

pan american foot-and-mouth disease center

SITUATION OF FOOT-AND-MOUTH DISEASE CONTROL PROGRAMS SOUTH AMERICA, 1987

MARCH, 1988



pan american health organization
pan american sanitary bureau, regional office of the
world health organization

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1. SITUATION OF VESICULAR DISEASES

1.1 General Situation

In 1987, vesicular diseases in South America totaled 3950 episodes in herds, a 13% decline in the number of herds affected in comparison with 1986. This figure is the lowest recorded in the past nine years.

The estimated rate of cattle herds affected by vesicular diseases was 1 per 1000, a rate comparable to that recorded in recent years.

Recorded frequency in foot-and-mouth disease (FMD)-affected herds (episodes with laboratory diagnosis) was 1311, an 11% increase in comparison to 1986, a frequency slightly higher than those recorded in the past six years.

With respect to the geographical distribution of the frequency of herds affected by vesicular diseases in South America in 1987, two situations of major importance were reported. The first pertains to an outbreak of type O (O₁) FMD, detected in Chile in March. The disease entered the country in mid-February through the summer-pasturing fields in the Andes Mountains, owing to the smuggling of cattle from the province of Mendoza in Argentina to Region VII in Chile, affecting the provinces of Linares, Talca and Curicó, which make up this region. The disease spread to other regions in the country through animal mobilization at auctions and fairs, provoking outbreaks, especially at slaughterhouses in the country's central and northern areas. All episodes were eliminated by the slaughtering of diseased animals and their contacts, burial of the carcasses, disinfection and regional quarantine. The situation in Region VII continued until August, with the strategy of slaughtering diseased animals and their contacts always being used. In no case was anti-FMD vaccine administered.

The other major situation in 1987 was an epidemic caused by virus A-81 Castellanos Argentina/87, antigenically similar to the A-Argentina/81 family. This epidemic began in April, continuing until approximately the beginning of the last quarter of the year. The first signs were noted in Argentina, in the Humid Pampa and Mesopotamia regions, the latter bordering on Uruguay and southern Brazil. It affected a large number of herds in an extensive area of grid squares. It next proceeded to

Uruguay, where it quickly spread over the entire country except for the Montevideo milk-producing basin. In the north, it reached the border of the state of Rio Grande do Sul, Brazil. The disease mainly affected the southwest of this state, its most important livestock area. The disease was contained by the immobilization of livestock in the affected areas, widespread regional quarantines, the moving up of vaccination cycles, a widening of the antigenic spectrum of virus A of the vaccine with the incorporation of the A-81 Castellanos/87 strain, and the suspension of auction fairs in the affected areas. The disease reached a peak between May and August, with the following totals of affected herds for this subregion: Argentina, 1346 foci, with 486 of virus A type; Uruguay, 232 foci, with 115 of virus A; and Rio Grande do Sul, 167 foci, with 44 of virus A.

In South America, Guyana, French Guiana and Surinam remained free of FMD during 1987.

Regarding the types of virus in evidence in 1987, there was a 95% increase in the presence of virus A in comparison with 1986, basically due to the epidemic situation occurring in the Plata Basin region caused by the appearance of virus A-81/87. There was a notable drop in the frequency of type C for South America in general. Thus, the predominant type of FMD virus for 1987 was virus A (67%), followed by type O (30%) and C (3%).

Vesicular stomatitis in South America in 1987, expressed as the frequency of laboratory diagnoses with virus identification, dropped 27% in comparison with 1986, with New Jersey type increasing by 13% and Indiana falling by 51%, Peru and Ecuador reported no herds affected by vesicular stomatitis in 1987. The predominant type of vesicular stomatitis virus in 1987 was New Jersey (58%).

Specimens were collected from 60% of the herds affected by vesicular diseases, with 40% showing a positive diagnosis.

Cattle morbidity was estimated to be 8 per 10,000, cattle lethality was 0.50%, and the internal morbidity rate for affected herds was 10%.

Estimated pig morbidity was 2 per 10,000, pig lethality was 29% and internal morbidity in affected herds was 11%.

Indicators regarding the frequency of vesicular diseases in other species were inconclusive.

Other regions of America continue to be free of FMD (North America, Central America and the Caribbean).

In Mexico and Central America, the recorded frequency of vesicular stomatitis for 1987 showed an increase over 1986, in

regard to the total number of herds affected (27%), and especially for Indiana-type vesicular stomatitis (124%). The type of active virus was identified in only 46% of the herds affected, with New Jersey being the predominant type.

1.2 Country-by-Country Situation

ARGENTINA

The total for 1987 was 1346 affected herds, with cattle the main species affected (1311), followed by pigs (31); in some cases, FMD existed simultaneously in both species. This is the highest figure for the past nine years, except for 1984, when there was an epidemic of virus C. For cattle, this figure represents a rate of 4.2 per 1000 affected herds. The disease was recorded in 280 of the 1216 grid squares into which the country is divided (23%). This represents an average of 4.8 cattle herds affected per grid square affected, although the occurrence of FMD was highly concentrated in certain regions of the country.

The provinces with the highest recorded number of cattle herds affected, approximately 88%, were Buenos Aires, Santa Fé, La Pampa and Córdoba, a group with the country's greatest number of herds and the most cattle. Foci primarily occurred in the areas of these provinces that make up the so-called Humid Pampa, corresponding to a secondary endemic area where the fattening of cattle predominates. The frequency dropped in the region of Mesopotamia, with approximately 8%. The country was faced with an epidemic situation in 1987, caused by the virus A81 Castellanos-Arg/87. Recorded instances of this virus was markedly higher (91%) in the four provinces where there were more foci. The rate in Mesopotamia was 7%, and 1.5% in the north of the country. The disease was once again reported in the province of Mendoza, which borders on Chile. The risk situation thereby created for Chile obliged it to reinforce its prevention measures during the 1987-88 summer-pasturing season.

The frequency of affected herds was extremely high between the 19th and 42nd weeks, that is to say, between April and September. For foci with a diagnosis of virus A, the monthly frequency for this period was of a markedly epidemic type.

The presence of virus types in 1987 was characterized by the predominance of an epidemic level of virus A-81 (91%). The frequency of this virus was significantly high from April to September. There were also occurrences of virus O (4%) and C (5%).

The active virus was typified in only 40% of all infected herds on record. Viruses O₁, A-81 and C₃ were identified in 1987.

Morbidity in cattle was 18 per 10,000, lethality was 0.14% and internal morbidity was 11%.

BOLIVIA

Program coverage continues to be officially limited to the departments of Santa Cruz de la Sierra and Cochabamba, plus the Pilot Plan area of Beni. Information is also obtained from other areas of the country, albeit not systematically. The department of La Paz recorded 7 affected herds of cattle and 1 of pigs, with 27 affected herds of cattle in the department of Oruro.

The year 1987 had a recorded frequency of 49 affected herds in the area under program, including cattle and pig herds. The total frequency of 84 affected herds in the country for 1987 can be considered high in view of the country's background, being the highest since 1980. A great many of these episodes occurred during the first half of the year, mostly in the departments of Santa Cruz de la Sierra and Cochabamba, in the area covered by the program, which was also the case in the departments of La Paz and Oruro.

The affected-herd rate in the area under the official program was 3.9 per 1000, a figure surpassing the 1.64 for 1986.

Virus A was the most commonly identified virus in 1987, with the total number of foci with diagnosis being low (26%).

The disease was recorded in 10 of the 170 grid squares comprising the surface of the area under program (6%), an average of 4.9 episodes per grid square affected in this region.

The morbidity rate for cattle in the area under program was 48.6 per 10,000, lethality was 0.17% and internal morbidity was 26.3%.

Viruses A₂₄ and C₃ were identified in 1987.

BRAZIL

There were 1064 affected herds recorded in 1987, including cattle and pigs, the lowest frequency in the past 9 years. The rate of cattle herds affected was 0.68 per 1000. In 1987, the disease was recorded in 174 of the country's 778 grid squares (22%), representing an average of 6.1 episodes per grid square affected. Seasonal recordings of affected herds were the highest between the 18th and 33rd weeks (April-August), as predicted. The regions with the highest recorded frequency of vesicular diseases were the Northeast, the states of São Paulo, Mato Grosso do Sul and Rio de Janeiro in the Central and South-east regions, and the state of Rio Grande do Sul in the South.

States mainly affected in the Northeast were Pernambuco, Ceará and Rio Grande do Norte, with extremely high frequencies especially between April and September. In the Central and Southeastern regions of the country, the states of Mato Grosso do Sul, São Paulo and Rio de Janeiro reported high numbers of affected herds, especially with virus A during the third quarter of the year. The virus A-84 (São Carlos) was identified in these episodes in the three states, a virus that was detected in no other state. Likewise, in the southern state of Rio Grande do Sul, which had previously shown a very favorable epidemiological situation, there was an epidemic of virus A-81 in 1987, appearing in the areas bordering on Uruguay and Argentina. The presence of this virus was limited solely to the state of Rio Grande do Sul.

Morbidity in cattle was 4.7 per 10,000, lethality was 1.3% and the internal rate of morbidity was 10.5%.

There was a predominance of reported cases of virus A during 1987, the highest in the past three years. Virus O, with fewer cases than in 1986, was identified mainly in Pernambuco, Mato Grosso do Sul and Rio de Janeiro. Very few cases of virus C were reported.

The type of active virus was identified in 25% of affected herds, with a definite predominance of viruses A and O, in that order. Viruses identified in Brazil in 1987 were O₁, A₂₄, A-81, A-84 and C₃.

COLOMBIA

A low frequency of herds affected by vesicular disease (856) was recorded in Colombia in 1987, the third lowest since 1979. The affected cattle herds rate was 1.7 per 1000, considerably less than that recorded in 1986 (3.2%).

One hundred and thirteen grid squares were affected, representing 25% of the country's surface area. This is one of the lowest affected-area incidences since 1979. The average number of affected herds per affected grid square was 7.5.

The recorded monthly frequency of herds affected by vesicular diseases during 1987 was high in January and February, primarily due to the recording of the two types of vesicular stomatitis virus, and to a lesser degree, FMD virus O.

Morbidity in cattle from vesicular diseases was 6.8 per 10,000, lethality was 1.3% and the internal morbidity rate was 10.5%.

In pigs affected by vesicular diseases, the internal morbidity rate was 13% and the lethality rate was 45%.

Geographic distribution of vesicular diseases in 1987 was characterized by high numbers in the central departments of the country: Antioquia, Cundinamarca and Santander. Meta, Valle, Huila and El Cesar were affected to a lesser degree.

FMD was concentrated mainly in Cundinamarca (virus O), Meta and El Cesar (virus A). January, March, May, July, September and October were the months showing the most diagnoses of type O FMD. Type A affected a greater number of herds in January, May, October and December.

There was a higher frequency of the two types of vesicular stomatitis in January and February. The department of Antioquia was particularly affected by both types of virus. There was also a significant presence of New Jersey virus in Santander, Huila and Valle.

For cattle herds affected by FMD, the internal morbidity rate was 11% and lethality was 1%.

In pigs, the internal morbidity rate for FMD was 13% and lethality 45%.

Recorded cases of vesicular stomatitis outnumbered those of FMD in 1987. The type of active virus was identified in 50% of herds affected by vesicular stomatitis.

In comparison with 1986, there was a decline in the appearance of all viruses except for the New Jersey type for vesicular stomatitis.

FMD viruses identified in Colombia were A Sabana-85, A₂₄, A-32, and O₁.

CHILE

The country was affected by an outbreak of type O FMD in 1987. The disease entered the country through the smuggling of cattle from Argentina (department of Malargue, province of Mendoza), moving toward the summer-pasturing areas in the Andean foothills in Region VII of the country.

The disease was detected and clinically confirmed on March 10, 1987, on two properties in the Rabones sector (Colbún communal area) in the province of Linares, Region VII, and in the movement of animals to auction fairs and then to other points in the country, being detected in Regions I, V, VI, X and the Metropolitan Region.

All positive diagnoses of samples processed at the Pan American Foot-and-Mouth Disease Center (PAFMDC) proved to be virus O₁.

An epidemiological survey led to the discovery of the origin of the diseased animals, the identification of those that had come down from the summer-pasturing fields in the same communal area (Botacura Summer Pasture), and the approximate time when the problem began, namely the first half of February.

There were repercussions of the spread of the disease on a regional and extraregional level.

On a regional level, the disease spread from the Colbún communal area (Region VII) to other summer-pasturing fields in this same area, owing to the movement of animals --diseased or in an incubation period-- to the Colbún Central Valley, as well as to the communal areas of Linares, Yervas Buenas, Longaví and summer-pasturing field in the San Clemente communal area (province of Talca). The FMD then spread to the Central Valley of Talca and the communal areas of Rio Claro, Pelarco and Pencahue. The disease also reached the foothills and Central Valley of the province of Curicó.

In regard to the extraregional spread, on March 7, prior to the suspicion and confirmation of the disease by the Agriculture and Livestock Service (SAG), 133 sheep from the Botacura Summer Pasture in the Carrizales sector were moved to the San Clemente communal area, then sent to the El Tattersall and Ruralco fairs in Santiago (Metropolitan Region), where animals are auctioned off, mainly for slaughtering.

Sheep from the Ruralco auction fair, and their contacts, proceeded to the following areas:

- a) the north of the country: Region I --the Alto Hospicio, Pozo al Monte and Arica slaughterhouses;
- b) central area: Regions V and VI --Concón slaughterhouses and the Pedehue de San Fernando Herd property;
- c) south: Region X, province of Valdivia, San José de la Mariquina communal area, Santa Clara property.

As a result of other movements from the affected area (Colbún communal area, Linares), a focus was detected on Maipo Island in the Metropolitan Region.

Eighty-one foci pertaining to 147 affected properties were detected. Of these, virus O₁ was identified in 135, and the rest through the VIA test.

