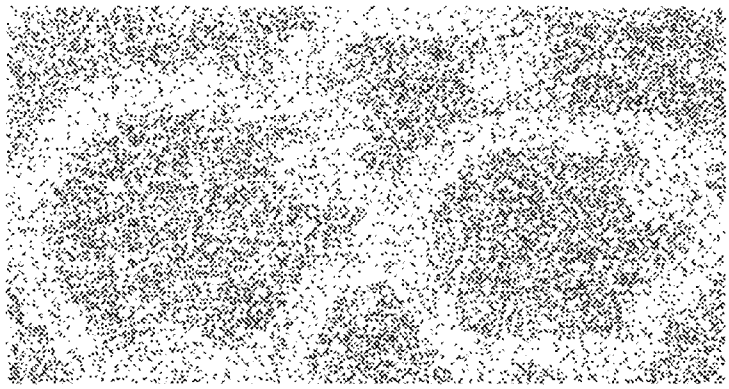
REPUBLIC OF CHILE
MINISTRY OF AGRICULTURE
AGRICULTURE AND LIVESTOCK SERVICE
DEPARTMENT OF LIVESTOCK PROTECTION
SUBDEPARTMENT OF EPIDEMIOLOGYCAL
SURVEILLANCE

CHILE: A COUNTRY FREE FROM CLASSICAL SWINE FEVER



Chile - 1999

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1. MAIN FACTS ABOUT CHILE

Geographic Situation: Chile is a country belonging to three continents, as its territory lies within South America, Antarctica and Oceania. It is situated on the southWestern part of the Southern Cone of South America, extending onto the Antarctic Continent and reaching Easter Island, in Polynesia. Moreover, its territory includes the Juan Fernandez Archipelago and San Felix, San Ambrosio and Salas y Gomez Islands. Its lengthy and narrow shape causes a great diversity of landscapes, climates and flora. Its geography is uneven and mountainous, and it is decorated with a great number of rivers, lakes and lagoons. (Appendix 1)

Boundaries: North: Peru, East: Bolivia and Argentina, South: South Pole, West: Pacific Ocean.
Area: 756,096.3 km.^{2} (*)
Population: 14,622,354 inhabitants
Language: Spanish (Other Languages: Mapuche, Quechua, Aymara and Pascuense)
Administrative Division: Thirteen Regions (divided into 51 provinces and 335 municipalities):
Tarapaca (I Region)
Antofagasta (II Region)
Atacama (III Region)
Coquimbo (IV Region)
Valparaiso (V Region)
Libertador General Bernardo O'Higgins (VI Region)
Maule (VII Region)
Biobio (VIII Region)
La Araucania (IX Region)
Los Lagos (X Region)
Aysén del General Carlos Ibañez del Campo (XI Region)
Magallanes y Antartica Chilena (XII Region)
Metropolitana de Santiago (Metropolitan Region)
Capital: Santiago (Metropolitan Region)

* excludes Chilean Antarctic Territory (1,250,000 km.^{2}) and inner sea waters.
Source: National Institute for Statistics (INE), Statistical Abstract 1997.

1. **CHILE'S TOTAL, FOREST, AGRICULTURAL AND CATTLE FOREIGN TRADE**

The following tables exhibit details and figures of Chile's exports and imports during the 1992-1998 period.

IMPORTS AND EXPORTS BETWEEN CHILE AND THE WORLD, 1992-1998 (MILLIONS US$)

IMPORTS							
Year	92	93	94	95	96	97	98
Total Country	9670.2	10771.4	11412.6	15346.3	17353.1	18299.9	17285.4
Other sectors	9018.2	10087.9	10605.1	14303.7	16105.2	17030.4	16003.5
Forest, Agriculture and Cattle	652.0	683.5	807.5	1042.6	1247.9	1269.5	1281.9
Cattle	170.2	187.7	173.4	229.9	270.8	289.8	281.2
Agriculture	466.2	474.6	606.3	769.6	920.6	915.8	915.3
Forest	15.6	21.2	27.7	43.1	56.5	63.9	85.4
EXPORTS							
Year	92	93	94	95	96	97	98
Total Country	10125.5	9416.2	11643.4	16444.7	15396.2	17024.8	14757.1
Other sectors	7357.2	6713.5	8368.9	11971.4	11236.3	12754.5	10443.2
Forest, Agriculture and Cattle	2768.3	2702.7	3274.5	4473.3	4159.9	4270.3	4313.9
Cattle	69.2	65.1	102.9	112.5	116.3	164.0	169.9
Agriculture	1660.4	1540.9	1721.0	2095.3	2510.1	2458.3	2703.4
Forest	1038.7	1096.7	1450.6	2265.5	1453.5	1647.9	1444.5

Source: ODEPA Statistics

IMPORTS AND EXPORTS OF CATTLE PRODUCTS CLASSIFIED BY SOURCE AND DESTINATION MARKETS. 1992-1998 PERIOD. (THOUSANDS US$).

IMPORTS							
Year	92	93	94	95	96	97	98
Total	170191	187707	173423	229907	270819	289773	281232
EEC	18891	29283	12691	17150	29464	13481	24353
APEC	35580	40586	42749	52530	52177	49102	42855
MERCOSUR	95836	103563	111512	152804	180261	221345	205342
OTHER	19984	13565	6471	7426	9917	5845	8682

EXPORTS							
Year	92	93	94	95	96	97	98
Total	69128	65967	152800	112512	116319	164037	168941
EEC	20323	18739	34174	28839	32050	58575	45724
APEC	16512	8692	15389	18889	21261	28337	47295
MERCOSUR	17389	23951	36049	36391	20269	44456	33186
OTHER	15171	16638	27268	32323	47731	40466	42736

Source: ODEPA Statistics

2. STRUCTURE OF THE OFFICIAL VETERINARIAN SERVICE

Organization and structure of the Agriculture and Livestock Service (SAG)

Agriculture and Livestock Service (SAG) is a non-centralized organization, which has a legal constitution and a patrimony of its own. It is responsible to the Ministry of Agriculture, and its mission is to support the enhancement of competitiveness, sustainability and equity level within the forest, agriculture and cattle sectors, through improvements to the condition of the state of production resources related to sanitary, environmental, genetic and geographic dimensions, and nutrition quality development.

In order to fulfill its duties, the Service exhibits a nationwide coverage, and it has founded its organization, basically on three structural levels (Appendix 2).

Strategic	Central Ruling level
Tactical	Regional Coordination level
Operative	Sector Executive level

Superior direction, organization and administration of the Service are duties of its National Director, who is at the same time its legal representative. The central level is composed of five Technical Departments: Agriculture Protection, Livestock Protection, Renewable Natural Resources Protection, Seed, and Laboratories and Quarantine Stations. It also has six Counseling Departments: Juridical, Planning and Studies, Internal Controlling, International Affairs, General Secretary and Administration and Finance.

