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Stories of narrations, actions and facts related to the control and eradication of foot-and-mouth disease in the state of Mato Grosso do Sul.

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***Keywords*— Stories of Narrations, Actions, Facts, control, eradication of foot-and-mouth disease.**

***Abstract*—** *In the year that the state of Mato Grosso do Sul celebrates its 44th anniversary, the State Agency for Animal and Plant Sanitary Defense - IAGRO celebrates its 42 years of work and dedication in favor of agriculture and livestock in the state. IAGRO in this period underwent the formation of its technical and structural staff so that the operationality of the work would happen in an integral way in the state as it is today. Throughout this period, we are aware of the history of narratives, actions and facts related to the good work performed by active, inactive, concursus's and hired public service person, who contributed to IAGRO today being for Brazil, a reference in animal and plant health defense work, a work with international recognition. These stories, actions and facts culminate in the main objective today of IAGRO, which is the main demand of this agency and the productive sector of the entire Mato Grosso do Sul, that is, the withdrawal of the vaccine against foot-and-mouth disease throughout the state's cattle herd. Thus, this work aimed to narrate the history, actions and facts related to the control and eradication of foot-and-mouth disease in Mato Grosso do Sul over these 42 years of this young agency. The result of this work allowed the employees, especially the younger ones, to make a trip to the history of the institution, to be moved by stories lived by colleagues of service, to have a knowledge of*

actions and remarkable facts, which made the history of this agency, leaving the challenge of continuing to write, experience and mark as a new protagonist of the work of animal and plant sanitary defense of the state of Mato Grosso do Sul.

I. INTRODUCTION

Since the creation of Mato Grosso do Sul in 1977, its economy has always been focused largely on agriculture. In 1979, IAGRO, the State Agency for Animal and Plant Sanitary Defense, was created, which has always contributed to the sector, guiding, supervising, thus ensuring the improvement of animal and plant health in the State.

Over the years, one of the strengths of the institution has become the fight against foot-and-mouth disease. Since the 1980s, there has been a reduction in outbreaks of foot-and-mouth disease and policies have been implemented aimed at reducing outbreaks and mandatory vaccination. At the beginning of that same decade, there was a large number of outbreaks. Mato Grosso do Sul recorded 100 cases annually, until vaccination became mandatory in the state.

The last outbreaks were recorded in 2006, in the municipalities of Japorã, Eldorado and Mundo Novo and ended with the formation of Zav (Zone of High Surveillance), which acted as a buffer zone, with 15 km of extension of the international line, where the bovídeos and other ruminants were identified individually, the georeferenced properties, the two annual vaccinations for foot-and-mouth disease were carried out by the state official service, the properties were often inspected by veterinary medical inspectors and each local office had two veterinary medical inspectors.

This condition was only amended in 2019, after a recommendation from the OIE for ZAV to become a single vaccination-free area in Mato Grosso do Sul, and its approval was ratified at the Panaftosa General Assembly 88, in May 2020, Resolution Nº 7.

To achieve this status, intense work was carried out, with surveillance on properties, traffic control, animal serology, health education, public service person training.

In 2021, the State of Mato Grosso do Sul aims one more step: foot-and-mouth disease-free area without vaccination from 2022.For this, efforts are focused on improving the capacity of animal health defense as a whole. Personal, structural, health education and communication, financial resources.

This article aims to tell a little of the history of Mato Grosso do Sul and IAGRO allied to the fight of Foot-and-Mouth Disease throughout its existence.

a) The history of the division of Mato Grosso do Sul

Due to the great debate that had been taking place for decades among the population of Mato Grosso, political, economic, cultural issues, among others, where it was already clear and notorious the discontent and anxiety of the matogrossense people, so that the federal government would carry out the division of the state, with the objective of mainly enabling the governance of the then great state[1].

All this movement culminated in the creation of the state of Mato Grosso do Sul, through the publication of Complementary Law Nº 31, of October 11, 1977, and the implementation of the state in 1979. At the time, the state after being implemented consisted of 55 municipalities, with 453.000 inhabitants in the urban area and 547.000 in the rural area, with an area of 350,549 square kilometers having as first governor Dr. Harry Amorim Costa [1][2].