The monthly frequency of affected herds was typical of an outbreak occurring in an FMD virus-free country. It climbed during the first three months until peaking in June (68 episodes), then dropped until becoming extinguished in August.

Only one strategy was employed for eradication: the sanitary slaughter of susceptible livestock, both diseased animals and their contacts, yielding a total of 31,036.

ECUADOR

The recorded frequency of herds affected by vesicular disease (34) in 1987 was the lowest on record since 1979, almost 50% less than in 1986.

The presence of the disease was recorded in 17 of the 188 grid squares making up the surface of the country (9%), equal to an average of 2.0 episodes per grid square affected.

The affected cattle herd rate was approximately 0.14 per 1000. Morbidity in cattle was 2.1 per 10,000, lethality was insignificant, and the internal morbidity rate for affected herds was 16.5%.

In the context of this low number, the departments where vesicular diseases reached the highest totals were Pichincha, Loja and Esmeraldas.

In regard to timeframe, the highest frequencies were recorded during the last four months of the year, especially in the case of virus A.

Virus A was the predominant virus type (Carchi and Cotopaxi). There was not a single herd affected by vesicular stomatitis recorded in the entire country during 1987. Of particular note was the presence of vesicular episodes in the eastern department of Pastaza, where the occurrence of type A FMD was recorded.

The active virus was identified in only 38% of the foci. FMD virus identified were O₁ and A Vallée.

FRENCH GUIANA

There was no record of vesicular disease in 1987.

GUYANA

There was no record of vesicular disease in 1987.

PARAGUAY

There were 7 episodes of FMD recorded in Paraguay in 1987, the lowest total ever recorded for this disease in the country. Four episodes were recorded during the first three months of the year. The rate of cattle herds affected was 0.04 per 1000 (4 per 100,000).

In 1987, the presence of the disease was recorded in 7 grid squares. The geographical distribution of the disease was mainly concentrated in departments of the Oriental region (Central, San Pedro, Misiones and Caaguazú). No cases were recorded in the Western region of the country.

Cattle morbidity was 0.18 per 10,000, lethality was nil, and the internal morbidity rate was 6.6%.

With respect to virus types, O₁ was the only subtype noted in 1987, being detected in only three¹ affected herds.

PERU

In 1987, the recorded frequency of herds affected by vesicular diseases (28) declined sharply in comparison to every year since 1979. The rate of cattle herds affected by vesicular diseases in 1987 was 0.06 per 1000 (6 per 100,000).

Six grid squares with the presence of vesicular disease were reported in 1987, representing 4% of the country's area, and an average of 4.5 episodes per grid square affected.

The vast majority of foci occurred during the first three months of the year, with Lima responsible for 86% of all recorded cases in the country.

The geographic distribution of virus types shows that virus A occurred mainly in Lima (8) and Piura (1). FMD viruses O and C were not recorded in 1987, as well as the two virus types for vesicular stomatitis. It should be mentioned that the agent was identified in only 10 episodes of vesicular diseases occurring in 1987. The A virus subtype identified in Peru was A₂₄.

SURINAM

No vesicular disease was recorded in 1987.

URUGUAY

In 1987, the situation in the country was of epidemic proportions, in keeping with the situation in Argentina provoked by the A-81 virus. This was the highest number of foci recorded since 1981. The total was 232 herds, or an increase of 286% over the number of herds affected in 1986. The rate of cattle herds affected was 4.9 per 1000.

Affected grid squares totaled 137, representing an affected area of 28% of the country's area. The average number of affected herds per grid square with the disease was 1.7. Monthly frequencies between May and August were markedly higher

than forecasted for these months. There was a considerable increase in the presence of virus A relative to the last nine years of the program, with the recorded rate also being higher than predicted for the period May-July. Virus A-81 was typified in 91% of the cases, with low instances of virus O (2) and C (5).

Geographic distribution clearly indicates a predominance of FMD in the coastal region (60%), especially along the southern coastline next to Mesopotamia in Argentina. The departments recording the highest frequency were Paysandú (41), Soriano (29) and Colonia (87). The type of active virus was identified in virtually every department in the country where foci occurred. Viruses identified in the country during 1987 were O₁, A₂₄, A-81 and C₃.

VENEZUELA

Taking into consideration the country's situation during the past nine years, the recorded frequency of herds affected by vesicular diseases (152) was low in 1987. The rate of cattle herds affected by vesicular diseases was 0.60 per 1000.

Recorded occurrences of vesicular disease in Venezuela were noted in 60 grid squares during 1987, representing 17% of the country's area. The average number of foci per affected grid square reported was 2.5.

The highest monthly frequencies were recorded in March and July.

The states of Lara, Aragua, Apure, Bolívar, Mérida and Zulia showed vesicular-disease frequencies that were slightly high in 1987 within this low-frequency context.

Recorded cases of FMD dropped for 1987: 26 diagnoses, with 20 being virus O and 6 virus A. New Jersey virus was recorded in 20 cases of vesicular stomatitis, and Indiana in three.

Virus O appeared mainly in Lara, Bolívar and Apure, with New Jersey primarily in Aragua and Lara.

A positive result for typifying viruses was obtained in 32% of vesicular episodes. FMD virus subtypes identified in 1987 were A₂₄, A₂₇ and O₁.

2. SITUATION OF FOOT-AND-MOUTH DISEASE CONTROL PROGRAMS

2.1 General Situation

The highlight of the period, which will undoubtedly have a decisive influence on the present and future development of animal-health programs in general, and FMD programs in particular, involves the V Inter-American Meeting, at the Ministerial Level, on Animal Health (RIMSA V) held in Washington, D.C., on April 27-30, 1987.

At this meeting, the Ministers of Agriculture resolved to "request that every country in the Region agree to carry out all actions necessary in order to eradicate foot-and-mouth disease as the year 2000." In the same resolution it was decided "to request that the PAHO Director create a Hemispheric Committee for the Eradication of Foot-and-Mouth Disease" and to "entrust the PAHO and COSALFA with preparing a hemispheric program for eradicating foot-and-mouth disease, including suitable mechanisms for program implementation, and to submit it for approval at the XV Regular Meeting of COSALFA."

Other important events are the signing of the Technical Cooperation Agreement by the government of Argentina, Brazil, and Uruguay and the Pan American Health Organization (PAHO) in order to carry out the first stage of the FMD Control and Eradication Project in the Rio de la Plata Basin (June 24, 1987); advances in the formulation of strategies and the drawing up of the "Subregional Project for the Control of Foot-and-Mouth Disease in Andean-Pact Countries" and the "Situation Diagnosis and Strategy for the Control of Foot-and-Mouth Disease in the Amazon Region"; activities regarding bilateral and multilateral border agreements, and the negotiations undertaken by several countries in order to obtain external financing for animal-health programs.

Along other lines, and despite the fact that programs continue to be hampered by current socio-economic restrictions in the Region, to one degree or another these programs continue to carry out basic activities such as epidemiological surveillance; vaccination; foci control; the control of animal movement and the importation of animals, animal products and by-products; vaccine production and control; personnel training, and compliance with border agreements. In addition, due to epidemiological situations mentioned in section 1 of this report, it was necessary to step up anti-FMD activities in a number of countries.

Program coverage remained at practically the same level as during previous years; altogether it reached 61.4% of the territory of the countries involved, 73.6% of cattle herds and 77.4% of cattle.

On a regional level, the total volume of anti-FMD vaccine produced was 521.25 million doses, with 453.77 million doses available, an increase of 11.1% and 5.7%, respectively, over 1986. For the countries, the ratio between available vaccine doses and cattle in program-covered areas ranged from 3.27 and 3.05 in Argentina and Uruguay, to 0.32 and 0.23 in Bolivia and Peru. A study of these figures must take into account that sheep are vaccinated in Argentina and Uruguay, as well as the fact that different vaccination strategies are being carried out in different countries, based on the epidemiological characteristics of the disease and the vaccine type available and/or administered.

There were slight modifications in the infrastructure for carrying out programs in 1987 when compared to the year before. The number of field operation units therefore went from 2,112 to 1,871, a drop of 241; excluding Brazil, there was virtually no change in human resources (5,155 personnel in 1986, 5,223 in 1987) or vehicles (2,421 in 1986, 2,296 in 1987).

Financial resources for operating expenses totaled \$US 23.01 million, almost half of the \$US 42.01 million for the same countries in 1986. This figure excludes Argentina, which did not include this data in its 1987 report, and Uruguay, which omitted it in the 1986 report. Brazil is a primary factor in this downturn, with its reported budget for this year referring only to federal funds. There were also decreases in the budget allocation for Ecuador (down 50.3%, even when an adjustment is made to operating expenses recorded in 1987); Peru (down 74.6%) and Venezuela (down 27.9%). There were increases in the case of Colombia (up 47.8%) and Paraguay (up 24.3%), while budgeting for operating expenses in Bolivia and Chile remained essentially unchanged. In the case of Chile, however, the 1987 situation of the outbreak and subsequent elimination of FMD led to expenses totaling \$US 7.11 million as of December of that year.

As on previous occasions, the human, physical and financial resources shown in the reports from most countries include the observation that such funds are not exclusively earmarked for anti-FMD activities.

2.2 Country-by-Country Situation

ARGENTINA

The National Animal Health Service (SENASA) covers the country's entire livestock population.

A differential criteria for vaccination continue to be applied in 1987, distinguishing between four areas as follows:

- i) mandatory vaccination area: includes all provinces north of the Barrancas and Colorado Rivers, except for the official vaccination zones of Federación in Entre Ríos and Ayacucho in Buenos Aires. Vaccination is mandatory every four months for cattle and every six month for sheep;
- ii) official vaccination areas: in five departments of Rio Negro province and the districts of Patagones and Ayacucho in Buenos Aires province, and Federación in Entre Ríos province. Despite different methods of administration, the vaccine employed is oil adjuvant;
- iii) ring vaccination areas: comprising the province of Neuquén and the south of Rio Negro province. This strategy did not have to be applied in 1987 since there were no foci;
- iv) disease-free area, located south of the 42nd parallel, comprising the provinces of Chubut and Santa Cruz, and the national territory of Tierra del Fuego.

SENASA hopes to implement a new National Plan for the Control and Eradication of Foot-and-Mouth Disease in 1988, applying differentiated strategies while increasing the production and use of oil-adjuvant vaccine. With this in mind, two Anti-FMD Vaccination Demonstration Plans were placed in operation in 1987. One was in the department of Federación and the other was the Ayacucho Pilot Plan, located in the Salado basin in the department of Ayacucho, Buenos Aires province. The latter is self-financed through the taxation of operating costs that are paid by livestock raisers.

Doses produced in 1987 totaled 196.15 million, with 188.35 million approved. Of these, 179 million doses were saponin-hydroxide vaccine and 9,389,690 were oil-adjuvant vaccine.

Vaccine availability relative to the number of cattle was 3.58 doses per animal. It should, however, be pointed out that sheep are also vaccinated in Argentina.

Available personnel totaled 1,686 in 1987, of which 375 were veterinarians, 982 paratechnical staff and 329 administrative personnel. These figures include 148 laboratory personnel --57 professionals and 91 assistants. Of the latter, 57 are paratechnical staff and 34 administrative staff.

There were 295 field operation units in 1987, and 1152 vehicles. Considering that the country's area is 2,779,892 km², each operation unit covers an average of 9423.36 km²,

tending 1057 herds and 178,501 cattle, and is made of 1 veterinarian, 4 assistants and 3.9 vehicles.

The report sent to the PAFMDC did not include data on financial resources and operating expenses for the 1987 program. For the period immediately prior to this (1986), the figures were \$US 68.3 per herd and \$US 0.40 per head of cattle, which did not include the costs of vaccine and vaccinations to the cattleraiser.

The country's international cooperation agreements with neighboring countries --Bolivia, Brazil, Chile, Paraguay and Uruguay-- are still in force. In reference to the Subregional Project for the Control and Eradication of Foot-and-Mouth Disease in the Plata Basin, multilateral talks and measures have been moved up so as to hasten the implementation of this project, in which the PAHO is also participating, through the PAFMDC, along with Brazil and Uruguay.

BOLIVIA

The National Foot-and-Mouth Disease, Rabies, and Brucellosis Service (SENARB) has part of the departments of Cochabamba and Santa Cruz under program, as well as three provinces in the department of Beni.² This represents 290,850 km² out of a total area of 487,266 km² for these departments and provinces. There are 600,200 head of cattle under program, broken down into 9345 herds, with these figures accounting for only 10.0% and 9.5% of the respective national totals.

In regard to FMD outside of the above areas, there are also activities carried out by the National Livestock Bureau, albeit to a very limited degree. The present report contains no quantitative data on available resources nor services provided by this Bureau.

In the area under program for 1987, SENARB operated 19 veterinary field units, 5 in the department of Cochabamba, 13 in Santa Cruz and 1 in Beni, which were manned by a staff of 20 professionals, 6 administrative personnel and 25 assistants. There were also 5 administrative employees in the La Paz unit. Twenty-six vehicles were utilized, the same number as for 1986.

Based on the above information, each operation unit covers an average of 15,307,9 km², 492 herds and 31,589 head of cattle, with each veterinarian tending to an average of 467 herds and slightly more than 30,000 cattle.

Project funding totaled \$US 716,868, of which 33.0% was earmarked for payroll, 65.0% for operating expenses, and 2.0% for concluding works under construction. Based on the number of cattle herds and animals in the area covered by SENARB, this total gives \$US 76.71 per herd and \$US 1.20 per head of cattle.

The country does not manufacture anti-FMD vaccine, with 190,800 doses being imported from Brazil in 1987.

The Bolivian SENARB report to COSALFA does not mention that Paraguay exported 226,500 doses of saponin-hydroxide vaccine to Bolivia, though this fact is found in the National Animal Health Service (SENACSA) report from Paraguay.

Vaccination coverage for the departments of Cochabamba, Santa Cruz and Beni was low, with a total of 190,800 vaccinations recorded for the year, or 0.32 doses per animal.