Coordination and execution of the various programs carried out by the Service are geographically and functionally distributed according to the administrative division of the country, among the 13 regions; which develop their activities through 63 Sector Offices.

The Animal Health Authority within the Republic of Chile settles on the Agriculture and Livestock Service, which enforces it through its Livestock Protection Program (Appendix 3), committed to the development of the country's cattle patrimony through protection, care and improvement of animal health, sanitary quality and harmlessness of the subsector's products, by-products and consumable goods, as well as collaborating with the development and consolidation of the cattle industry and technology in order to support the productive exporting efforts made by the subsector and the country.

In order to accomplish this mission, three areas have been defined to develop the program's tasks

1. **Zoosanitary:** with constant monitoring actions, Defense and Laboratory Diagnosis, and sanitary improvement through disease control and eradication programs (brucellosis, hydatidosis, and goat health).

2. **Sanitary Quality:** through control and certification of exportable products and by-products, residue monitoring and control on cattle products, registry and control of biological and pharmaceutical products for veterinarian use.

3. **Cattle Industry and Technology:** collaborating with technological development and consolidation of cattle industry, proposing rules and standards related to the quality of milk and its sub-products, enforcing the Law on Meat Classification and standardization and the rules concerning control of animal feed.

The table below exhibits the Service's personnel endowment:

OFFICIAL VETERINARIAN SERVICE'S PROFESSIONAL AND TECHNICAL PERSONNEL ENDOWMENT

Region	Professional	Technician	Total
I	3	21	24
II	3	6	9
III	3	3	6
IV	3	8	11
V	12	29	41
R.M.	23	21	44
VI	6	7	13
VII	9	21	30
VIII	14	21	35
IX	12	12	24
X	23	27	50
XI	7	9	16
XII	10	10	20
CENTRAL	49	31	80
TOTAL	174	213	387

The Ministry of Health holds Public Health authority in Chile, through its Health Agencies System (27 Agencies cover the whole national territory). Among its functions, it authorizes controls and guarantees that all the products reserved for human consumption are elaborated under a proper sanitary condition, granting permission to abattoirs and processing plants that elaborate cattle products for domestic consumption.

3. MAIN FACTS ABOUT THE PIG SECTOR IN CHILE

The Sixth National Agricultural Census, carded out in 1997, revealed the national pig livestock, totaling 1,716,881 head of livestock. The most relevant regions are the V1 Region and the Metropolitan Region (R.M.), which, summed up, concentrate 54.82% of the nation's livestock.

PIG LIVESTOCK, CHILE, 1997

Regions	Stock	Share (%)
I	5,150	0.30
II	3,134	0.18
III	2,003	0.12
IV	4,383	0.25
V	76,046	4.43
R.M.	421,681	24.56
VI	519,513	30.26
VII	128,638	7.49
VIII	227,580	13.26
IX	190,933	11.12
X	130,959	7.63
XI	4,034	0.23
XII	2,897	0.17
Total	1,716,881	100.00

Source. National Institute for Statistics (INE).

Pig breeders, abattoirs and sausage processing plants have achieved a high technological level, as in the production premises, as well as the slaughtering, industrial processing and marketing stages.

4. INDUSTRIAL PIG PRODUCTION

It is important to point out that, since the late 70's, domestic pig production has undergone a progressive transformation. At the present time, more than 76% of the livestock is concentrated in industrial premises, totaling 289 farms that range, basically, from Region IV to IX. According to estimates derived from a census among pig producers, farms within these regions totaled 1,307,991 head.

PIG LIVESTOCK IN DOMESTIC INDUSTRIAL FARMS, JUNE 1997

Region	Stock		Number of farms
	Heads	%	
Total	1.307.991	100,0	289
IV	966	0,1	6
V	75.302	5,7	44
R.M.	416.863	32,1	67
VI	517.410	39,6	57
VII	103.275	7,8	26
VIII	162.824	12,4	24
IX	29.351	2,2	61

Source. National Institute for Statistics (INE) (Pig farms census).

5. FAMILY PIG PRODUCTION (BACKYARD)

Family pig breeding is an activity spread nationwide in rural sectors, and totals 408.690 head. The maximum share concentrates in the southern part of the country, in regions VIII, IX and X.

PIG LIVESTOCK IN FAMILY FARMS (*), CHILE, 1997

Regions	Stock (thousands of heads)	Share (%)
I	5150	1,3
II	3104	0,8
III	2003	0,5
IV	3397	0,8
V	844	0,2
R.M.	2688	0,7
VI	2103	0,5
VII	25383	6,2
VIII	64756	15,8
IX	161582	39,5
X	130958	32,0
XI	4034	1,0
XII	2687	0,7
Total	408690	100,00

Source: (*)1997 census estimates, National Institute for Statistics (INE).

6. SLAUGHTER PLANTS

Law 19.162, known also as the "Meat Law", aimed mainly to develop a deep change in the meat marketing systems within the country. At the same time the number of slaughterhouses was decreased, because they did not fulfill the needs for infrastructure, equipment and mode of operation. By the time this law came into force, a significant number of abattoirs ceased their operations because their slaughter volume did not justify the investments required to fulfill the required standards.

The Metropolitan Region is the main consumption and slaughtering center in the country, concentrating more than 45% of domestic slaughter, reaching this figure by bringing livestock from cattle producing regions.

Abattoirs (MAT) are by majority concentrated in the X, IX, VIII, VII, R.M. (Metropolitan) and V Regions, which coincide with the places with a higher number of head of cattle and/or the place of the main urban districts within the country.

In relation to Self-Consumption Slaughter Centers (CFA), they represent about a third of the places warranted by the SAG services for animal slaughtering.

SLAUGHTER PLANTS, BROKEN DOWN BY REGIONS, CHILE, 1998

	Regions													
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	R.M.	Total
MAT	4	3	2	7	9	12	10	17	12	16	3	6	11	114
CFA	1	0	1	3	0	5	0	10	2	8	20	0	0	50
Total	5	3	3	10	9	17	10	27	14	24	23	6	11	164

7. ANIMAL TRANSIT CONTROL

Animal transit control is granted and regulated by the "Law of Animal Health" disposition, DFL RRA N° 16 of 19.02.63, which, in its Third Chapter, describes the procedure for regulating animal transit by means of the **"Guide for free animal transit"** paper, which determines that livestock transport throughout the territory of the Republic must be subject to a Free Transit Waybill. Besides the preceding, there is a tax-related disposition that forces shippers to furnish a waybill or invoice on those animals in transit.

Free transit waybills, along with tax seals and fiscal stamps, are issued by the Municipal Treasury, which grants transit along public roads, railroads, air and water ways. By the other way, managers of livestock markets or abattoirs shall not be able to sell at auction or to slaughter an animal without having the corresponding free transit waybill in sight.