And over 44 years of history, another 24 municipalities were created, totaling 79 in 2021, with an estimated population of 2,8 million people [3].And the main base of the economy is agribusiness, but it also stands out worldwide for its natural beauties [4]. In the division of states, Mato Grosso do Sul had all the existing research structure at the time [5].

The then created state of Mato Grosso do Sul, is located in the central west region of Brazil, bordering the following countries Paraguay and Bolivia (1103 km) and with the following Brazilian states: Mato Grosso, Goiás, Minas Gerais, Paraná and São Paulo [2].

An Adjustment Term was signed on February 8, 1979, where it aimed to establish an administrative coexistence, seeking to expedite economic development activities through assistance between the parties for the transfer of existing assets and documentary collection that was already belonging to the territory of Mato Grosso do Sul [6].

After 44 years of implementation in the state of Mato Grosso do Sul, the then young Brazilian state, became one of the largest grain producing states in the country, being the 5th largest cattle herd, having national prominence in the breeding of pigs, poultry, fish, in the production of honey, cellulose, ethanol, among other agribusiness activities [2] [2][3].

b) Creation of the State Agency for Animal and Plant Health Defense -IAGRO

On January 1, 1979, the governor of Mato Grosso do Sul, Dr. Harry Amorim Costa, according to Decree Law Nº. 9 of January 1, 1979 created IAGRO under the name of Department of Agricultural Inspection and Defense of Mato Grosso do Sul –IAGRO [4].

In 2000, IAGRO, by Law Nº 2,152, received the current name: State Agency for Animal and Plant Sanitary Defense. In this fact, there was a curious moment, where IAGRO'spublic service person participated in the choice of the agency's new slogan. Since December 2014 it is linked to the Secretariat of State and Production of Agrarian Development, Industry and Tourism - SEMAGRO[7].

Its attributions are the execution of agricultural inspection and defense policies, mainly in the actions of national animal health programs, animal disease diagnosis, inspection of animal products, plant health diagnoses, soil and seed analysis, sanitary education, trade in agricultural insums, traffic controls and information systems[8].

Formed by a total effective public service person board of 455 people, and 78 non-effective active public service person (assigned from other agencies or commissioned). Hierarchically divided into Board of Directors, Direct superior advisory that has four coordinators in its formation, five senior management sits under their tutelage 16 divisions with various planning and execution obligations within the agency[8].

The operational structure is divided into 11 Regional Units (Fig. 1), being distributed throughout the territory of MS and strategic points. They are: Amambai, Aquidauana, Campo Grande, Costa Rica, Coxim, Dourados, Jardim, Naviraí, Nova Andradina, Ponta Porã and Três Lagoas. And they are composed of 78 Local Units (with the exception of the municipality of Ladário that is linked to the corumbá office). who have a technical team composed of veterinarians, agronomists, chemists, chemical engineers, agricultural technicians, field and administrative assistants, trained and trained to give full support in the activities to be performed daily[8].

Fig. 1: Geographical distribution of IAGRO's regional offices

Source: IAGRO, 2021

Health Education began before the division with the advent of CACOFA in the eastern region of the state, where veterinarians participated in an exhibition where they presented photos and drawing of animals with symptoms of foot-and-mouth guiding the population on the disease and the importance of herd vaccination to decrease the progress of the disease in the state[9].

In the division of the state, nine regions were created, most of the municipalities had a veterinarian, who after training in TrêsLagoas, implemented registration, orientation lectures and vaccination of herds. There was an amateur radio system (in Campo Grande) in which the information was passed on to the regional ones and the educational material was produced in the existing printing plant at IAGRO[9].

IAGRO also carries out surveillance, defense and health surveillance activities through fixed inspection posts in the border areas of Bolivia and Paraguay, as well as with all states of the federation that border Mato Grosso do Sul[8].