Albeit in a limited form, the training of both professional and assistant personnel was continued. Among the former, 2 veterinarians attended the Course on the Development of Animal-Health Programs at the PAFMDC; 2 professionals received training in epidemiology and zoonoses at the University of Campo Grande, Mato Grosso do Sul, Brazil; 3 received training in exotic diseases (African swine fever prevention) in Ecuador and Venezuela; 17 professionals attended a National Seminar on Epidemiology and Characterization, applying methodology and materials from the PROASA project. Finally, 34 assistant personnel attended a practical class on vaccination.

International coordination was maintained, including border-agreement discussions held with Argentina, Brazil, Paraguay and Peru.

BRAZIL

The Project for the Control of Foot-and-Mouth Disease is carried out in every state and territory of the country except Amazonas, Amapá, Pará, Piauí and Rondonia. State coverage reaches 61.0% of total area, 88.7% of herds and 73.1% of the cattle population. On a national scale, these figures translate into 36.3%, 57.6% and 68.7%, respectively.

FMD vaccine manufactured and controlled totaled 231,515,100 doses, of which 17,340,070 doses (7.49%) corresponded to oil-adjuvant vaccine and the rest (92,51) to saponin-hydroxide-adjuvant vaccine. Of the former (oil adjuvant), 10,731,650 doses were approved (61.9% of those submitted to control), and 159,792,010 doses of saponin-hydroxide-adjuvant vaccine (75.0%). The control method utilized was the protection against footpad generalization.

In comparison with 1986, there was a decline in the number of herds vaccinated (685,000, down 19.1%) and in the number of cattle vaccinated (54.2 million, down 13.7%). The dose/cattle ratio of 2.0 for the area under program represents a drop of 16.7% from the year before.

According to Brazil's 1987 report to COSALFA, there were 953 field operation units, 20% less than the 1191 reported in 1986. This figure represents an area of 3239 km², 1634 herds and 89,336 cattle for each unit on the average.

The report to COSALFA does not contain updated information on human resources available in 1987, but instead pertains to 1986, when there was a total of 8151 personnel working in the program. Neither is there data as to the number of vehicles in the program fleet, with figures from 1985 being the latest available at the PAFMDC. The report for that year concerning the Situation of FMD Control Programs shows 973 automobiles and 165 motorcycles.

Financial resources for 1987 totaled \$US 31,046,000, of which \$US 1,634,000 were for capital expenses. The breakdown of these figures gives \$US 19.94 per herd and \$US 0.36 per head of cattle in the area under program.

A total of 127 professionals in the Secretariat of Animal Defense received training during 1987 in the following areas: Animal-Health Project Management and Evaluation; Control of Chemotherapy Products; Control of Biologicals Products; Animal-Health Program Development; Control and Eradication of Avian Diseases; Animal Quarantine; Parasitic Diseases, and Animal-Health Specialization.

The Technical Cooperation Agreement signed by Argentina, Brazil, Uruguay and the PAHO in regard to the Control and Eradication of Foot-and-Mouth Disease in the Plata Basin has not yet initiated its activities.

On July 27, 1987, a contract was signed between the Brazilian government and the International Bank for Reconstruction and Development (IBRD) for financing the Animal-Disease Control Project. The loan is for \$US 51 million, with the Brazilian contribution being \$US 57.4 million, or a total of \$US 108.4 million for the Project.

Finally, Brazilian imports for 1987 saw the entry of animals and animal products and byproducts from twenty-one countries, including Germany, Belgium, Canada, Denmark, Spain, the United States, France, The Netherlands, Italy, Japan, New Zealand, Poland, Portugal, the United Kingdom and Switzerland.

COLOMBIA

The program is maintaining its nationwide coverage, with regional priorities dependent upon the degree of livestock development in the area and the epidemiological characteristics of the disease. Based on this concept, the greatest emphasis is placed on disease- and virus-free areas, breeding areas, areas

where the negative economic impact of FMD is the greatest, and border areas.

The result is that 60.1% of the area of the country is considered to be under program, with virtually no coverage in the Amazon Region, where there is practically no livestock.

In 1987 preparations were finalized so that as of 1988 the entire territory located on the northwestern bank of Magdalena and Cauca Rivers will be included under the program pertaining to the cooperative project with the US government (ICA-USDA), which involves adding the departments of Córdoba, Sucre and Atlántico to the initial scope of the project, as well as the north-central part of Bolívar.

For the country as a whole, the number of herds is calculated to be 498,679, with 23,971,202 head of cattle. The area under program includes 441,818 herds and 16,393,541 animals, which gives a program coverage of 88.6% of herds and 68.4% of cattle.

FMD vaccine production was 26.1 million doses, or 23 batches with 24,429,650 doses of saponin-hydroxide type and 6 batches with 1,664,555 doses of oil-adjuvant type. All vaccine administered was submitted to official control. As of January 31, 1987, the results from one (1) batch each of oil-adjuvant and saponin-hydroxide vaccine were still pending. The total number of doses submitted to control was therefore 23,067,000, with 20,722,620 doses approved, 1,481,595 still pending, and 862,805 doses of saponin-hydroxide vaccine rejected.

All vaccine placed under control is submitted to sterility, innocuity and physical-chemical tests. By the same token, 16 of the 23 batches of saponin-hydroxide vaccine (76%) and 100% of the oil-adjuvant batches were controlled by means of direct testing in cattle (PGP). The seven that were not tested directly were submitted to serum-protection testing in suckling mice and supplementary tests.

It should be mentioned that as in previous years, all vaccine was produced by the Colombian Veterinary Products Company (VECOL). During 1987, a private laboratory undertook preliminary work directed toward the manufacturing of both saponin-hydroxide and oil-adjuvant vaccines in 1988.

Some 120,000 doses of the oil-adjuvant vaccine produced and approved in 1987 were earmarked for swine vaccination, and the PAFMDC supplied 7,000 doses of trivalent oil-adjuvant vaccine to be administered in the Leticia, Amazonas area on the Brazilian-Peruvian border. This yielded a total of 20,609,620 'available doses' for vaccinating cattle, or a ratio of 1.26 doses/head of cattle in the area under program.

In 1987 the program engaged 893 personnel, of which 209 were professional staff, 359 were technical assistants and 325 were administrative assistants. The breakdown for these personnel was as follows: 71 at the central level and at quarantine stations; 640 in field units and at the regional level; 166 in the diagnostic laboratory network, and 16 in the central laboratory for vesicular-disease diagnosis and the FMD vaccine-control laboratory. A total of 135 professionals and 294 technical assistants are engaged in work at the field units, as well as in coordination, supervision and assistance at the regional level.

There are 111 field units, with each tending to an area of 6187 km², 3980 herds of cattle and 147,690 cattle on the average.

For developing its activities, the program has 360 vehicles: 132 automobiles, pickups and jeeps; 210 motorcycles, 16 mobile information units and 2 trucks.

Financial resources totaled \$US 7.14 million, of which half was earmarked for payroll. Capital expenses were slightly less than \$US 785,000 and were used to acquire laboratory and unit equipment.

Also important was the support from livestock raisers, who paid approximately \$US 7.6 million for vaccine and vaccinations.

Total public expenditures (both current and capital expenses) for 1987 yielded an average of \$US 17.9 per herd and \$US 0.48 per head of cattle in the area under program.

The country imported 1786 cattle from Germany, Canada, Chile, France and Panama, and 152 goats from France and the United States. On the other hand, beef was exported to Aruba, Curaçao and Peru, with goat meat exported to Aruba and Curaçao, equal to 54,671 cattle and 16,019 sheep.

Continuing with the personnel-training program, in 1987 three veterinarians attended the Course on Animal-Health Development Programs organized by the PAFMDC. Two other professionals were sent to observe animal-health programs with emphasis on FMD in Argentina, Brazil (Rio Grande do Sul) and Uruguay, while seven participated in a joint Colombian-Ecuadorean seminar held in Tulcan on the characterization of FMD-production forms and ecosystems along the border of both countries.

Following the incorporation of the Bogotá Plain, the Ubaté and Chiquinquirá Valleys, the department of Nariño and the "La Isla" project into a plan for vaccination with oil-adjuvant

vaccine, 200 personnel, including five from Ecuador, were trained in the use and administering of this vaccine.

In light of the increasing frequency of vesicular stomatitis, an international seminar was held, with financial support from the PAHO and the Colombian Agro-Livestock Institute (ICA). Discussions included epidemiological and economic aspects that can contribute to the implementation of an active plan for the research and control of the disease in Colombia, in which the PAFMDC would participate.

Finally, in regard to international coordination, permanent contact was maintained with disease-control programs and animal-health agencies in neighboring countries, the European Economic Community (EEC), the International Office of Epizooties (OIE), the Andean-Pact countries, the Inter-American Institute for Agricultural Cooperation (IICA), the Food and Agriculture Organization of the United Nations (FAO) and PAEC, with border meetings being held with Brazil, Ecuador and Venezuela. Also of particular interest was the way in which the cooperative project with the US Department of Agriculture (ICA-USDA Project) continues to be carried out.

CHILE

Chile's entire area of 757,520 km² is covered by a program to prevent the entry of FMD and other exotic diseases into the country. Its livestock population consists of 3,818,682 cattle, 5,678,325 sheep, 1,134,516 goats, 890,781 pigs and 100,173 camelidae. There are slightly more than 189,000 herds of cattle.

Free of FMD since January 1981, the country saw outbreaks of the disease in 1984 and 1987. On both occasions, it was eliminated by the sanitary slaughter of susceptible livestock, including sick animals and their contacts.

For this reason it was necessary to slaughter 31,653 animals in 1987, pertaining to 147 herds, of which 2,204 were clinically diseased and the remainder susceptible contacts. This figure reflects 16,848 cattle, 478 pigs, 6,373 sheep, 7,869 goats and 85 camelidae, the latter being slaughtered due to their contact with episodes at slaughterhouses in Region I in the north of the country. The total cost of the entire eradication was \$US 7,387,770, of which 65.74% corresponded to reimbursements for slaughtered animals. This amount could rise even higher in 1988, owing to pending agreements.

The program to prevent the entry of FMD and other exotic diseases is based on the implementation of a System of Epidemiological Surveillance and Control at 'possible entry sites', such as ports, airports, border check stations, places where

livestock concentrate (fairs, slaughterhouses, expositions), livestock centers related to ports and airports (proximity, possibility of utilizing garbage from boats and aircraft), and in summer pasturelands (veranadas) bordering Argentina, as well as in the Highlands bordering Peru and Bolivia.

An educational program is also being developed so as to have the community contribute to lessening the risk of introducing and/or spreading FMD. This program includes not only involved groups, such as the owners of animals that live in the mountains, owners who send their animals to summer and winter pasturelands, and livestock caretakers, but also the general public. Activities of this were likewise carried out with Law and Order Forces, as well as security elements, in order for them to become familiar with the activities of the Agriculture and Livestock Service (SAG), to recognize the importance of their duties in checkpoint control and the patrolling of borders and unpopulated areas, supporting control operations at SAG checkpoints, and to become acquainted with the summer-pasturing control system and the current legal measures to be taken in the case of illegal entry or the presence of suspicious animals.

The SAG has 56 field units for carrying out these activities, with each covering an area of 13,527 km² 3,376 herds of cattle and 68,191 cattle, on the average.

There are 81 personnel working in the project --25 professionals and 56 technical assistants-- with a budget of \$US 292,300 for operating expenses and \$US 34,000 for capital expenses, yielding an average of \$US 1.89 per herd and \$US 0.90 per animal.

In addition, and as a consequence of the abovementioned sanitary emergency, it was necessary to hire 107 additional personnel (42 veterinarians, 55 agricultural specialists, 8 administrative personnel and 2 computer experts). The cost of this item was \$US 256,437, with an additional \$US 516,887 paid to regular personnel for per-diem and overtime expenses.

Along the same lines, upon request by the country, the PAFMDC prepared 500,000 doses of monovalent O₁ oil-adjuvant vaccine, though there was no need to administer it due to the strategy used to eradicate the disease.

Throughout the year, 47 technical professionals received a total of 8,523 man-days of in-country training. At the PAFMDC, one veterinarian received two months' training in cell cultures and another one three months' in the development of animal-health programs. Through the IICA, one veterinarian was sent for two weeks to Buenos Aires to attend a course on the Diagnosis of Exotic Diseases.

There were 39 activities involving sanitary education and dissemination. The main and/or most frequent subject was FMD; 1368 people participated.

Ongoing coordination is being maintained with a number of national and international organizations, as well as with International Technical Cooperation Agencies. Based on the current agreement with Argentina, a meeting was held involving the central authorities of both countries, as well as two regional meetings. It was decided to hold a meeting in Buenos Aires in March of 1988 so that both countries may carry out a joint study, with consultantship from the PAFMDC, of a sub-regional plan to be implemented in the central region of the Andes Mountains.

ECUADOR

The Animal Health Program and activities directed toward FMD prevention and control cover the entire country --19 provinces and the Galapagos Islands, with the latter being disease-free.

The 267,000 km² of the country contain 3,764,900 cattle, 1,450,000 pigs, 1,196,000 sheep, 228,000 goats and 640,000 horses. There are 247,855 herds of cattle.

There were 1,200,000 doses of vaccine available, of which 600,000 were national saponin-hydroxide vaccine and the rest oil-adjuvant vaccine obtained from the PAFMDC. This figure means that in 1987 the country only had 0.32 doses per head of cattle, almost 29% less than in 1986.

The number of doses administered to cattle was 1,136,397 with vaccination carried out in 70,395 herds.

The program consists of 57 field operation units --three less than for the previous year--, 51 vehicles and 345 personnel. Of the latter, 92 are professionals, 208 technical assistants and 45 administrative assistants. The breakdown of this figure gives 84.6% of the personnel working in the four regions into which the country is divided, 12.2% at the central level and 3.2% in laboratories.