The above mentioned persons are obliged to preserve at the establishment they operate, for a three year term, the waybills that prove the origin of the livestock they sold or slaughtered.

Every free transit waybill is countersigned by the Chilean Police, at the police control, which is closest to the place of origin or the way of transit of the animals.

Apparent Pork consumption

With regard to unitary apparent pork consumption, the year 1998 exhibited the highest historical figure of 14.6 kg, which means that the per capita consumption has doubled in the last decade.

APPARENT PER CAPITA PORK CONSUMPTION

Year	Consumption (Kg per capita)	Annual variation (%)
1992	9.7	7.7
1993	10.4	7.2
1994	11.2	7.7
1995	12.1	8.0
1996	12.7	5.0
1997	13.5	6.3
1998	14.6	8.6

Source: National Institute for Statistics (INE).

9. **Foreign trade of pig sector**

Regarding the foreign trade of pork, we can affirm that our imports are of little significance, and they totaled, in 1998, 1215 tons and US$ 1.8 million.

On the other hand exports, primarily towards Argentina (46.1%) and Japan (29.3%), are of the highest importance regarding to volume during 1998 nevertheless the returns, expressed as FOB values, place Japan in the first place with 52.7% (US$ 20.1) followed by Argentina with 30,8% (US$ 11.8). National forecasts of pork shipments have been boosted by the declaration of Chile as a country free from CLASSICAL SWINE FEVER, which shall facilitate a higher presence in other marketplaces.

PORK IMPORTS AND EXPORTS, CHILE, 1992-1998

Year	Exports		Imports	
	Volume (ton)	Value (thsnds US$ FOB)	Volume (ton)	Value (thsnds US$ FOB)
1992	8,055	9,520	110	145
1993	3,360	8,912	280	637
1994	4,113	10,312	111	586
1995	2,159	5,809	1,025	1,367
1996	2,435	8,516	1,173	1,412
1997	12,093	24,592	1,048	1,559
1998	17,506	38,179	1,215	1,827

Source: National Institute for Statistics (INE).

10. ANTECEDENTS OF THE DISEASE

CLASSICAL SWINE FEVER is a viral disease which affects common pigs, and whose development from severe to chronic is the result of interactions between the viral agent and susceptible pathogenic guests in determined areas or environments.

Such interactions are primarily facilitated by the presence of the viral agent in the ecosystems, by introduction of ill or susceptible pigs, and consumption by the pigs of organic waste contaminated with the disease virus. The disease infection rate rises close to 100%, and its death rate is also very high, especially in those ecosystems having highly susceptible guests.

Its incorporation to the "A" list of diseases of the OIE means that it has been defined as pathology capable of producing severe pig health upsets, hence severely affecting commercial exchanges with animals and pig products.

The presence of this severe disease in our country, together with the magnitude of the losses it produced to the pig sector and the limitations its presence imposed to the complete development of an important national pig trade and to pig and pig-products exports, imposed that, in 1980, the Livestock Protection Division of the Agriculture and Livestock Service initiated the preparation of a project to eradicate Hot Cholera from the country, a goal that was achieved after 18 years of constant efforts, as from the Public as well as from the Private sector.

11. HISTORICAL EPIDEMIC FACTS ABOUT CLASSICAL SWINE FEVER IN CHILE.

CLASSICAL SWINE FEVER was diagnosed for the first time in Chile in the middle of 1943, a time when the following lesions were described:

- Hemorrhages on the kidney cortex
- Hemorrhagic infarcts on the spleen
- Hemorrhagic lesions on the spleen
- Large intestine, blind intestine and ileum ulcers
- Button ulcers in blind intestine
- Initiating necrosis focus in rectum.

During subsequent years, and until the introduction of good quality vaccines, the disease originated severe losses in the country. During 1961, at the Fourth National Veterinarian Convention, a project was presented about a "Disease Map of Chile", which referred to CLASSICAL SWINE FEVER after this manner:

- The disease is present throughout the whole country, an exception being made for the provinces of Chiloe and Aysen
- Geographical distribution of CLASSICAL SWINE FEVER lies mainly on the Central Valley and its Coast, but it appears less frequently in the pre-cordillera.
- The highest frequency of appearance is in the central-southern part of Chile.
- Provinces of Linares, Maule, Ruble, Arauco, Cautin, Osorno Llanquihue, are the areas with the highest frequency (Ruble and Cautin show laboratory diagnosis and the other provinces show clinical diagnosis and autopsy).
- Seasonally, CLASSICAL SWINE FEVER appears in all seasons. Provinces of Nuble and Llanquihue have appearances of the disease only in spring and summer.

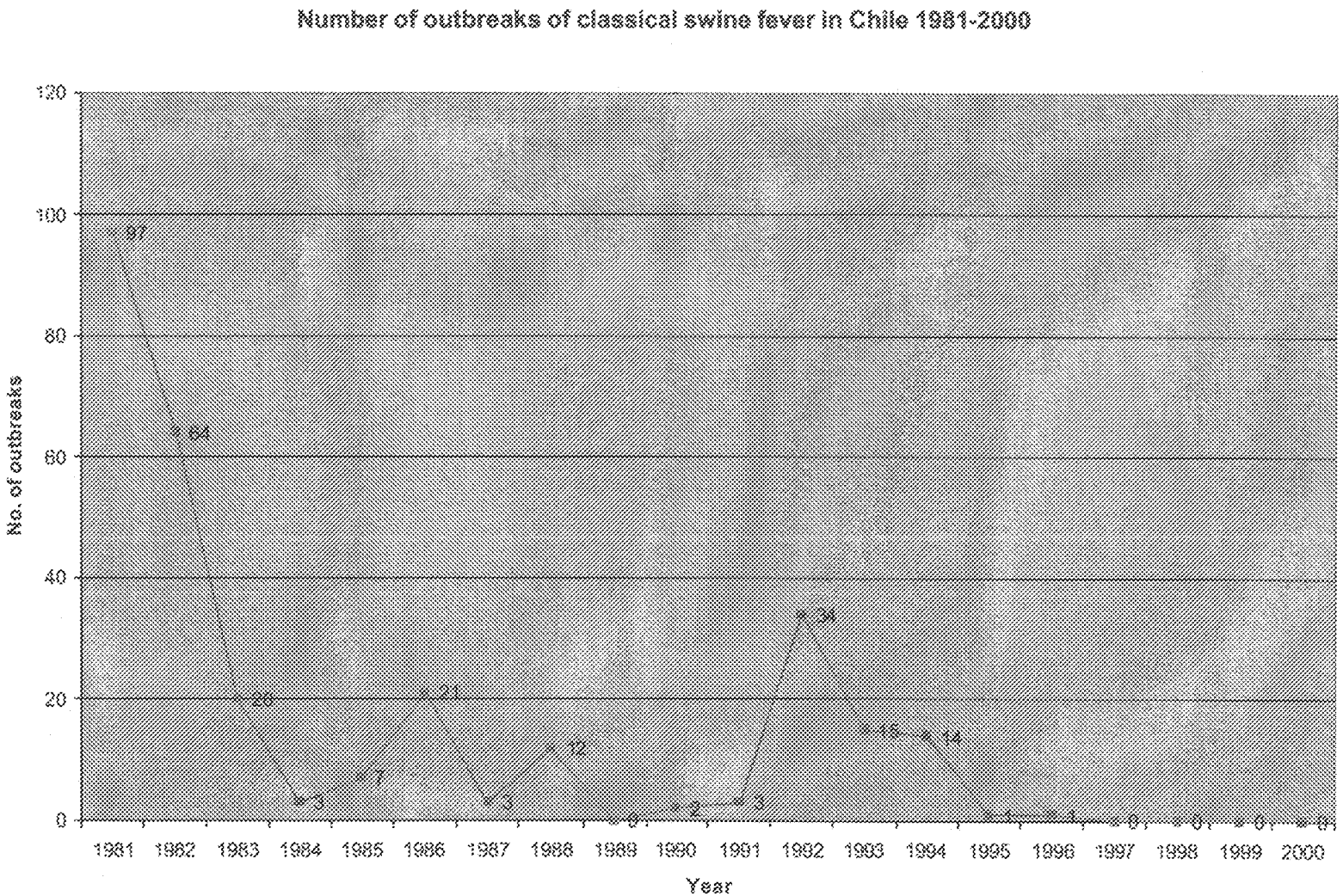
In 1974, due to the formulation of the Decade Plan for Animal Health, which included a Pig Protection Project, a sanitary survey was conducted among the country's pig breeders. Its results showed that 15% of the surveyed producers declared they had had the disease on their premises.