The creation of these fixed posts in the border region emerged as a measure to contain the entry of citrus cancer into the country [9].There are currently six fixed posts in operation, one in Guia Lopes da Laguna (Laguna), two in Ponta Porã (CopoSujo and Pacuri), one in Bataguassu (Porto XV) and one in TrêsLagoas (Jupiá), as illustrated in the fig.2[8]

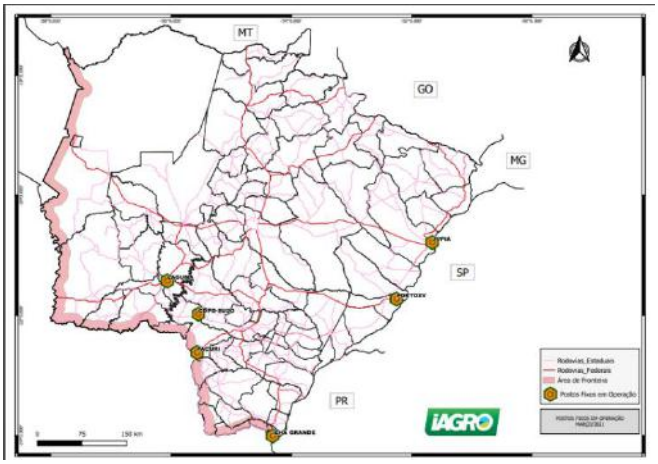

Fig. 2: Active fixed posts in the state of Mato Grosso do Sul

Source: IAGRO 2021

c) Chronology of foci of foot-and-mouth disease in the states of Mato Grosso and Mato Grosso do Sul

In the mid-1950s, there was practically foot-and-mouth disease in all south American countries, with this was created the Organization of American States (OAS), in the city of Rio de Janeiro, in 1951 [10]. According to Federal Decree No. 52.344 of August 9, 1963, the institutionalization of the campaign to combat foot-and-mouth disease began:

> *art.1º It is instituted in the Ministry of Agriculture, linked to the Secretary General of Agriculture, the "Campaign Against Foot-and-Mouth Disease" (C.C.F.A.), with the task of mobilizing all government resources and tracing the norms of the policy of research and combating foot-and-mouth disease, as well as adopting technical and administrative measures necessary for the implementation and development of the anti-aftosa campaign, throughout the national territory (Federal Decree 52.344/1963).*

This led to the implementation of laboratory infrastructure, personnel training and awareness of producers, initiating the control and diagnosis of the disease[11]. In 1968, he began to think about financing by a quota system of PAHO (Pan American Health Organization) member countries [12].

In the 1970s, the information system was implemented, which, due to surveillance and more accurate identification capacity, revealed the largest number of outbreaks, along with the implementation of vaccine quality control, the identification of problem areas through the study of animal transit and its comparison with the occurrence of the disease[11]. (Lyra and Silva, 2004).

In the early 1980s, the entire Midwest region of Brazil had a high rate of outbreaks of foot-and-mouth disease. The State of Mato Grosso do Sul recorded more than 100 outbreaks annually, reaching a total of 552 investigations by the 1990s[12].

In the 1990s, there was the publication of State Law 1.045, of May 23, 1990, which made vaccination in the State mandatory. And there was also the implementation of the eradication policy with the regionalization of actions and the free country goal, which should occur in 2005, and this goal was compromised due to the last outbreaks and the Hemispheric Plan for the Eradication of Foot-and-Mouth Disease to predict eradication in the South American continent in 2009[12].

In 1998, after a period of 38 months without occurrences of Foot-and-Mouth Disease, the disease was diagnosed in Porto Murtinho (Fig. 3-6), by a team from the then Department of Agricultural Inspection and Defense of Mato Grosso do Sul - IAGRO, meeting the anonymous complaint of two properties involved and a total of 3039 sacrificed animals (Fig.4) [13].

Fig. 3: Foot-and-mouth disease lesions in an inspected animal

Fig. 4: Sacrificed animals already placed in the ditch of destruction.

Fig. 5: Animals sacrificed in the ditch of destruction. public service person *opening the housings.*

Fig. 6: Work of opening animal carcasses inside the ditch to prevent gas build-up.

After clinical findings, sanitation actions were triggered that lasted about 106 days. With the support of the Ministry of Agriculture, there was the option of using a sanitary rifle with compensation from the owners, an option that served as a reference framework for the state, being definitively established as an action to eradicate the total foot-and-mouth disease of 3039 sacrificed animals [13].

At that time, the vaccination schedule took place through the stages of February (including animals under 12 months old), May (for animals aged up to 24 months) and November (total herd vaccination). Porto Murtinho because it had part of its territory considered Pantanal, still had a campaign stage per year and performed vaccination of total herd (only for pantanal properties with campaign option in May or November)[13].