Average coverage for each operation unit was therefore 4,768 km², 4.426 herds of cattle and 67,214 cattle.

According to the report sent to the PAFMDC, the program had \$US 688,512 for current expenses, representing only 37.28% of the amount available for this item in 1986. Capital expenses totaled \$US 10,617. It should be pointed out that these figures only include up to September.

Based on the above, the average amount of funds available was \$US 2.78 per herd of cattle and \$US 0.18 per head.

Program personnel took part in nine training events, at both the national and international level, with a total of 85 technicians participating.

The National Animal Health Program maintains ongoing coordination with national agencies, including the National Health Institute in the Ministry of Animal Health, the National Council of Science and Technology (CONACYT) and the Dairy Development Project (PROFOGAN).

International agencies of note include the PAHO/WHO and their Pan American FMD and Zoonoses Centers, the OIE, the IICA, OAS, FAO, the Board of the Cartagena Agreement (JUNAC), and the ICA.

PARAGUAY

The SENACSA maintains an FMD control program that covers the entire 406,752 km² of the country and its 187,608 cattle herds, and 7,374,269 head of cattle.

An important element of the control strategy employed is the massive and systematic vaccination of cattle every four months, when saponin-hydroxide vaccine is utilized, and every six or twelve months when oil-adjuvant vaccine is used. Depending on the time of vaccination, the number of herds attended varies between 103,000 and 107,670, with some 4.2 million cattle vaccinated at each interval.

Sanitary control of cattle is carried out by the use of 27 fix control stations, mobile stations and livestock inspection at areas of concentration. This means that somewhat more than 30,000 herds and a million head of cattle are inspected, as part of the permanent epidemiological surveillance system.

Vaccine production at two private laboratories totaled 9,100,670 doses, all of which were inspected and approved for use. This amount includes 283,460 doses of oil-adjuvant vaccine. The country exported 354,300 doses (226,500 to Bolivia and 127,800 to the Phillipines), while importing 1,505,000 doses from the PAFMDC, of which 300,000 were monovalent A type and 5,000 were for pigs. Vaccine on hand was therefore 10,551,270 doses, yielding an average of 1.39 doses per head of cattle regardless of the type of vaccine used.

Oil-adjuvant vaccine continues to be administered in those areas pertaining to the Pilot Plans in Quyquyhó, Caapucú, the Mennonite Colonies in the Eastern and Western Regions, and seven districts of the department of Neembucú. It is also

utilized in dairy farms around Asunción, as well as areas close to fairs, auctions and expositions, and a safe area around the Central Laboratory.

In 1987, Paraguay imported animals from Argentina, Germany, Brazil, Chile, The Netherlands, Switzerland, Uruguay and the United States. In turn, it exported fish to Germany, Belgium, China, The Netherlands, Japan and the United States; wild game to Germany, and, on a temporary basis, cattle and horses to Brazil.

SENACSA carries out its operations by means of 45 regional operation units and 559 personnel; of the latter, 123 are professionals, 206 are technical assistants and 230 administrative assistants. These personnel are broken down into 157 at the central level, 84 at the laboratory, and 318 who work in the program areas into which the country has been divided. There are 78 vehicles --44 automobiles, pickups or similar vehicles, and 34 motorcycles.

The above figures give an average breakdown for each field unit of 9,039 km², 4,169 herds of cattle and 163,873 cattle.

Financial resources for current expenses at SENACSA totaled \$US 2,225,333, or 24.3% higher than in 1986. The total for capital expenses was \$US 1,029,218, or a drop of 4.7%. The annual average for current expenses per herd of cattle was therefore \$US 11.86, and \$US 0.30 per head.

In the area of personnel training, SENACSA organized and carried out eleven (11) events at the national level, and sent 12 personnel abroad. Eighty meetings were likewise held with rural livestock raisers and educational institutions.

The country maintains close coordination with national and international organizations such as the Animal Health Services of bordering countries. Moreover, in cooperation with the PAFMDC, it is continuing to study the possibility of implementing a project for an FMD-free area in the northwestern part of the country, an area now considered to be clean.

PERU

The FMD Control and Eradication Program encompasses the entire nation, covering 1,282,120 km², 463,182 cattle herds and 3,391,484 cattle.

FMD vaccine is produced by a government laboratory belonging to the National Institute of Animal Health in the Ministry of Health. Some 780,000 doses were manufactured in 1987, of which one-third utilized oil adjuvant and the rest

only aluminum hydroxide. Average number of doses available per head of cattle was therefore 0.21.

FMD vaccination is limited solely to cattle, with established program strategy directed toward a progressive reduction of vaccination areas and the increasing use of oil-adjuvant vaccine.

Vaccination took place in 14 departments during 1987, with 470,577 doses being administered to cattle. There was no report of any vaccination in the departments of Piura, La Libertad, Ancash, Ica, Tacna, Huancavelica, Ayacucho, Apurimac, Cuzco and Madre de Dois.

The program comprises 144 field units, 518 personnel and 145 vehicles, of which 27 are pickups and 118 are motorcycles. These resources provide service to a wide range of animal-health activities, and are not solely limited to FMD control.

Staff totals include 98 professionals, 392 technical assistants and 28 administrative assistants. Of these, 8 are laboratory personnel, 5 work at the central level, and 505 in the field units. Average field coverage is 8,904 km², 3,217 cattle herds and 23,552 heads of cattle.

Financial resources earmarked for current expenses were \$US 258,999,35, some 74.6% less than was reported for 1986. The average per herd therefore dropped from \$US 0.56 to \$US 0.08.

In 1987, Peru carried out imports from 19 countries, with a total of 25,242 cattle, 1,501 sheep, and 3,977 pigs, while exporting 83 horses to seven countries in the area.

In 1987, no specific training courses were held in regard to FMD Control and Eradication. One veterinarian attended the PAFMDC course on Animal-Health Development Programs in Rio de Janeiro, Brazil.

The program coordinates its national activities basically with the Departamental Agricultural Units, which are the executor agencies for the program, and with the National Institute of Animal Health, which is in charge of diagnosing vesicular diseases, as well as the production, control and distribution of FMD vaccine.

Internationally, there is ongoing coordination with the PAHO through its Peruvian unit, and with the PAFMDC. In the case of Bolivia and Ecuador, these relations involved border meetings dealing with animal health.

URUGUAY

Since 1968, the country has maintained an FMD control program covering its entire 162,500 km² and its livestock population of 48,300 cattle herds, 9,885,000 head of cattle and 24,372,000 sheep.

Sanitary-control policy continues to be based on massive and systematic vaccinations --every six months for cattle, and yearly for sheep-- prompt handling of foci, and epidemiological surveillance, all with the ongoing participation of rural livestock raisers.

Vaccine production for the year totaled 27,061,905 doses of trivalent vaccine and 22,767,220 doses of monovalent A-81 vaccine. Of the former, some 31 million doses were submitted to control, including 8,352,700 doses produced in 1986, with 4,275,980 doses left for 1988. Of the latter, 22.64 million doses were submitted to control. Some 697,500 doses were exported to the Philippines, leaving a total of 52.76 million doses on hand, of which 20.14 million were administered to cattle.

There were 3.04 doses of trivalent vaccine per head of cattle. This figure drops to 1.54 when sheep are included, which are vaccinated annually, as was mentioned above.

Average vaccination coverage was 97.0% for cattle herds, reaching 94.0% of cattle.

Program staff totaled 580 personnel, of which 100 are university professionals, 2 technical experts, 306 specialists, 130 administrative personnel and 42 service personnel. Of this total, 69.8% are assigned to the field, 18.3% to the laboratory, and the remainder to the central offices.

The program fleet consists of 158 vehicles --86 automobiles and/or pickups, and 72 motorcycles.

On the basis of the 41 field operation units reported in 1986, average coverage per unit for 1987 was estimated to be 3,963.4 km², 1.178 cattle herds, 241,098 cattle and 594,439 sheep.

Financial resources available as reflected in this year's report totaled \$US 1,623,874 for current expenses and \$US 643,488 for capital expenses, yielding an average of \$US 33.62 per cattle herd and \$US 0.16 per head of cattle.

During the year, the program sent two technicians to Buenos Aires to participate in a Course on Exotic Diseases. Two more were sent to Rio de Janeiro, Brazil, to attend a course

held by the PAFMDC (PAHO/WHO) on the Development of Animal-Health Programs. On a national level and through the application of PROASA methodology and experience, with the collaboration of PAFMDC/PAHO/WHO, a two-week course on Epidemiological Updating was held, with invitations extended to technical personnel from Argentina and Brazil.

In the area of international commerce, the country imported cattle from Argentina, Canada and Brazil; buffaloes from Brazil; sheep from Argentina, Australia, Brazil and New Zealand, and horses from Argentina, Brazil, the United States and Spain. It also imported semen from Australia, Canada, the United States, France, the United Kingdom and New Zealand.

Exports consisted of cattle to Argentina, Bolivia, Brazil and Paraguay; sheep to Argentina, Brazil and Paraguay; horses to Argentina, Brazil, Paraguay, Chile, the United States, Bolivia, the United Kingdom, and Italy; and semen to Argentina.

Coordination at the national level continues to be maintained with every official and private agency related to the FMD problem. Internationally, bilateral agreements have been satisfactorily carried out with Brazil, and, with certain limitations, with Argentina.

The EEC was promptly provided with a wide variety of data, as were Brazil, Peru, Spain (the Canary Islands) and Mexico. There was an ongoing exchange of information and technical assistance with the PAFMDC, remaining at the same level as in the past.

VENEZUELA

The FMD Control Program conducted by the Ministry of Agriculture and Livestock covers the entire country, an area of 911,930 km² with approximately 160,173 cattle herds and 11,843,609 head of cattle.

Strategy continues to be based on the vaccination of susceptible cattle by official services and private veterinarians who obtain the vaccine from Ministerial agencies.

Live-virus vaccine produced nationally is utilized, except in the states of Sucre, Bolívar, Monagas and T.F.D. Amacuro, where oil-adjuvant vaccine is used exclusively, as is the case in certain demonstration areas in Barinas, Lara and Zulia.

A basic aspect of the program consists of epidemiological surveillance, which has served to revitalize and implement an information subsystem that includes electronic data processing and extensive personnel training.

In addition to the above, there is the control of cattle transit, which utilize the dispatching of sanitary mobilization guides as its basic tool as well as the control of all episodes of vesicular diseases, including their laboratory diagnosis, and sanitary education and dissemination.

National vaccine production totaled 7,174,500 doses; as mentioned above, it was modified live-virus type. There were also 1,257,000 doses of bivalent oil-adjuvant vaccine imported from the PAFMDC. This yields a total of 8,449,500 doses of vaccine on hand, or an average per head of cattle 0.71 doses.

Work proceeds on the installation and implementation of a laboratory for producing oil-adjuvant vaccine, with an annual capacity of 20 million doses.

Vaccination coverage continues to be low. The yearly total was 8,150,000 doses administered to 26,893 herds, yielding a ratio of 0.69 doses/head of cattle, with one out of every six cattle herds being vaccinated at the most.

There are 150 animal-health field operation units in the country. Program personnel include 408 employees, with almost half (188) being professionals, 56 technical assistants and 158 administrative assistants. The vehicle fleet comprises 314 motor vehicles.

Financial resources for operating expenses totaled \$US 623,771, with \$US 138,467 being invested in materials and equipment (capital expenses). However, it should be pointed out that these funds are not exclusively for FMD, instead being overall amounts provided to the Animal Health Division out of the regular budget of the Ministry of Agriculture.

Based on the above figures, each field unit covers an average of 6.080 km², 1,068 cattle herds and 78,957 cattle. This results in operating expenses per cattle herd of \$US 3.89 and \$US 0.05 per head of cattle.

A number of events were held last year involving personnel training, with the following of particular note: four one-week Courses in Epidemiological Principles; a four-months Intermediate Course in Animal Health in conjunction with the University of Zulia; a Course on the Use of Oil-Adjuvant FMD Vaccine; a two-week Animal Quarantine Course; a seminar on the System of Epidemiological Surveillance for Diagnostic Laboratories; and a seminar on Administrative Control and Budgeting. Twenty-four staff members received individual training, including at home and abroad, for a total of 49 man-months. Of the latter group, 5 received training by the PAFMDC --3 for an eight-month period studying the production of FMD vaccine, and 2 for six months, studying laboratory maintenance.

In 1987 Venezuela imported cattle from Australia (1401), Canada (698), Costa Rica (700), Cuba (880), the United States (4725) and New Zealand (12,503); sheep imports came from Canada (20), with pigs from Canada (547) and the United States (538). Semen was also imported from Canada, the United States, the United Kingdom and New Zealand, as well as embryos from the United States.

Within the country, the Animal Health Division and the FMD Program maintain close relations with the Ministries of Development, Treasury, Health and Social Security, Foreign Affairs, Domestic Affairs, Environment and National Resources, as well as with the National Health Institute, the Institute of Veterinary Research, the Venezuelan Institute of Scientific Research and a number of colleges.

Internationally, border agreements with Colombia, Brazil and Guyana remain in force, as well as agreements involving technical cooperation and information exchange with the OIE, IICA, JUNAC, FAO and PAHO.

3. CONTINENTAL VESICULAR DISEASE SURVEILLANCE AND INFORMATION SYSTEM: RESULTS AND PERFORMANCE

3.1 Results in South America

As in preceding years, the behavior of vesicular diseases in South America in 1987 was continuously monitored by means of a system of indicators that enable analysts to characterize and interpret the levels of occurrence and the behavior of virus types. The historical series of vesicular disease occurrences stored in the PAFMDC data bank is used to interpret the significance of the weekly frequencies of vesicular diseases recorded on a grid map, and the frequency of affected herds, by virus types, based on each country's political and administrative subdivisions.