12. **PROJECT SITUATION ANALYSIS AND HISTORY OF CLASSICAL SWINE FEVER OUTBREAKS.** (1981-1992 TERM)

- 282 CLASSICAL SWINE FEVER outbreaks were detected in the country.
- Only regions XI and XII remained free from CLASSICAL SWINE FEVER outbreaks, which led to consider them as ecosystems free from the disease.
- Metropolitan, V and VIII regions were characterized by a high appearance of CLASSICAL SWINE FEVER outbreaks on industrial pig premises.
- CLASSICAL SWINE FEVER affected premises were 8% of industrial type (more than 50 mothers) and 92% were family premises, fattening premises and waste-feeding breeding places.
- CLASSICAL SWINE FEVER does not transmit from small family breeding to large industrial premises. On the contrary, the presence of CLASSICAL SWINE FEVER in large premises is a factor of dissemination of the disease towards the small pig production.
- The strategy adopted by the project determined a real decrease of the CLASSICAL SWINE FEVER incidence in the country, this way enabling the achievement of the commitment to eradication. Already in 1991, the disease was showing a decreasing trend of its incidence.
- The higher incidence in 1992 is a sign of the high monitoring performed on the major industrial infection sources and the dissemination factors.

The actions described before, allowed the achievement of the control over the disease, except for the epidemic outbreak in 1992, when 34 outbreaks occurred, five of which appeared in industrial plants, from where the viral agent disseminated to the rest of the country through infected pigs and contaminated meat. This fact influenced the latter appearance of the disease in 1993 and 1994.

On the other hand, in 1995 there was an outbreak at a family premise located in the middle of the Atacama desert (II Region), more than 1000 km away from industrial production areas. This situation recurred in August 1996, affecting the same premise due to persistence of infected animals on the premise. This situation was resolved by applying the new laws established for the eradication process, which involved slaughter and destruction of all the pigs on the premise.


Number of outbreaks of classical swine fever in Chile 1981-2000
No. of outbreaks
120
100
80
60
40
20
0
97
64
20
3
7
21
3
12
0
2
3
34
13
14
0
0
0
0
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
Year

13. GOALS OF THE CLASSICAL SWINE FEVER ERADICATION PROJECT

- To eradicate CLASSICAL SWINE FEVER from the country
- To set up a monitoring system to control exotic diseases in pigs
- To enhance foreign trade forecasts

Goal:

- To eradicate the disease within 10 years time

Strategy:

- Within the free zones, that comprised regions X (continental Chiloe), XI and XII, it was forbidden to vaccinate against CLASSICAL SWINE FEVER as well as to bring living pigs and crude products from the rest of the country. In the case of an outbreak, the infected animals and their contacts would be killed or slaughtered.

As for the Control Zone, comprising the rest of the country, the basic actions were:

- Control of CLASSICAL SWINE FEVER outbreaks detected, by means of setting primary quarantine on premises before diagnosis, and an official quarantine upon confirmation of CLASSICAL SWINE FEVER, prohibiting free commercialization of the pigs to marketplaces, abattoirs or other premises.
- Upon every CLASSICAL SWINE FEVER outbreak an epidemiological investigation would have been done, aiming to know the possible source or sources of the disease.
- Reception of reports on suspicion of disease in premises, marketplaces and abattoirs.
- Samples collection at abattoirs, especially those of highest regional volume.
- Effectuation of a national pig census, that would allow to characterize different pig ecosystems.

14. LINES OF ACTION OF THE PROJECT FOR CLASSICAL SWINE FEVER ERADICATION IN CHILE. OBJECTIVES:

Sanitary control: to control every situation that poses a risk of dissemination of the infection agent, taking all the measures necessary to prevent it.

Legislation: to have adequate legislation according to the needs of the project, allowing its easy interpretation and enforcement.

Training: to achieve that the Veterinary participating in the project receives the necessary training to carry out the tasks assigned to them.

Administration: to set up and maintain different procedures that allow programmed activities to be carried out fluently, making necessary resources available in time.

Biostatistics and evaluation: to set up and maintain an information system that permit permanent knowledge of the evolution of the disease and the functioning of the project with respect to the activities performed and the degree of fulfillment of goals and objectives.

Studies and Monitoring: to know the evolution of factors that condition the occurrence of the disease and to evaluate the risk of dissemination and introduction of the agent.

Sanitary education: to enhance the degree of knowledge of the disease among the community in order to improve their denunciation and support to the project's actions.

15. LINKS BETWEEN PUBLIC AND PRIVATE SECTORS

The need to keep the Private Sector informed, in order to ease the Project's activities and the execution of some joint activities, determined that, since 1978 and before the threat of African CLASSICAL SWINE FEVER coming to the country, the Livestock Protection Division of SAG accomplish meetings and send periodic information to Veterinary and pig breeders in the country.

