 | 25 | 100 | 74 | 74 |
| Venezuela | 143 | 53 | 30 | 37 | 21 | 57 |
| Total | 3,839 | 2,095 | 1,369 | 55 | 36 | 65 |

TABLE 46. Continental information and Epidemiological Surveillance System for Vesicular Diseases. Weekly reports of outbreaks by map grid squares. Reception level and "delays". Central America and Mexico, 1990.

| Country | Weekly reports | | | | Days of delays /c | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Received | | Published /a | | Until receipt /b | | | Rec.-publication | | | Total /d | | |
| | No. | % | No. | % | Md | Mx | Mn | Md | Mx | Mn | Md | Mx | Mn |
| Belice /e | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Costa Rica | 51 | 98 | 48 | 94 | 19 | 35 | 7 | 3 | 19 | 0 | 21 | 42 | 13 |
| El Salvador | 51 | 98 | 45 | 88 | 34 | 101 | 3 | 4 | 11 | 1 | 41 | 112 | 7 |
| Guatemala | 50 | 96 | 34 | 68 | 7 | 90 | 0 | 3 | 10 | 0 | 7 | 34 | 6 |
| Honduras/e | - | - | - | - | - | - | - | - | - | | - | - | - |
| México | 52 | 100 | 49 | 94 | 21 | 100 | 12 | 3.5 | 23 | 0 | 26.5 | 49 | 7 |
| Nicaragua | 52 | 100 | 1 | 2 | 113 | 236 | 11 | 3 | 3 | 3 | 14 | 14 | 14 |
| Panamá | 50 | 96 | 50 | 100 | 7 | 21 | 3 | 0 | 10 | 0 | 11.5 | 27 | 6 |

Notes:
/a - Number of weekly reports published in proportion to those received.
/b - Time between last day of week covered by report and its receipt by PAFMDC.
/c - Md = Median; Mx = Maximum; Mn = Minimum. All time lengths are in days.
/d - Median times calculated between deadline date of week reported and publication of report. This figures only includes "delays" of published weekly reports on the "FOOD AND MOUTH DISEASE AND VESICULAR STOMATITIS - EPIDEMIOLOGICAL REPORT".
/e The country did not send this report.