Data for 1987 show the presence of grid squares where vesicular diseases were recorded for more than 15 weeks of the year (Figure 1) in the Humid Pampa and Mesopotamia areas of Argentina, along the Uruguayan coast, in the west-central and south-central regions of Colombia, and in the northeastern and south-central regions of Brazil. In addition, once again there was an outbreak of FMD in Chile, although there was no significant persistence in terms of affected grid squares due to eradication measures taken.

During recent years, including 1987, the number of grid squares on the South American map with more than 15 weeks of recorded disease has remained low, between 1-3% of all the grid squares on the continent. These figures are below those recorded before 1980.

Table 5 shows for each country on the continent the months when the recorded frequency of herds affected by some type of virus significantly exceeded the expected frequencies. These situations may be considered epidemiological or epidemic.

3.2 Performance in South America

This section assesses the operating performance of communications within the Continental Epidemiological Information System, especially in terms of the regular flows of information between the national animal health services in South America and the PAFMDC.

3.2.1 Alert Notices

Notices of alert were frequently telexed or telegraphed in 1987 to various countries on the continent to warn them of the appearance of vesicular diseases in border areas of neighboring countries, as well as the appearance of the disease in previously unaffected areas. Special communiqués regarding epidemics noted during this year were also sent to other international agencies, such as veterinary services of the EEC and the World Reference Laboratory at Pirbright, England. Reports were also issued concerning the progress of FMD eradication in Chile.

3.2.2 Weekly Information Transmittal on the Presence of Vesicular Diseases, by Grid Square

Personnel engaged in national control programs are aware that the map of each South American country has been subdivided into a grid map based on geographic coordinates. This map serves as a guide for a weekly telex communication of the presence of vesicular disease (regardless of the number of episodes). A numerical code is employed to indicate both the week reported and the grid squares affected. The PAFMDC prepares the code annually and distributes it to each country prior to the beginning of the year. The telegraphed notice serves as data input for the PAFMDC's epidemiological file stored in a Digital 1134 computer. The PAFMDC issues the Weekly Epidemiological Report for distribution to countries and international agencies, both in South America and elsewhere.

a) Reporting level

The reporting level of the weekly communications sent by South American countries in 1987 was 98.8%, an adequate level in relation to preceding years: 1986 (98.7%), 1985 (99.8%), 1984 (98%), 1983 (99.6%), 1982 (97%), 1981 (96%), 1980 (99%), and 1979 (97%). The Center received an average of 51.4 weekly communications in relation to the 52 weeks on its codified

report calendar. Peru and Uruguay were the only countries not furnishing all of their reports (Table 35).

b) Publishing Level

Considering the data received by the PAFMDC, 86.5% of the weekly reports were published, a decline in relation to the 97.6% for 1986. Despite the fact that the PAFMDC published weekly data arriving after the deadline, it should be noted that there is a tendency not to comply with report deadlines. Compliance by Bolivia and Peru was 28% and 18%, respectively.

c) Prompt Transmittal of Weekly Communications

For 1987 on the average, Argentina, Bolivia and Peru were extremely lax in submitting their weekly reports. In overall terms, the effective functioning of weekly communications underwent a decline. The delays noted in the case of certain countries are incompatible with procedures involving rapid, simple and frequent reports that ensure proper monitoring and surveillance of vesicular diseases.

3.2.3 Monthly Information on Vesicular-disease Episodes and their Laboratory Diagnosis

This information reports the number of herds affected, according to each country's political and administrative divisions, as well as the number of affected herds from which specimens were collected, according to the virus type identified.

a) Reporting and Publishing Levels

Both the reporting and publishing levels were 100% for 1987, indicative of a higher level of system compliance in comparison to 1986 (Table 36).

b) Monthly Reporting Delays

For 1987 in general, the countries shortened their delays in submitting their Monthly Epidemiological Report to the PAFMDC (average delay: 46 days) (Table 37). Nonetheless, the delay times differed among the countries. Only Brazil, Colombia, Ecuador, Chile and Paraguay complied at acceptable levels, with delays of approximately one month. The remaining South American countries posted delays of up to two months, which is too long.

In general the monthly reporting system continues to suffer from the same shortcomings noted in previous years. In some cases, the delay in transmission to the PAFMDC has become crucial. Countries are repeatedly failing to provide the epidemiological comments required for data interpretation and to locate the virus types on the grid map. Instances have also been observed when some countries have altered the formats of monthly communications, which hinders data compilation because it affects the uniformity of the monthly report on vesicular diseases.

3.2.4 Surveillance Activities: Laboratory Confirmation

Specimens were collected for laboratory diagnosis in 60% of herds with animals showing clinical symptoms of vesicular disease in 1987. Argentina, Chile, Colombia, Ecuador, Paraguay and Uruguay were above average in performing this field work. Chile carried out collections at 100% of its foci in tracing operations for eliminating FMD from the country. Generally speaking, the rate of specimen collection showed improvement over 1987 (Table 38).

Virus identification was accomplished in only 42% of herds showing clinical symptoms of vesicular disease, though this figure is higher than the 34% for 1986. These rates, however, should still be considered low, in addition to which there are some countries posting very low levels, including some that reported a scant number of vesicular episodes.

The monthly communication of information on active virus subtypes must be improved. This is a very important requirement for providing information to COSALFA countries, international agencies and other countries.

3.3 Performance in Central America and Mexico

This section assesses the operational performance of the communications of the Continental Epidemiological Information System between the national animal-health services of Central America and Mexico, and the PAFMDC, which is the organization responsible for overseeing this system.

3.3.1 Weekly Communication on the Presence of Vesicular Disease by Grid Square

The map of each country in this region of the American continent has also been subdivided into a grid map based on geographic coordinates. The map serves as a guide for weekly telex notification of the presence of vesicular disease (regardless of the number of episodes). A numerical code is employed to indicate both the week reported and the grid squares affected, as is done in South America.

a) Reporting Level

For 1987, the number of weekly reports received from Central American countries and Mexico dropped to 91.3%, when compared to 1984 (94%). This does not include Belize and Honduras, who did not submit reports due to having changed their data-processing systems. Among reporting countries, Nicaragua showed the lowest level, along with Costa Rica. Considering the six countries that did provide reports, the Center received weekly reports on an average of 47.5 weeks (Table 39).

b) Publishing Level

Considering the data received by the PAFMDC, 77.5% of weekly reports were published, although the PAFMDC also publishes those reports that are received late. There was a certain delay in publishing this weekly report in 1987, owing to the delay in receiving information.

c) Prompt Transmittal of Weekly Communications

Mexico and Panama were the two countries that transmitted their reports to the PAFMDC with the least delay.

3.3.2 Monthly Information on Vesicular Disease Episodes and their Laboratory Diagnosis

This information reports the number of herds affected according to each country's political and administrative divisions, as well as the number of affected herds from which specimens were collected, according to the type of virus identified.

a) Reporting and Publishing Levels

All countries in the region achieved excellent monthly reporting levels in 1987 (Table 40).

b) Monthly Report Delays

There was variation in the delay by Central American countries and Mexico in forwarding their Monthly Epidemiological Reports to the PAFMDC (Table 41). It should be pointed out that in general, average delays were quite acceptable considering the experience in South America.

3.3.3 Surveillance Activities: Laboratory Confirmation

In Central American countries and Mexico for 1987, 46% of herds affected by vesicular disease provided positive results in laboratory diagnosis. The situation was especially favorable for Nicaragua and Costa Rica in this field work (Table 17).

3.3.4 Support of the Vesicular Diagnosis Laboratory LADIVES, in Panama

The Vesicular Diseases Diagnosis Laboratory (LADIVES) in Panama continues functioning normally. This laboratory sends the PAFMDC a monthly report on the results of virus typification, plotting geographically the department or province where the typified virus episode has occurred.

3.4 Notification System for Suspected Diseases Clinically Similar to Hog Cholera --PAFMDC/PAHO/IICA

The Continental Vesicular Disease Epidemiological Surveillance and Information System, coordinated by the PAFMDC, now enjoys the participation of virtually every Latin American country in the mechanism of weekly telexed reports based on grid maps. The procedures have become systematic and regular.

Through joint action of the PAHO/PAFMDC and the IICA, the gathering and dissemination of information regarding hog cholera has continued. The procedures for this system will gradually be improved, especially to the extent that national programs are properly developed and their information systems implemented, utilizing current mechanisms and their experience with vesicular diseases.

Beginning in 1987, monthly reports began to be published, which contain results of laboratory confirmation diagnoses of hog cholera.

3.5 Recommendations

The following points should continue to be emphasized:

- a) Carefully maintain and improve the epidemiological information system, which is a valuable working asset for all the countries of the continent, a vital support mechanism for its programs, and one of the most important animal-health accomplishments in South America. Every possible effort must be made to prevent a decline in the system and its performance.
- b) Reduce delays in sending weekly and monthly reports to the PAFMDC.

- c) Ensure that the information generated by the system is timely and reliable, and that communications follow standardized procedures.
- d) Pay closer attention to the use of information, as an objective base for the epidemiological characterization of FMD and subsequent readjustment of control goals and strategies, as well as in the forecasting, recognition and monitoring of epidemic situations and their solution.
- e) Include monthly information on virus subtypes identified and their location on the map.
- f) In the case of epidemic situations, keep the PAFMDC permanently informed. It is the reference body for consultation by neighboring countries, international agencies and other countries. Complete information should be forwarded at least weekly, showing not only the affected grid squares, but also the number of foci and typification by grid squares. If a variant appears, indicate the grid squares where it is being identified. In addition, the reports should include the degree of morbidity that is being recorded. Recognition is in order for Argentina, Uruguay and the state of Rio Grande do Sul, Brazil, whose efforts were outstanding along these lines in light of the epidemic of A-81 virus they suffered in 1987.
- g) Encourage greater integration between the laboratory and central- and field-level epidemiologists, in pursuit of the correct inclusion of information on types and subtypes and their repercussion of FMD epidemiology.
- h) Regularly forward to the PAFMDC field specimens for the reference laboratory.
- i) Take prompt action, applying suitable measures, when seroepidemiology leads to the detection of serological and immunological variations in active strains in the field.

FIGURE 1. GRID-SQUARE DISTRIBUTION BASED ON NUMBER OF WEEKS WITH VESICULAR DISEASE OCCORRENCE. SOUTH AMERICA, 1987

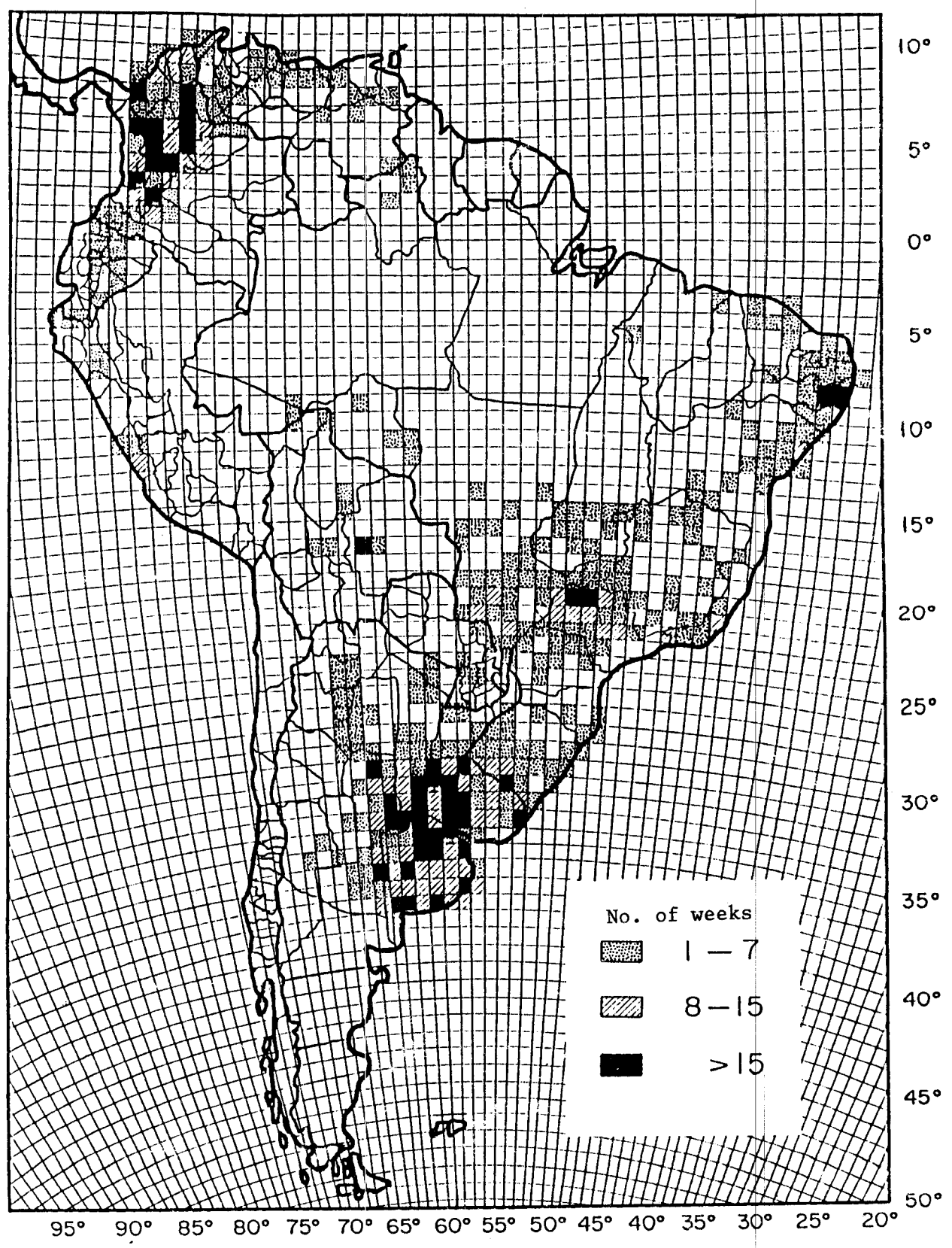


TABLE 1. Number of herds affected by vesicular disease, and causative agent. South America, 1987.