That is how it can be pointed out the accomplishment of a great number of meetings with the Associations of veterinary specialized in pigs, Association of Pig Breeders and other veterinary.

Besides, participation of SAG in informative meetings with veterinary at National Conventions, as well as meetings organized by the Universities of the country and the College of veterinary of Chile (A.G.), permitted the project to be a common national objective.

The main issues treated were:

- Appearance of the disease in the country and control activities performed.
- Quality control of anti-CLASSICAL SWINE FEVER vaccines
- Animal slaughtering procedures and indemnification to producers in cases of appearance of CLASSICAL SWINE FEVER after declaration of Chile as a country free from the disease.

In 1995, modifications were made to the Plan for Control and Eradication of CLASSICAL SWINE FEVER, establishing a new strategy aiming to eradicate CLASSICAL SWINE FEVER from the National territory, whose main lines of action were:

- Epidemic Monitoring
- Sanitary Control
- Laboratory
- Sanitary Disclosure
- Legislation
- Training

16. FINAL STAGE

Epidemic situation of CLASSICAL SWINE FEVER in the country set the following landmarks during October 1997:

- Absence of the disease for more than a 14 month term in the whole national territory.

- Absence of CLASSICAL SWINE FEVER outbreaks in industrial premises for the last 3 years.

- Absence of detection of the virus within the national pig population, validated through studies on industrial premises and in small pig farmers operations.

The above was showing that the results of the Project for Control and Eradication of CLASSICAL SWINE FEVER, which had been carded out jointly by working with the private sector, were exhibiting an exceptional epidemic condition, which, at the same time, was allowing the necessary steps to be taken in order to establish the eradication of the disease. This situation was agreed to by the national productive sector.

Faced with a favorable scenario in order to achieve CLASSICAL SWINE FEVER eradication, it was decided to prohibit vaccination throughout the whole national territory from October 06, 1997, preserving a bank with 800,000 vaccine doses which would eventually be used if an outbreak would occur, and whose cost would be assumed by the producer sector.

On the other hand, an insurance was bought, which would allow to pay off the losses generated by the death or killing of animals, in the case of a CLASSICAL SWINE FEVER outbreak. Just as with the vaccine bank, the cost of this insurance is assumed completely by the Association of Pig Producers (ASPROCER).

Among the actions foreseen for this final stage is epidemic monitoring by means of systematic monitoring over industrial premises and small farmers, sanitary controls at livestock concentration places such as livestock marketplaces, cattle shows, pig gathering places, etc.

17. LABORATORY DIAGNOSIS

Diagnostic methods used during the development of the Program for Control and Eradication can be sketched as follows:

Beginning from the development of the direct immunofluorescence technique (IFD) to detect antigens, being customary since 1981.

During 1985, CLASSICAL SWINE FEVER diagnosis was complemented with virus culture of pig kidney cells (PK15) as a way to improve specificity of customary diagnosis through IFD to detect the viral antigen. During the same year a technique for serum neutralization was implemented, which eased the evaluation of the immune state but not diagnosis on vaccinated animals.

In 1994, ELISA technique was implemented. This improved laboratory work efficiency by processing a higher number of samples. During the after-eradication stage ELISA has become the customary diagnostic method for CLASSICAL SWINE FEVER because of its high sensitivity and specificity.

18. CLASSICAL SWINE FEVER MONITORING

During 1978 and 1979 SAG detected, at domestic abattoirs, 37 and 92 positive diagnoses respectively, which were distributed within the central-southern territory as follows:

Regions	I	R.M.	VI	VII	VIII	IX	X	Total
Number of positive diagnostics	1	41	2	4	6	66	9	129

During 1980 a prevalence study of CLASSICAL SWINE FEVER in Chile was performed, whose results were that 97% of the samples analyzed were positive to the diagnosis performed with the Direct Immunofluorescence test. The table below exhibits the number of samples analyzed and the positive results, as well as the rate of positiveness broken down into regions:

Regions	Number of samples analyzed	Number of positive samples	% Of positive samples
IV	22	1	4,5
V	177	16	9,0
R.M.	1092	139	12,7
VI	52	2	3,8
VII	44	2	4,5
VIII	284	11	3,9
IX	147	12	8,2
X	133	7	5,3
Total	1951	190	8,7

During 1994-1995 term a systematic sampling was performed at abattoirs, among female waste material at all industrial premises, aiming to detect premises with viral infection.

SAMPLING OF ORGANS OF FEMALE PIG WASTE MATERIAL (IFD METHOD) AT ABATTOIRS, BROKEN DOWN BY REGIONS AND BY YEARS.

Region	1994	1995	1996	Total
V	18	688	354	1060
R.M.	1294	5804	1221	8319
VI	1356	2522	1109	4987
VII	2054	1618	1360	5032
VIII	281	573	1065	1919
IX	188	206	239	633
	5191	11411	5368	21970

Source: Livestock Laboratory SAG

During that time a total 21,970 samples were processed in the laboratory. Only six premises were detected as infected by the virus without having symptoms of the disease. Four of them were premises that had had outbreaks in 1993, one had had outbreaks in 1986 and the last one had not had the disease before.

Note: 16602 samples were processed (94-95), 70 of which were positive, being the last positive diagnosis on the 11th of April, 1995. The following table indicates the premises and number of positive samples for each premises.

Plantel	1994	1995	1996
[redacted]	58	0	0
	0	3	0
	8	0	0
	1	0	0
	1	0	0
	1	0	0
Total	67	3	0

Aiming to define the situation of the premises that had had historic positive diagnosis, and considering that afterwards they had had sampling with negative results, a Vigilance Process was performed on all of them.

19. **VIGILANCE PROCESS**

As an overview, the process consisted of using groups of non-vaccinated pigs, identified and distributed evenly among the different yards within the production barn. These pigs were kept in that condition upon their shipment to the slaughterhouse, so they shared the same place with other vaccinated pigs throughout the different stages of usual operation in the industry (motherhood, breeding and fattening) for at least three months.

These groups were serum-tested on the 60th day (breeding stage), 100_1 loth day (breeding stage) and a third test 15 days before they were sent to the slaughterhouse (160 or more days, fattening stage). Along with this, samples from organs from these pigs were collected at the slaughterhouse to perform laboratory tests. Results of this vigilance process proved the absence of viral activity on these premises. (Appendix 4)

VIGILANCE PROCESS ON PREMISES, BROKEN DOWN INTO REGIONS, 1996

Region	Premises	Groups	Pigs in each group	Total of pigs
R.M.	[redacted]	43	1010	4030
VI	[redacted]	5	10	50
VII	[redacted]	633	101010	603030
		24	10	240

Source: Project for Control and Eradication of CLASSICAL SWINE FEVER

Additionally, a serological research was performed on a representative sample from small farmers pigs in regions I to IV, XI and XII, which did not show the presence of antibodies, which indicates that these non-vaccinated pigs have no viral activity nor have had contact with CLASSICAL SWINE FEVER virus.

SEROLOGICAL RESEARCH (ELISA) ON SMALL PIG FARM OPERATIONS, CHILE, 1996

Region	Number of samples	Results
I	179	Negative
II	173	Negative
III	151	Negative
IV	39	Negative
X1	388	Negative
X11	125	Negative
TOTAL	1055	

Source: Livestock Laboratory SAG

RECORDS OF CLASSICAL SWINE FEVER SUSPECTS ATTENTION, 1997-98 TERM, CHILE

Region	Type of operation	Type of sample	Presumed diagnostic	Final diagnostic
I	Family	Organ tissue	CLASSICAL SWINE FEVER	Negative
III	Family	Blood	CLASSICAL SWINE FEVER	Negative
VI	Industrial	Piglet	CLASSICAL SWINE FEVER	Negative
VIII	Family	Organ tissue	CLASSICAL SWINE FEVER	Negative
R.M.	Industrial abattoir	Organ tissue	CLASSICAL SWINE FEVER	Negative
R.M.	Industrial abattoir	Organ tissue	CLASSICAL SWINE FEVER	Negative

Source: Denunciation Attention Records, SAG

When the decree on prohibition to vaccinate against CLASSICAL SWINE FEVER came into force, it was decided in 1998 to establish a survey system to ensure this prohibition was complied with at every pig operation. Estimations were that only breeding females could exhibit some degree of serological reactions because of their immune memory generated in past vaccinations. In fattening pigs, however, no positive sera should be detected. The tables below show the results of the survey:

SEROLOGICAL SURVEY (ELISA) ON FATTENING PIGS, 1998

Category	Region	Total of samples	Results	
			Positive	Negative
Fattening	II	10	0	10
Fattening	V	309	0	309
Fattening	R.M.	855	0	855
Fattening	VI	769	0	769
Fattening	VII	320	0	320
Fattening	VIII	370	0	370
Fattening	IX	108	0	108
Fattening	X	6	0	6
	Total	2747	0	2747

SEROLOGICAL SURVEY (ELISA) ON BREEDING FEMALES, 1998

Category	Region	Total of samples	Results	
			Positive	Negative
Breeding females	V	263	51	212
Breeding females	R.M.	305	2	303
Breeding females	VI	674	8	666
Breeding females	VII	194	88	106
Breeding females	VIII	247	37	210
Breeding females	IX	40	25	15
Breeding females	XII	37	1	36
Total		1760	212	1548

20. CONTROL OF VACCINES AGAINST CLASSICAL SWINE FEVER

Since the beginning of the Plan for Control and Eradication, rigorous efforts were made in order to describe and specify the immunologic product needed to support the achievement of the proposed targets.

The Plan considered the usage of vaccines by the private sector, authorizing to that effect only the Chinese lineage of CLASSICAL SWINE FEVER, in order to control the disease at clinical and sub-clinical levels in regions where it was endemic, strengthening the mass's immunity of the national pig population and reducing to some extent the incidence of carriers.

At no time vaccines were obligatory, because their handling, application and marketing were at all times under the private sectors control. However, official authorization to distribute and use CLASSICAL SWINE FEVER vaccine was always conditioned upon fulfillment of the standards that regulated biological product registration. Moreover, biological quality of each series or lot of the product had to be certified by research and quality controls, according to specific requirements stated by the respective legal standards.

The plan had to have at every time with a proven immunological quality product; safe to be inoculated to pigs and that would not interfere the field diagnosis. Since 1984 a new control system was implemented, with officially defined techniques which established specific requisites about immunofluorescence (negative to IFD) and Efficacy. The latter should have to be tested on vaccinated pigs against the pathogenic virus, with quantitative criterion ($100\ DP_{50\%}$ by dose).

REQUISITES FOR VACCINES AGAINST CLASSICAL SWINE FEVER (11980-1997 TERM)

Requisites CLASSICAL SWINE FEVER vaccine	Decree Nº 1482 24.06.80	Disposition Nº 1543 of 23.11.83	Disposition Nº 1479 16.10.84
Control for registration (Seed Lineage Control) Harmlessness test by dose and immunosupression	+	+	+
Harmlessness test on breeding females	-	-	-
Attenuation irreversibility test	-	-	-
Reduced diffusibility test	-	-	
Series control	+	+	+
Sterility test	+	+	+
Humidity test	+	+	+
Harmlessness test	-	+	+
IFD test (vaccine and pigs)	-	+	+
Identity test Chinese lineage	-	+	+
Efficacy test	+ (full dose)	+ (diluted dose) $100_{DP\ 50\%}$	+ (diluted dose) $100_{DP\ 50\%}$

In 1987, due to the repeated isolation of the challenging virus in tonsils from vaccinated pigs used for official control of each vaccine series, it was deemed the right time to perform an analytical evaluation of the situation, in order to explore the feasibility of applying a new estimation criterion about CLASSICAL SWINE FEVER vaccine's efficiency so as to avoid the presence of carrier animals in the field.

Within such research work, two quantitative criteria were compared to calculate the protective dose of the vaccines: clinical and virological criteria, both on vaccinated animals, clinically healthy, and after they were exposed to pathogenic cultures of the virus.

The results of this research showed that clinical criterion for evaluation only had 20% sensitivity, being for that insufficient to evaluate an efficacy test. On the other hand, virological criterion had 100% sensitivity and 80% specificity, concluding that evaluations should be thereafter made on virological criterion so as to avoid the presence of carrier animals.

In 1991, before the private sector's concern about the performance that national CLASSICAL SWINE FEVER vaccines would have regarding the viruses isolated in the country, an experiment was designed in order to evaluate clinically, pathologically and immunologically the real protection given by the biological agent used.

In 1992, an agreement was made about the effectuation of a research on immunological behavior of national vaccines against CLASSICAL SWINE FEVER before the virus. The results showed that national vaccines studied granted an adequate immunity against the virus lineage named "El Peñon".

During the last years of the Plan (1994), and despite there being the availability of a harmless non-fluorescent biological agent, the disease was still appearing on some industrial premises within the country. This situation determined the need to exhaust every expedient of research on the properties of national vaccines against CLASSICAL SWINE FEVER, which led finally to a research on duration of the immunity they conferred.

The research done confirmed the data described by literature about the heterogeneous serological response of pigs inoculated with anti-CLASSICAL SWINE FEVER vaccine, and the lack of correlation between the titers of neutralizing antibodies and the protection against the disease. It also cleared the point about the fulfillment by the biological agents of the minimum serological requisites established by International Reference Organizations, that is 80% serum positiveness six months after vaccination; but, from an anat. - pathological and virological point of view, immunity conferred was not enough to avoid CLASSICAL SWINE FEVER lesions and presence of carriers.