Country	Affected herds	Affected herds with samples collected	Diagnosis				
			Foot-and-Mouth Disease			Vesicular stomatitis	
			O	A	C	New Jersey	Indiana
Argentina	1346	865	23	486	27	-	-
Bolivia	84 ¹	19	-	12	1	-	-
Brazil ²	1064	479	94	161	13	-	-
Chile	147	147	135	-	-	-	-
Colombia	856	604	100	73	-	142	115
Ecuador	34	21	2	11	-	-	-
Paraguay	7	6	3	-	-	-	-
Peru	28	12	-	10	-	-	-
Uruguay	232	148	2	115	5	-	-
Venezuela	152 ³	81	20	6	-	20	3
Total	3950	2382	379	874	46	162	118

Notes: 1/ Includes 7 cattle herds and 1 pig herd in the department of la Paz and 27 cattle herds in the department of Oruro clinically diagnosed as vesicular disease.

2/ Data incomplete for states of Rondonia, Pernambuco, Alagoas, Bahia, Minas Gerais, Parana, Santa Catarina, Mato Grosso, Mato Grosso do Sul and Goias.

3/ In 32 herds affected, there is no identification of species affected.

TABLE 2. Herds affected by foot-and-mouth disease based on virus type, by country and year. South America, 1987.

Country	Virus type	1981	1982	1983	1984	1985	1986	1987
Argentina	O	64	13	351	90	10	30	23
	A	429	39	23	6	5	11	486
	C	22	4	196	348	288	315	27
Bolivia	O	2	-	1	3	6	3	-
	A	3	3	1	8	-	11	12
	C	7	7	3	1	3	-	1
Brazil	O	218	85	61	82	127	126	94
	A	731	589	190	144	113	102	161
	C	18	13	22	19	25	17	13
Colombia	O	87	50	192	164	98	167	100
	A	99	79	32	78	402	276	73
	C	-	-	-	-	-	-	-
Chile	O	-	-	-	13	-	-	135
	A	-	-	-	-	-	-	-
	C	-	-	-	-	-	-	-
Ecuador	O	12	9	66	13	5	6	2
	A	35	35	47	29	16	19	11
	C	-	-	-	-	-	-	-
Paraguay	O	5	6	11	22	1	4	3
	A	1	13	1	-	-	-	-
	C	-	1	-	6	7	-	-
Peru	O	4	-	-	-	7	-	-
	A	2	6	1	4	11	17	10
	C	1	7	3	-	-	-	-
Uruguay	O	4	1	-	10	15	2	2
	A	14	2	1	-	-	1	115
	C	-	-	4	6	3	28	5
Venezuela	O	29	28	13	18	31	13	20
	A	22	13	10	7	16	8	6
	C	-	-	-	-	-	-	-

TABLE 3. Foot-and-mouth disease virus subtypes identified in 1987.

Argentina	O ₁	A-81	C ₃
Bolivia	-	A ₂₄	C ₃
Brazil	O ₁	A ₂₄ , A-84 A-81	C ₃
Chile	O ₁	-	-
Colombia	O ₁	A ₂₄ , A-85, A ₃₂	-
Ecuador	O ₁	A ₂₄	-
Paraguay	O ₁	-	-
Peru	-	A ₂₄	-
Uruguay	O ₁	A ₂₄ , A-81	C ₃
Venezuela	O ₁	A ₂₇ , A ₂₄	-

TABLE 4. Strains used for production of foot-and-mouth disease vaccine. South America, 1987.

Country	Virus Strains		
	O	A	C
Argentina	O ₁ Caseros o O ₁ Campos	A Arg/79 A-81 Castellano-Ar/87	C ₃ Arg/84
Brazil	O ₁ Campos-Br/58	A ₂₄ Cruzeiro y A 79-Venceslau A-81 Castellano-Ar/87 /2	C ₃ Indaial
Colombia	O ₁ Campos	A ₂₄ Cruzeiro	-
Ecuador	O ₁ Ecuador	A ₂₄ Ecuador	-
Paraguay	O ₁ Campos	A ₂₄ Cruzeiro	C ₃ Resende
Peru	O ₁ Urubamba	A ₂₄ Cruzeiro	C ₃ Resende
Uruguay	O ₁ Campos	A ₂₄ Cruzeiro A-81 Castellano-Ar/87	C ₃ Resende
Venezuela/ ¹	O ₁ Campos	A ₃₂ Venezuela	-

Notes: /1 Only country producing live attenuated-virus vaccine.
/2 Monovalent A-81 Castellano-Ar/87 vaccine utilized solely in Rio Grande do Sul.

Source: Reports sent by countries and PAFMDC Diagnosis and Reference Laboratory.

TABLE 5. Months when the recorded frequency of herds affected by vesicular-disease viruses significantly exceeded the expected frequencies. South America, 1987.

Months	Argentina	Bolivia	Brazil	Colombia	Ecuador	Paraguay	Peru	Uruguay	Venezuela
January	C	A		NJ I		O	A		I
February	A C		C	NJ I			A		NJ
March	A C	A C	O	O NJ I			A		I
April	A		O C	O NJ I			A C		NJ
May	A O C		A	A O NJ I			A		O
June	A		A O	O NJ I	A		A O C		O NJ
July	A		A C	NJ I			A		O NJ
August	A		A C	I			A		A
September	A		A O	O	A				O
October	A	A	O	A O I					O NJ
November	A	A		NJ		O		A	
December	A			A O NJ		O			O NJ

TABLE 6. Vesicular disease morbidity in cattle. South America, 1987.

Countries	Herds/a		Population/a				Rates/b			
	Total	Affected	Total (x 1000)	In Affected herds	Diseased	Deaths	Herds Affected (0/00)	Population Morbidity (0/000)	Internal Morbidity (0/0)	Lethality (0/0)
Argentina	311726	1311	52658.0	874111	96219	133	4.21	18.27	11.01	0.14
Bolivia	9345	36	600.2	11102	2914	5	3.85	48.55	26.25	0.17
Brazil	1556861	1057	85137.1	379382	39954	507	0.68	4.69	10.53	1.27
Colombia	441818	762	16393.5	106669	11235	147	1.72	6.85	10.53	1.31
Chile/1	189044	147	3818.7	16848	2139					
Ecuador	247855	34	3764.9	4880	804	-	0.14	2.14	16.48	0.00
Paraguay	187608/2	7	7373.3	1995	131	-	0.04	0.18	6.57	0.00
Peru	463182	27	3391.5	3615	351	-	0.06	1.03	9.71	0.00
Uruguay	46827/2	232	9885.0	216586	7372	-	4.95	7.46	3.40	0.00
Venezuela	160173	99	11843.6	18641	1899	16	0.62	1.60	10.19	0.84
Total	3614439	3712	194865.8	1633829	163018	808	1.04	8.39	9.95	0.50

Notes: a/ Covered by programs.
 b/ Data from Chile not included.
 1/ Outbreak eradicated by elimination. 16,848 animals slaughtered.
 2/ PAFMDC estimate.

TABLE 7. Vesicular disease morbidity in swine. South America, 1987.

Country	No. of herds Affected	Population			Rates/a			
		Total (x 1000)	In affected herds	Diseased	Deaths	Population Morbidity (0/000)	Internal Morbidity (0/0)	Lethality (0/0)
Argentina	31	3700.0/1	16631	2102	335	5.68	12.64	15.94
Bolivia/2	13	310.6	542	211	5	6.79	38.93	2.37
Brazil	7	30067.1	9966	3560	1163	1.18	35.72	32.67
Colombia	73	2312.0	14819	1949	871	8.43	13.15	44.69
Chile/3	4/4	890.8	478	65				
Ecuador	1	1450.0	23	19	-	0.13	82.61	0.00
Paraguay	2/4	1403.0	370	70	-	0.50	18.92	0.00
Peru	1	2141.9	12	7	-	0.03	58.33	0.00
Uruguay	...	195.0/5	1588	120	-	6.15	7.56	0.00
Venezuela	21	2532.8	32233	108	-	0.43	0.34	0.00
Total	153	45003.2	76662	8211	2374	1.85	10.71	29.14

Notes: a/ Data from Chile not included.

1/ Figure taken from country's report to COSALFA XIV.

2/ Comprising departments of Cochabamba, Santa Cruz and Beni (pilot Plan).

3/ Outbreak eradicated by elimination. 478 animals slaughtered.

4/ In herds of cattle.

5/ FAO Production Yearbook, vol. 40, 1986.

... No information.

TABLE 8. Vesicular disease morbidity in sheep. South America, 1987.

Country	Population				Rates/a		
	Total (x 1000)	In affected herds	Diseased	Deaths	Population Morbidity (0/000)	Internal Morbidity (0/0)	Lethality (0/0)
Argentina	31840	89872	699	10	0.22	0.78	1.43
Bolivia	1105.4/1	-	-	-	0.00	0.00	0.00
Brazil	18477.2	118506	1052	257	0.57	0.89	24.43
Colombia	2335.9	66	26	11	0.11	39.39	42.31
Chile/2	5678.3	6373	...	...	...	...	...
Ecuador	1195.0	-	-	-	0.00	0.00	0.00
Paraguay	366.0/3	150	60	-	1.55	40.00	0.00
Peru	15294.2	362	-	-	0.00	0.00	0.00
Uruguay	24372.0	404661	7	-	.00	.00	0.00
Venezuela	309.5	-	-	-	0.00	0.00	0.00
Total	100995.5	620210	1844	278	0.19	0.30	15.08

Notes: a/ Data from Chile not included.

1/ Figure taken from country's report to COSALFA XIV.

2/ Outbreak eradicated by elimination. 6373 animals slaughtered.

3/ FAO Production Yearbook, vol. 40, 1986.

... No information.

TABLE 9. Vesicular disease morbidity in goats. South America, 1987.

Country	Population				Rates/a		
	Total (x 1000)	In affected herds	Diseased	Deaths	Population Morbidity (0/000)	Internal Morbidity (0/0)	Lethality (0/0)
Argentina	3100/1	3486	350	132	1.16	10.33	36.67
Bolivia	1200/1	-	-	-	0.00	0.00	0.00
Brazil	9674.6	794	8	2	0.01	1.01	25.00
Colombia	654.9	46	15	4	0.23	32.61	26.67
Chile/2	1134.5	7869	...	...	...	...	...
Ecuador	228.0	-	-	-	0.00	0.00	0.00
Paraguay	123.0/1	-	-	-	0.00	0.00	0.00
Peru	2021.4	2	-	-	0.00	0.00	0.00
Uruguay	12.0/1	-	-	-	0.00	0.00	0.00
Venezuela	1057.4	-	-	-	0.00	0.00	0.00
Total	19205.8	12197	383	138	0.21	8.85	36.03

Notes: a/ Data from Chile not included.

1/ FAO Production Yearbook, vol 40, 1986.

2/ Outbreak eradicated by elimination. 7869 animals slaughtered.

... No information.

TABLE 10. Vesicular disease morbidity in horses. South America, 1987.

Country	Population				Rates		
	Total (x 1000)	In affected herds	Diseased	Deaths	Population Morbidity (0/000)	Internal Morbidity (0/0)	Lethality (0/0)
Argentina	3255.0/1	-	-	-	0.00	0.00	0.00
Bolivia	991.0/1	-	-	-	0.00	0.00	0.00
Brazil	5442.3	-	-	-	0.00	0.00	0.00
Colombia	2830.6	474	105	-	0.37	22.15	0.00
Chile	538.0/1	-	-	-	0.00	0.00	0.00
Ecuador	640.0	-	-	-	0.00	0.00	0.00
Paraguay	360.0/1	-	-	-	0.00	0.00	0.00
Peru	1326.6	5	-	-	0.00	0.00	0.00
Uruguay	505.0/1	-	-	-	0.00	0.00	0.00
Venezuela	452.8	-	-	-	0.00	0.00	0.00
Total	16341.3	479	105	-	0.06	21.92	0.00

Notes: 1/ FAO Production Yearbook, vol. 40, 1986.

TABLE 11. Monthly distribution of cattle herds affected by vesicular diseases.
South America, 1987.

Country/ /Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Argentina	21	22	23	162	435	210	117	108	119	70	11	13	1311
Bolivia/1	5	7	11	13	11	10	2	4	2	3	2	-	70
Brazil	42	60	72	92	133	255	162	114	74	36	8	9	1057
Colombia	154	89	44	33	56	48	76	43	50	74	46	57	770
Chile	-	-	21	21	68	25	5	7	-	-	-	-	147
Ecuador	3	-	3	2	-	5	1	2	7	3	5	3	34
Paraguay	1	2	1	-	-	-	-	-	-	-	1	2	7
Peru	10	7	2	-	1	-	1	5	1	-	-	-	27
Uruguay	-	-	-	6	104	69	36	15	-	1	1	-	232
Venezuela	7	5	10	4	4	10	14	6	12	12	5	10	99
Total	243	192	187	333	812	632	414	304	265	199	79	94	3754

Notes: 1/ Includes 7 affected cattle herds (2 Jan, 2 Feb, 3 Aug) in department of La Paz and 27 (10 Apr, 8 May, 9 Jun) in department of Oruro. All with clinical diagnosis only. Neither department covered by SENARB.

TABLE 12. Monthly distribution of cattle herds affected by FMD virus 0
South America, 1987.

Country/ /Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Argentina	1	-	-	1	18	1	-	1	-	1	-	-	23
Bolivia	-	-	-	-	-	-	-	-	-	-	-	-	-
Brazil	-	2	11	17	7	17	11	4	16	7	2	-	94
Colombia	9	5	7	2	8	6	12	2	15	20	4	9	99
Chile	-	-	21	21	68	25	5	7	-	-	-	-	147
Ecuador	-	-	-	-	-	1	-	-	1	-	-	-	2
Paraguay	1	-	-	-	-	-	-	-	-	-	1	1	3
Peru	-	-	-	-	-	-	-	-	-	-	-	-	0
Uruguay	-	-	-	-	-	2	-	-	-	-	-	-	2
Venezuela	3	1	-	-	1	3	4	1	1	2	1	2	19
Total	14	8	39	41	102	55	32	15	33	30	8	12	389

TABLE 13. Monthly distribution of cattle herds affected by FMD virus A
South America, 1987.