There is no doubt that, in eradicating CLASSICAL SWINE FEVER from the country, vaccine use has been a fundamental supporting implement; however, the success obtained has also been a prize and an acknowledgment to the efforts made by a group of professionals and technicians in the public and private sectors, who nourished from knowledge and encouraged to find scientific explanations to biological processes around us, did not hesitate to complete their task with experiences and researches that endowed the project with the best biological agent available.

VACCINES CLASSICAL SWINE FEVER (SERIES AND DOSES CONTROLLED) 1981-1997 TERM.

Year	Source	Series controlled	Series approved	Doses controlled	Doses approved	Doses rejected	Reason
1981	National	10	10	1049190	1049190		
1982	National	7	7	672250	672250		
1983	National	11	10	904810	811310	93500	IFD+
1983	Imported	2	2	1050	1050		
1984	National	12	9	1080950	834450	246500	Efficacy
1985	National	8	7	1365500	1146300	219500	Efficacy
1986	National	8	7	1291140	1147140	144000	Efficacy
1987	National	8	8	2060100	2060100		
1988	National	7	7	1770530	1770530		
1989	National	10	9	2169200	1866900	302300	IFD+
1989	Imported	1	1	740	740		
1990	National	6	6	2066370	2066370		

1991	National	9	8	2437730	2066370	400000	Efficacy
1992	National	8	8	2765450	2765450		
1993	National	9	9	2765870	2765870		
1994	National	8	8	2677380	2677380		
1995	National	10	10	3517820	3517820		
1996	National	6	6	2006720	2006720		
1997	National	6	6	2060300	2060300		
Total		146	138	32663030	31286220	1405808	

21. **LEGAL ANTECEDENTS**

The actions developed within the struggle against the disease are supported by the following legal dispositions:

- Decree N° 318, of 1925, Ministry of Agriculture, declaring CLASSICAL SWINE FEVER as an obligatory control disease.
- Law Power Decree (DFL) RRA N° 16, of 1963, Ministry of Agriculture, establishing measures to avoid the presence of pigs on public roads, dumps, riversides and other unsuitable places.
- Decree N° 32, of February 19, 1996, Ministry of Agriculture, establishing the "Regulation for Eradication of CLASSICAL SWINE FEVER", which systematized a great number of measures already in force, and gives further attributions to the Agriculture and Livestock Service in order to achieve eradication of the disease, given the results obtained until that date by means of the Program in progress.
- Disposition N° 2928, of October 6, 1997, Agriculture and Livestock Service, prohibiting inoculation of vaccines against CLASSICAL SWINE FEVER throughout the national territory.
- Decree N° 987, of 1998, Ministry of Agriculture, declaring Chile as a country Free from CLASSICAL SWINE FEVER.

22. **DECLARATION OF CHILE AS A COUNTRY FREE FROM CLASSICAL SWINE FEVER**

According to regulations established by article 2.1.13.2. of Zoosanitary Code of the International Zoological Epidemics Office (OIE), which indicates ***"One country can be considered free from CLASSICAL SWINE FEVER when there is evidence of absence of the disease for at least a two year term. This term shortens to one year since the appearance of the last case in countries that practice sanitary killing together with vaccination against CLASSICAL SWINE FEVER, and six months in countries that practice only sanitary killing."***

Given that requisites established by OIE were at fulfillment, on April 6, 1998, Disposition Na987 was signed by the Ministry of Agriculture, declaring the country ***FREE FROM CLASSICAL SWINE FEVER***, being this disposition published on the Official Paper of the Republic of Chile, N° 36039, on April 14, 1998. Besides, this disease was incorporated to the system for prevention of exotic diseases.

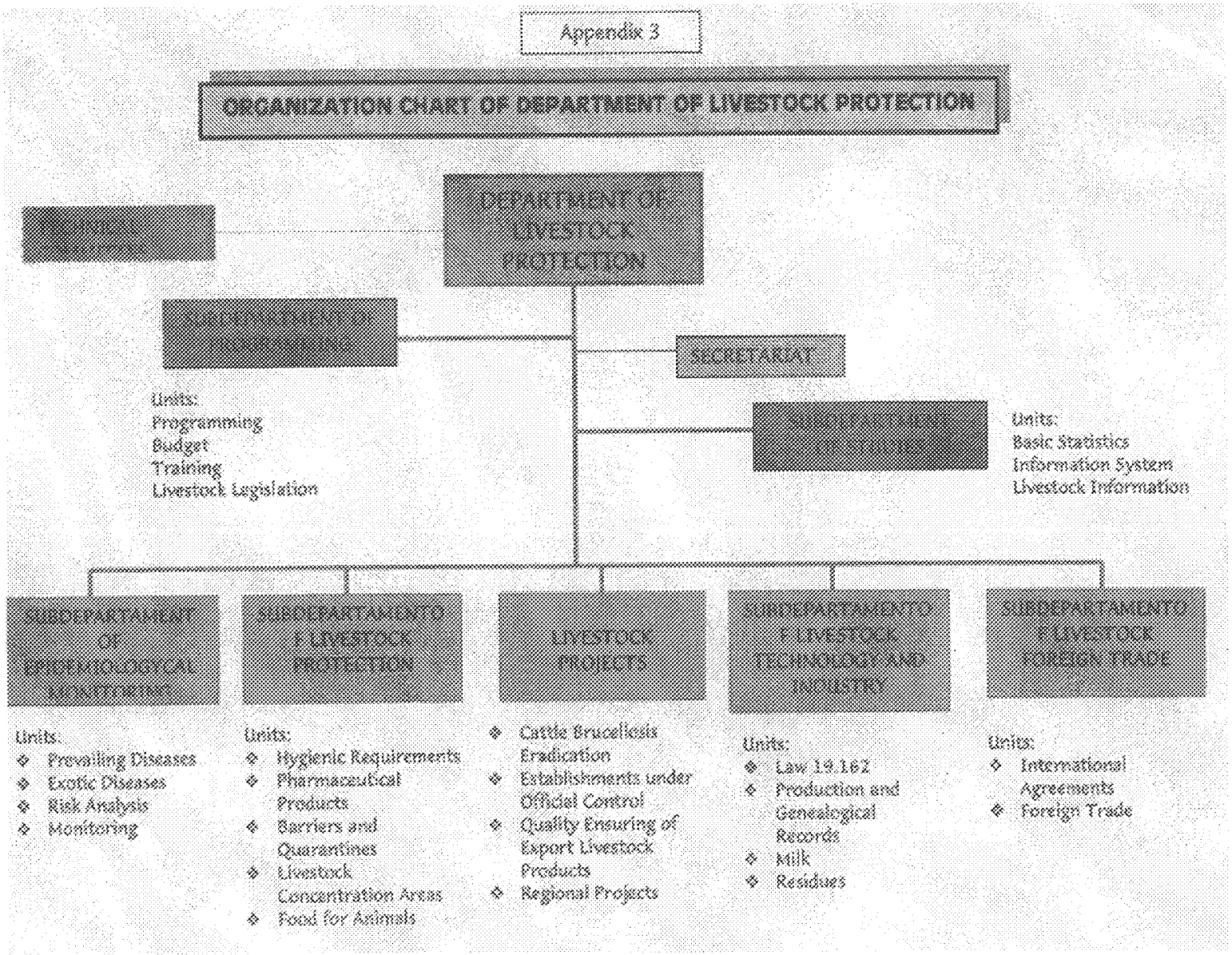
Appendix 1


PERU
BOLIVIA
Arica
Iquique
Atacama Desert
South Pacific Ocean
Antofagasta
PARAGUAY
Isla San Ambrosio
Chañaral
Isla San Félix
Coquimbo
Valparaíso
SANTIAGO
San Antonio
Rancagua
Archipiélago Juan Fernández
ARGENTINA
Concepción
Talcahuano
Lebu
Temuco
Puerto Montt
South Atlantic Ocean
Easter Island and Isla Sala y Gomez are not shown.
Punta Arenas
Strait of Magellan
0 200 400 km
0 200 400 mi

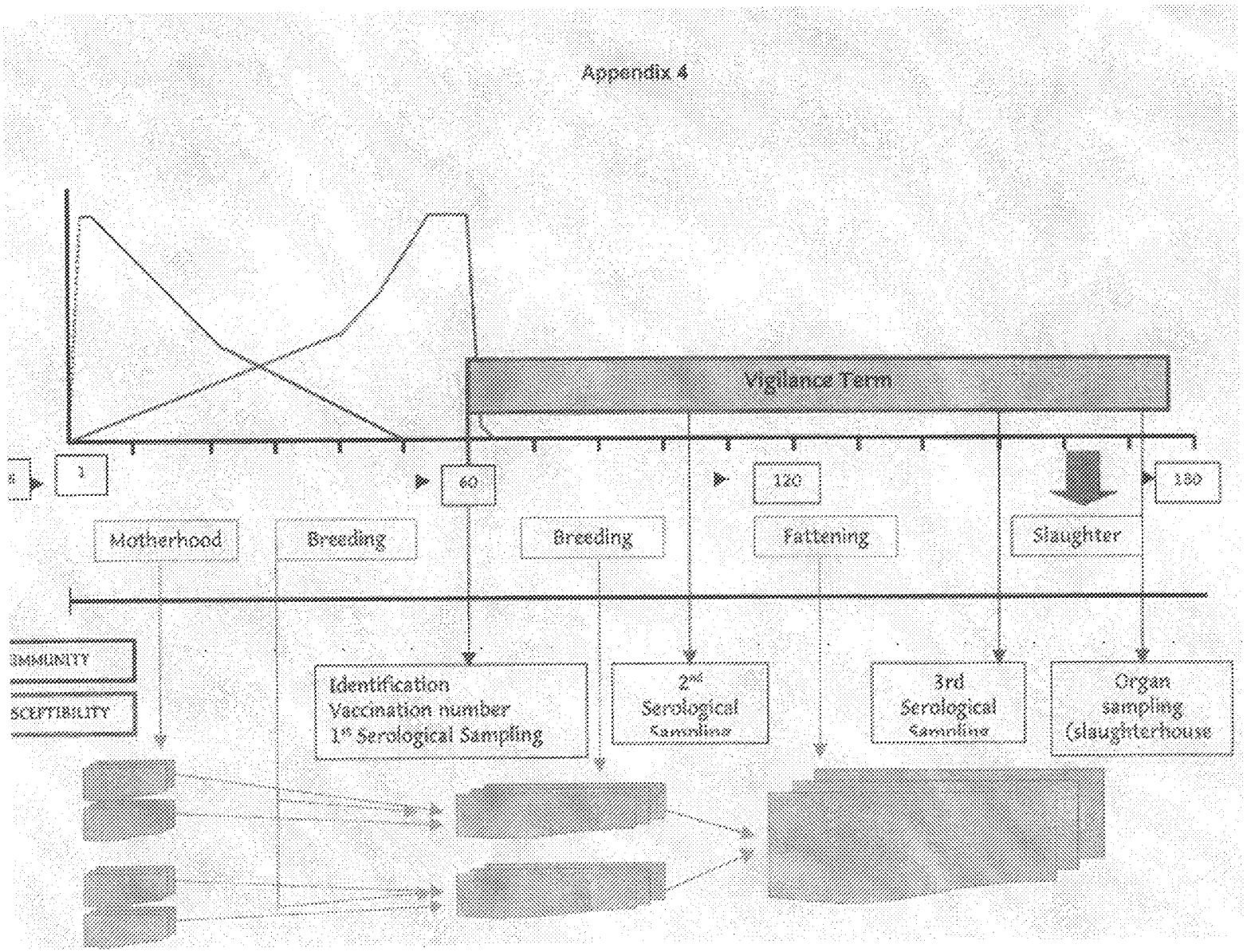
Appendix 2

Organizational chart of the Agriculture and Livestock Sector

Appendix 3


ORGANIZATION CHART OF DEPARTMENT OF LIVESTOCK PROTECTION
DEPARTMENT OF LIVESTOCK PROTECTION
SECRETARIAT
Units:
Programming
Budget
Training
Livestock Legislation
Units:
Basic Statistics
Information System
Livestock Information
SUBDEPARTAMENTO DE EPIDEMIOLOGICAL SURVEILLANCE
SUBDEPARTAMENTO F LIVESTOCK PROTECTION
LIVESTOCK PROJECTS
SUBDEPARTAMENTO F LIVESTOCK TECHNOLOGY AND INDUSTRY
SUBDEPARTAMENTO F LIVESTOCK FOREIGN TRADE
Units:
Prevailing Diseases
Exotic Diseases
Risk Analysis
Monitoring
Units:
Hygienic Requirements
Pharmaceutical Products
Barriers and Quarantines
Livestock Concentration Areas
Food for Animals
Cattle Brucellosis Eradication
Establishments under Official Control
Quality Ensuring of Export Livestock Products
Regional Projects
Units:
Law 19.162
Production and Genealogical Records
Milk
Residues
Units:
International Agreements
Foreign Trade

Appendix 4


Vigilance Term
1
60
120
180
Motherhood
Breeding
Breeding
Fattening
Slaughter
Identification
Vaccination number
1st Serological Sampling
2nd
Serological
3rd
Serological
Organ
sampling
(slaughterhouse