Country/ /Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Argentina	-	3	8	66	176	81	34	49	48	16	2	3	486
Bolivia	2	-	7	-	-	-	-	-	-	2	1	-	12
Brazil	5	1	2	5	26	42	31	27	10	9	1	2	161
Colombia	8	4	5	2	13	4	6	7	4	13	6	14	86
Chile	-	-	-	-	-	-	-	-	-	-	-	-	-
Ecuador	1	-	2	-	-	2	-	1	3	2	-	-	11
Paraguay	-	-	-	-	-	-	-	-	-	-	-	-	-
Peru	2	3	1	-	-	-	1	2	-	-	-	-	9
Uruguay	-	-	-	1	70	21	20	2	-	-	1	-	115
Venezuela	-	-	1	-	-	-	-	-	1	1	1	-	4
Total	18	11	26	74	285	150	92	88	66	43	12	19	884

TABLE 14. Monthly distribution of cattle herds affected by FMD virus C
South America, 1987.

Country/ /Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Argentina	3	5	2	1	9	1	2	-	4	-	-	-	27
Bolivia	-	-	1	-	-	-	-	-	-	-	-	-	1
Brazil	2	2	-	4	-	-	2	2	-	1	-	-	13
Colombia	-	-	-	-	-	-	-	-	-	-	-	-	-
Chile	-	-	-	-	-	-	-	-	-	-	-	-	-
Ecuador	-	-	-	-	-	-	-	-	-	-	-	-	-
Paraguay	-	-	-	-	-	-	-	-	-	-	-	-	-
Peru	-	-	-	-	-	-	-	-	-	-	-	-	-
Uruguay	-	-	-	4	-	1	-	-	-	-	-	-	5
Venezuela	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	5	7	3	9	9	2	4	2	4	1	0	0	46

TABLE 15. Monthly distribution of cattle herds affected by vesicular stomatitis, New Jersey type. South America, 1987.

Country/ /Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Argentina	-	-	-	-	-	-	-	-	-	-	-	-	-
Bolivia	-	-	-	-	-	-	-	-	-	-	-	-	-
Brazil	-	-	-	-	-	-	-	-	-	-	-	-	-
Colombia	38	24	11	8	8	10	11	7	4	4	9	8	142
Chile	-	-	-	-	-	-	-	-	-	-	-	-	-
Ecuador	-	-	-	-	-	-	-	-	-	-	-	-	-
Paraguay	-	-	-	-	-	-	-	-	-	-	-	-	-
Peru	-	-	-	-	-	-	-	-	-	-	-	-	-
Uruguay	-	-	-	-	-	-	-	-	-	-	-	-	-
Venezuela	-	1	-	1	1	1	2	-	-	2	-	2	10
Total	38	25	11	9	9	11	13	7	4	6	9	10	152

TABLE 16. Monthly distribution of cattle herds affected by vesicular stomatitis, Indiana type. South America, 1987.

Country/ /Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Argentina	-	-	-	-	-	-	-	-	-	-	-	-	-
Bolivia	-	-	-	-	-	-	-	-	-	-	-	-	-
Brazil	-	-	-	-	-	-	-	-	-	-	-	-	-
Colombia	29	23	11	3	9	5	15	7	2	0	2	1	115
Chile	-	-	-	-	-	-	-	-	-	-	-	-	-
Ecuador	-	-	-	-	-	-	-	-	-	-	-	-	-
Paraguay	-	-	-	-	-	-	-	-	-	-	-	-	-
Peru	-	-	-	-	-	-	-	-	-	-	-	-	-
Uruguay	-	-	-	-	-	-	-	-	-	-	-	-	-
Venezuela	1	-	2	-	-	-	-	-	-	-	-	-	3
Total	30	23	13	3	9	5	15	7	2	0	2	1	118

TABLE 17. Number of herds affected by vesicular stomatitis, by country and virus type. Central America, Panama and Mexico, 1978.

Country	Vesicular Stomatitis		No Diagnosis (Negative)	Total
	New Jersey	Indiana		
Belice	4	-	1	5
Costa Rica	21	4	16	41
El Salvador	18	2	24	44
Guatemala	29	15	61	105
Honduras	38	2	37	77
México	43	30	119	192
Nicaragua	12	10	-	22
Panama	4	2	17	23
Total	169	65	275	509

TABLE 18. Coverage by FMD control programs. South America, 1987.

Country	Area (Km ²)		Cattle Herds		Cattle Population (x 1000)	
	Total Under Program		Total Under Program		Total Under Program	
Argentina	2779892	2779892	311726	311726	52658.0	52658.0
Bolivia	1098581	290850/1	97993/2	9345	6000.0/3	600.2
Brazil	8511970	3086645	2704929/4	1556861	128918.0/3	85137.1
Colombia	1141748	686743	498679/5	441818/5	23971.2	16393.5
Chile	757720	757720	189044	189044	3818.7	3818.7
Ecuador	267000	267000	247855	247855	3764.9	3764.9
Paraguay	406752	406752	187608	187608	7374.3	7374.3
Peru	1282120	1282120	463182	463182	3391.5	3391.5
Uruguay	176215	176215	46827/4	46827/4	9885.0	9885.0
Venezuela	911930	911930	160173	160173	11843.6	11843.6
Total	17333928	10645867	4908016	3614439	251625.2	194866.8

Notes: 1/ Figures pertain to program coverage in part of departments of Cochabamba, Santa Cruz and Beni (Pilot Plan).

2/ According to second stage Project- Senarb - 1984

3/ FAO Production Yearbook, vol. 40, 1986.

4/ PAFMDC estimate.

5/ Does not include figures from Caquetá, Chocó, Arauca, Putumayo, Amazonas, Guainia, Guaviare, Vichada, Valpes and San Andres Islands.

TABLE 21. Human resources inventory. Foot-and-mouth disease prevention and control program. South America, 1986-1987. /a

Country	1986			1987				
	Total	Central	Laboratory	Field	Total	Central	Laboratory	Field
Argentina	1589	111	20	1458	1686	35	148	1503
Bolivia	159	...	...	...	159	56	45	56
Brazil	8156	52	...	8104	...	...	...	...
Colombia	806	66	16	724	693	71	182	640
Chile	163/1	2	2	179	81	2	2	77
Ecuador	345	41	11	293	345	42	11	292
Paraguay	558	154	85	319	559	157	84	318
Peru	518	5	8	505	518	5	8	505
Uruguay	595	88/2	86	421/2	580	69	106	405
Venezuela/3	402	17	...	385	402	17	...	385
Total	13311	536	228	12388	5223	456	586	4181

Notes: a/ In some countries, personnel do not work exclusively in FMD Programs.

1/ Figure taken from country's report to COSALFA XIII.

2/ PAFHDC estimate.

3/ Laboratory personnel are included in personnel total for State Agro-livestock Development units, to which Regional Diagnostic Laboratories are attached.

... No information.

TABLE 22. FMD Control Program Resources.
South America, 1987. /a

Country	Field operation Units	Human Resources							
		Professionals		Field		Others		Field	
		Central	Laborat.	Laborat.	Field	Central	Laborat.		
Argentina	295	12	57	306	23	91	1197		
Bolivia	19	11	17	20	47	28	36		
Brazil	953	...	...	...	...	...	...
Colombia	111	21	53	135	50	129	505		
Chile	56	1	1	23	1	1	54		
Ecuador	57	12	11	69	30	-	223		
Paraguay	45	29	38	56	128	46	262		
Peru	144	2	92	4	3	413	4		
Uruguay	41/1	21	14	65	48	92	340		
Venezuela	150	11	...	177	6	...	208		
Total	1871	120	283	855	336	800	2829		

Notes: a/ In some countries, personnel do not work exclusively in FMD programs
1/ Figure taken from country's report to COSALFA XIII.
... No information.

TABLE 19. FMD Vaccination of Cattle. South America, 1987.

Country	Bovine population under program (x 1000)	Available Vaccine doses (x 1000)	Doses/ /Bov.
Argentina	52658.0	172350.0/1	3.27/5
Bolivia/2	600.2	190.8	0.32
Brazil	85137.1	170503.7	2.00
Colombia	16393.5	20609.6/3	1.26
Ecuador	3764.9	1200.0	0.32
Paraguay	7374.3	10251.3	1.39
Peru	3391.5	780.0	0.23
Uruguay	9885.0	52763.5 (30099.1)/4	3.04
Venezuela	11843.6	8450.0	0.71

- Notes: 1/ Estimated 16 million administered to sheep.
 2/ Amt. of vaccine utilized and paid for by cattleraisers unknown. Inspection of administering of this vaccine, when carried out, consists of observation of procedure by a service expert.
 3/ Does not include 120,000 doses earmarked for pigs.
 4/ Trivalent vaccine doses administered to cattle. Sheep also vaccinated.
 5/ Estimated.

TABLE 20. Production, control, international commercialization and availability of FMD vaccine, by country. South America, 1987.

Country	Vaccine			Doses		
	Exported	Controlled	Approved	Exported	Imported	Available
Argentina	196151500	196151500	188349570/1	-	-	188349570
Bolivia	-	-	-	-	190800/2	190800
Brazil/3	231515100	231515100	170503660	-	-	170503660
Colombia/4	26094205	23067000	20722620/5	-	7000/2	20729620
Chile/6	-	-	-	-	550000	550000
Ecuador	600000	600000	600000	-	600000/2	1200000
Paraguay	9100570/7	9100570	9100570	354300/8	1505000/9	10251270
Peru	780000	780000	780000	-	-	780000
Uruguay/10	49829125/11	61984685/12	53460980	697500/13	-	52763480
Venezuela	7174500	7174500	7174500	-	1275500/2	8450000
Total	521245000	530373355	450691900	1051800	4128300	453768400

- Notes: 1/ Include 9389690 doses of oil-adjuvanted vaccine.
2/ Oil-adjuvanted vaccine produced by PAFMDC
3/ Includes 17340070 doses of oil-adjuvanted vaccine produced and controlled, with 10731650 doses approved.
4/ Includes 166455 doses of oil-adjuvanted vaccine produced, 1600245 controlled, and 1294654 approved.
5/ Retesting pending: 305600 doses of oil-adjuvanted vaccine and 1175995 doses of saponin-hydroxide vaccine.
6/ 500000 doses of monovalent O1 oil-adjuvanted vaccine prepared by PAFMDC and not used in emergency situation in Chile. PAFMDC also maintains a stock of 50,000 doses for such situations.
7/ Includes 283460 doses of oil-adjuvanted vaccine produced nationally.
8/ Includes 226500 doses of vaccine exported to Bolivia not contained in Bolivia's report to COSALFA and 127800 doses to Philippines.
9/ Includes 1200000 doses of oil-adjuvanted vaccine, 300000 doses of monovalent A, and 5000 doses of swine vaccine produced by PAFMDC-Brazil.
10/ Includes 22767220 doses of monovalent A-81 vaccine, of which 22664365 were controlled and approved.
11/ 4275980 doses projected for 1988.
12/ 8352700 doses were prepared in 1986 and controlled in 1987.
13/ 697500 doses to Philippines.

TABLE 23. Vehicle inventories. FMD control programs.
South America, 1986-87.

Country	1986				1987			
	Area Total Km ²	Total	Aut.	Moto.	Area Total Km ²	Total	Aut.	Moto.
Argentina	2779892	1292	...	...	2779892	1152	1152	-
Bolivia	290850	26	...	...	318664	26	...	...
Brazil	3029412	...	...	...	3086645	...	...	...
Colombia	686743	360	132	210	686743	360/1	150	210
Chile	757720	11	11	-	757720	12	12	-
Ecuador	267000	54	54	-	267000	51	51	-
Paraguay/2	406752	69	46	23	406752	78	44	34
Peru	1282120	145	27	118	1282120	145	27	118
Uruguay	162500	150	75	75	162500	158	86	72
Venezuela	911930	314	314	-	911930	314	314	-
Total	10574919	2421	659	426	10659966	2296	1836	434

Notes: 1/ Includes 16 mobile units and 2 trucks.

2/ Central unit and laboratory are in same building.

... No information.

TABLE 24. Financial-resource inventories (US\$). Operating expenses. FMD control program. South America, 1986-87.

Country	1986				1987			
	Total	Central	Laboratory	Field	Total	Central	Laboratory	Field
Argentina	16751400	1172400	4283900	11295100	330180	...	...	...
Bolivia	309156	...	...	...	7442352	3349143	2210703	1862506
Brazil	31046000/1	...	...	...	7143077	1861538	64616	5216923
Colombia	4832267	675414	69818	4087035	292300/2	30300	28000	234000
Chile	304762	50267	27276	227219	688512/3	161163	-	527349
Ecuador	1846641	571367	-	1275274	2225333	870099	394733	960501
Paraguay	1790058	677932	270559	841567	258999	3120	243399	12480
Peru	1020429	17143	23286	980000	1623874/4	104358	410149	1109367
Uruguay	...	...	...	...	623771	44443	...	579327
Venezuela	865600	59551	59915	746135	...	...	...	...
Total	58766313	3224074	4734753	19452330	20628398	6424164	3351600	10502453

Notes: 1/ PAFMDC-Brazil estimate.
 2/ Due to sanitary emergency, the country also paid out US\$ 7107125 as of 12-31-88.
 3/ Expenditures for period Jan-Sept. 1987.
 4/ Budget Figures.
 ... No information.

TABLE 25. Financial-resource inventories (US\$). Capital expenses. FMD control program. South America, 1986-1987.

Country	1986				1987			
	Total	Central	Laboratory	Field	Total	Central	Laboratory	Field
Argentina	1059800	-	1040500	19300	19512	...	...	...
Bolivia	40000	...	...	...	616440	71077	485099	60264
Brazil	1634000/1	...	...	...	1688461	707692	76923	903846
Colombia	203814	199646	4169	-	34000/2	-	27200	6800
Chile	12286	-	9762	2524	10617/3	-	-	10617
Ecuador	...	...	...	...	1029218	342524	308757	377937
Paraguay	1079879	376031	311969	391879	...	...	...	...
Peru	69286	-	-	69286	643488	...	243058	400430
Uruguay	...	...	...	...	138467	16667	...	121800
Venezuela	186667	9600	170178	6889	...	...	...	...
Total	4285732	585277	1536578	489878	4180203	1137960	1141037	1881694

Notas: 1/ PAFMDC estimate.
 2/ Due to sanitary emergency, the country also paid out US\$ 280645 as of 12-31-88.
 3/ Expenditures for period Jan-Sep 1987.
 ... No information.

TABLA 26. Cattle and cattle semen imports.
South America, 1987.

Importing Country	Country of Origin	No. of Cattle	Semen/a
Argentina	Canadá	26	x
	Uruguay	110	
Bolivia	-		
Brazil	West Germany.		x
	Argentina	99	x
	Bolivia	6100	
	Canadá	1200	x
	USA	1189	x
	France	117	x
	Holland	145	
	Italy		x
	Paraguay	8017	
	United Kingdom	15	x
Colombia	Switzerland	08	x
	Uruguay	3215	
	Germany		x
	Canada		x
	Chile		x
	France		x
Chile	Panama		x
	Canada		x
	USA		x
	New Zealand		x
	West Germany		x
Ecuador	United Kingdom		x
	USA	836	x
	Canada		x
	Costa Rica	458	
	Cuba	170	
	Brazil		x
	United Kingdom		x
Colombia	8		

TABLE 26. (Cont.)

Importing Country	Country of Origin	No. of Cattle	Semen/a
Paraguay	Argentina	29	
	Brazil	145	
	USA	22	
	Uruguay	85	
Peru	Argentina	2639	
	Brazil	982	
	Canada	1783	x
	Chile	562	
	Colombia	500	
	Costa Rica	84	
	Cuba	247	
	USA	5875	x
	Spain	40	
	Mexico	510	
	Panama	12020	
Uruguay	Argentina	23	
	Australia		x
	Brazil	2	
	Canada	5	x
	USA		x
	France		x
	United Kingdom		x
	New Zealand		x
Venezuela	Australia	1401	
	Canada	6980	
	Costa Rica	700	
	Cuba	880	
	USA	4725	x
	New Zealand		x

TABLE 27. Swine Imports.
South America, 1987.

Importing Country	Country of Origin	No. of Pigs
Argentina	-	
Bolivia	-	
Brazil	-	
Colombia	-	
Chile	USA	70
Ecuador	-	
Paraguay	-	
Peru	West Germany	50
	Australia	3000
	Canada	420
	Denmark	12
	USA	495
Uruguay	-	
Venezuela	Canada	547
	USA	538

TABLE 28. Sheep Imports.
South America, 1987.

Importing Country	Country of Origin	No. of Sheep
Argentina	Uruguay	879
Bolivia	-	
Brazil	Argentina	128
	USA	67
	New Zealand	132
	Uruguay	47
Colombia	-	
Chile	New Zealand	6
Ecuador	New Zealand	6000
Paraguay	Argentina	19
	Uruguay	267
Peru	Argentina	668
	Brazil	27
	Cuba	636
	USA	170
Uruguay	Argentina	44
	Australia	1
	Brazil	6
	New Zealand	6
Venezuela	Canada	20

TABLE 29. Goat Imports.
South America, 1987.

Importing Country	Country of Origin	No. of Goats
Argentina	-	
Bolivia	-	
Brazil	Holland	45
	United Kingdom	27
	Switzerland	77
Colombia	France, USA	152
Chile	Canada	
Ecuador	-	
Paraguay	-	
Peru	-	
Uruguay	-	
Venezuela	-	

TABLE 30. Horse Imports.
South America, 1987.

Importing Country	Country of Origin	No. of Horses
Argentina	Germany	11
	USA	65
	Italy	6
	Uruguay	361
Bolivia	-	
Brazil	West Germany	19
	Argentina	125
	Belgium	09
	Chile	16
	Denmark	04
	Spain	03
	USA	345
	France	38
	Peru	08
	Poland	11
	Portugal	32
	United Kingdom	25
Colombia	Switzerland	03
	Uruguay	16
Colombia	-	
Chile	Argentina	75
	Peru	3
	USA	15
	United Kingdom	1
	Ireland	3
	Czechoslovakia	6
	France	11
	Norway	5
Ecuador	USA	23
	Canada	7
	Costa Rica	12
	Chile	15
	United Kingdom	4
	Spain	2
	Colombia	36
	Peru	6
West Germany	2	

TABLE 30. (Cont.)

Importing Country	Country of Origin	No. of Horses
Paraguay	Argentina	452
	Germany	6
	Brazil	15
	Chile	5
	Switzerland	3
	Uruguay	1512
	USA	170
Peru	West Germany	12
	Argentina	31
	Brazil	5
	Chile	25
	Ecuador	1
	USA	61
	France	6
	Uruguay	1
Venezuela	2	
Uruguay	Argentina	275
	Brazil	6
	USA	71
	Spain	6
Venezuela	Argentina	36
	Belgium	3
	Costa Rica	1
	Chile	5
	USA	146

TABLE 31. Cattle and cattle semen exports.
South America, 1987.

Exporting Country	Importing Country	No. of Cattle	Semen/a
Argentina	Brazil	158	
	Paraguay	32	
	Peru	146	
	Uruguay	23	
Bolivia	-		
Brazil	-		
Colombia	Aruba, Curacao, Peru	54671	
Chile	Peru	204	
	Colombia	75	
Ecuador	-		
Paraguay	Brazil	35	
Peru	-		
Uruguay	Argentina	9	x
	Brazil	155	
	Bolivia	621	
	Paraguay	113	
Venezuela	-		

TABLE 32. Swine exports.
South America, 1987.

Exporting Country	Importing Country	No. of Pigs
Argentina	Bolivia	65
	Brazil	13
Bolivia	-	
Brazil	-	
Colombia	-	
Chile	-	
Ecuador	-	
Paraguay	-	
Peru	-	
Uruguay	-	
Venezuela	-	

TABLE 33. Sheep exports.
South America, 1987.

Exporting Country	Importing Country	No. of Sheep
Argentina	Bolivia	126
	Uruguay	6
Bolivia	-	
Brazil	-	
Colombia	Aruba, Curaçao	16019
Chile	Argentina	69
Ecuador	-	
Paraguay	-	
Peru	-	
Uruguay	Argentina	2
	Brazil	492
	Paraguay	676
Venezuela	-	

TABLE 34. Horse Exports.
South America, 1987.

Exporting Country	Importing Country	No. of Horses
Argentina	Germany	106
	USA	784
	Italy	3123
	Uruguay	554
Bolivia	-	
Brazil	-	
Colombia	Ecuador, USA	241
	France, Panama, Puerto Rico, Dominican Republic	
Chile	USA	52
	Peru	20
	Argentina	7
	Colombia	6
	Ecuador	27
	United Kingdom	3
	Venezuela	2
	Brazil	5
Ecuador	-	
Paraguay	Brazil	30
Peru	Argentina/1	8
	Bolivia	7
	Brazil/1	6
	Ecuador/2	22
	USA	23
	Panama	15
	Venezuela/1	2
Uruguay	Argentina	102
	Brazil	209
	Chile	1
	USA	1
	Paraguay	1502
	Bolivia	42
	United Kingdom	1
	Italy	1485

Notes: 1/ Race Horses
2/ Includes circus horses

TABLE 35. Continental information and Epidemiological surveillance system for Vesicular Diseases in Cattle. Reception level and delays in transmitting weekly reports of outbreaks by map grid squares. South America, 1967.

Country	Weekly Reports										Days of Delay					
	Received		Published /a		Until		Receipt/b		Receipt-Publication		Total /d					
	No.	%	No.	%	Md	Mx	Mn/c	Md	Mx	Mn	Md	Mx	Mn			
Argentina	52	100	52	100	30	83	10	2	8	-	34	84	13			
Bolivia	52	100	28	54	31	117	3	4	7	1	21	49	7			
Brazil	52	100	52	100	10	13	6	4	12	1	14	27	13			
Colombia	52	100	51	98	6	26	6	1	5	-	7	14	7			
Ecuador	52	100	50	96	7	75	1	1	10	-	7	87	7			
Paraguay	52	100	52	100	4	13	3	3	8	-	7	14	6			
Peru	48	92	18	35	59	210	4	2	7	1	21	49	7			
Uruguay	51	98	50	96	7	25	4	2	8	-	7	21	7			
Venezuela	52	100	52	100	11	19	3	3	9	-	14	21	6			

Notes: a/ No. 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.

TABLE 36. Continental information and epidemiological Surveillance System for Vesicular Disease in Cattle. Level of reception and publication of monthly reports on affected herds and diagnosis, by political division. South America, 1987.

Country	No. Received	No. Published	Months Not Received
Argentina	12	12	-
Bolivia	12	12	-
Brazil	12	12	-
Colombia	12	12	-
Chile	12	12	-
Ecuador	12	12	-
Paraguay	12	12	-
Peru	12	12	-
Uruguay	12	12	-
Venezuela	12	12	-

TABLE 37. Continental information and epidemiological surveillance system for Vesicular Diseases in Cattle. Delays in receipt of monthly reports, by days. South America, 1987.

Country	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Median
Argentina	132	104	73	43	64	34	158	127	97	66	36	32	70
Bolivia	138	110	132	102	71	41	166	135	105	74	44	36	104
Brazil	53	51	45	39	36	31	35	43	36	31	37	32	37
Colombia	40	32	27	25	26	27	49	18	26	32	30	29	28
Chile	17	55	92	62	31	27	46	67	37	25	35	29	36
Ecuador	33	17	87	26	26	24	53	34	26	37	35	27	30
Paraguay	33	30	92	62	31	29	34	28	22	51	21	50	32
Peru	149	121	90	60	79	49	161	130	100	69	39	49	85
Uruguay	72	66	73	43	71	41	54	56	20	69	39	49	55
Venezuela	62	34	84	54	23	112	81	50	61	30	81	50	58
Mediana	53	53	86	49	34	33	54	53	37	44	37	34	46

TABLE 38. Epidemiological surveillance activities: Indicators of laboratory confirmation of herds affected by vesicular disease. South America, 1987.

Country	Herds Affected			Percentage	
	Total	Sampled	W/Positive Diagnosis	Sampled	W/Positive Diagnosis
Argentina	1346	865	536	64	40
Bolivia	84	19	13	23	15
Brazil	1064	479	268	45	25
Colombia	856	604	430	71	50
Chile	147	147/2	147/2	100	100
Ecuador	34	21	13	62	38
Paraguay	7	6	3	86	43
Peru	28	12	10	43	36
Uruguay	232	148	122	64	53
Venezuela	152/1	81	49	53	32
Total	3950	2382	1591	60	40

Notes: /1 En 32 affected herds, there was no identification of species affected.

/2 Includes 12 herds with diagnosis by VIA test. Viral diagnosis made at PAFMDC.

TABLE 39. Continental Information and Epidemiological Surveillance System for Vesicular Diseases in Cattle. Reception level and delays in transmission of weekly reports of outbreaks by map grid squares. Central America and Mexico, 1987.

Country	Weekly Reports										Days of Delay					
	Received		Published /a		Until Receipt /b		Receipt-Publication		Total							
	No.	%	No.	%	Md	Mx	Mn/c	Md	Mx	Mn	Md	Mx	Mn			
Belize	-	-	-	-	-	-	-	-	-	-	-	-	-			
Costa Rica	45	87	12	19	23	192	5	4	5	-	23	42	7			
El Salvador	52	100	41	79	23	49	4	3	11	1	21	45	7			
Guatemala	52	100	39	75	21	116	4	3	6	-	21	45	7			
Honduras	-	-	-	-	-	-	-	-	-	-	-	-	-			
México	52	100	48	92	7	68	3	2	8	-	9	70	6			
Nicaragua	33	63	31	60	18	98	5	2	4	-	14	91	7			
Panama	51	98	50	96	7	28	4	1	7	-	7	24	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.

TABLE 40. Continental Information and Epidemiological Surveillance System for Vesicular Diseases in Cattle. Level of Reception and publication of monthly reports on affected herds and diagnosis, by political division, Central America and Mexico, 1987.

Country	No. Received	No. Published	Months not Received
Belize	12	12	-
Costa Rica	12	12	-
El Salvador	12	12	-
Guatemala	12	12	-
Honduras	12	12	-
Mexico	12	12	-
Nicaragua	12	12	-
Panama	12	12	-

TABLE 41. Continental Information and Epidemiological Surveillance System for Vesicular Disease in Cattle. Delays in receipt of monthly reports, by days. Central America and Mexico, 1987.

Country	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Median
Belize	37	16	57	27	39	35	119	51	58	67	37	50	45
Costa Rica	37	16	35	27	39	35	119	51	58	67	37	50	38
El Salvador	37	16	35	27	39	35	119	51	58	67	37	50	38
Guatemala	37	16	22	27	39	35	14	35	16	24	37	49	31
Honduras	37	16	35	27	39	35	119	51	58	67	37	50	38
Mexico	27	30	27	54	75	23	28	28	22	40	21	32	28
Nicaragua	37	16	35	27	39	35	119	51	58	67	37	50	38
Panama	27	16	21	27	16	25	49	51	58	67	37	29	28
Median	37	16	35	27	39	35	119	51	58	67	37	50	39