In 1999, there was a new reintroduction of the Foot-and-Mouth Disease virus, there were outbreaks in the municipality of Naviraí, there were three properties involved and 1740 animals sacrificed and five more properties with animals destined for sanitary slaughter totaling 6592 slaughtered animals, whose working period lasted until May 2000[13].

The suspicion originated in pigs and sheep that appeared to be sick. Because they are compatible symptoms, it was decided to immediately ban the property, from the municipality of Naviraí (Fig. 7), parts of the municipality of Juti and Jateí for the transit of animals susceptible to Foot-and-mouth disease as well as its products and by-products [13].

Fig.7: Foot-and-mouth disease injury in an animal from the naviraí outbreak.

The diagnostic methods at the time for unvaccinated animals was Immunodiffusion in Agar Gel with VIA antigen (IDGA-VIA) and for vaccinated the Immunoenzymatic Assay by Electrotransference Test [13]was already used.

And in 2005, more precisely on September 30, the Veterinarian of the property FazVezozzo, sought the Local Unit to report the possibility of vesicular disease in cattle and horses. At that time, vaccination stages were changed, with the February stage being removed that included calves up to 12 months old [15].

The harvests (Fig. 8-9) of this occurrence were carried out on October 1and the confirmatory result came out on October 8.The municipalities of Eldorado, Itaquiraí, Iguatemi, Mundo Novo and Japorã were banned, in several properties as an area of health risk. 77628 animals susceptible to foot-and-mouth disease were subjected to slaughter or sacrifice [15].

Fig.8: Harvesting of gallbladder fluid oot-and-mouth disease injury)

The diagnostictests used in this occurrence were the Immunoenzymatic Assay test using 3ABC protein (ELISA-3ABC) that protein is present at high levels in the serum of infected animals and the EITB test.The actions lasted until 2006[15].

Fig. 9: Esophageal Liquid (LEF) harvest for diagnosis of Foot-and-mouth disease

The sanitary status "free with vaccination" was only recovered after several actions to meet health requirements, including the creation of the High Surveillance Zone (ZAV) in the State of Mato Grosso do Sul. Zav, created on January 21, 2008, according to ORDINANCE/IAGRO/MS Nº 1.420, covering an area of sanitary protection formed by the municipalities and/or part of the municipalities that make up the state's borders with Paraguay and Bolivia [16](IAGRO, 2008).

According to Normative Instruction Nº 44, of the Ministry of Agriculture, Livestock and Supply, of October 3, 2007, "the transit of animals, their products and by-products, between the properties and municipalities that make up ZAV or destined for the other regions of the State and the country".

In February 2011, the Scientific Commission of the World Organization for Animal Health (OIE) recognized the High Surveillance Zone (ZAV) of Mato Grosso do Sul as "free of foot-and-mouth disease with vaccination". With the publication of Normative Instruction No. 13, of March 22, 2011, the guidelines for the implementation of the veterinary surveillance system at ZAV[17]were redefined.

The official veterinary service established that in each local unit of the municipalities of the border region, there were at least two veterinarians, in addition to fixed posts and mobile inspection teams acting permanently. Another initiative was the implementation of the georeferenced register of properties, followed by a specific plan of monitoring and veterinary surveillance, including, as a priority, inspections in properties and risk areas and inspection of the transit of animals[16].

In 2019, the municipalities that formed ZAV began to have the same health status as the rest of the state, considered as an area free of foot-and-mouth disease with vaccination.

d) Actions and facts related to the control of foot-and-mouth disease in Mato Grosso do Sul

An agreement between the OAS, the Pan American Sanitary Workshop and the Brazilian government on August 25, 1951, panaftosa was created. With the objective of being the first center specialized in Foot-and-mouth disease in the Americas, with the mission of cooperating with the countries of the region in the organization, development and strengthening of national programs for the prevention, control and eradication of the disease. Originally, it was dedicated exclusively to the fight against Foot-and-mouth Disease, today it also acts in technical cooperation fighting zoonoses and food safety. In 1952, the training program for veterinarians of the national official services for the prevention, control and eradication of foot-and-mouth disease [18] was initiated

It was created in 1972 during the 5th. Inter-American Meeting on The Control of Foot-and-Mouth Disease and Other Zoonoses (RICAZV), the South American Commission for the Fight against Foot-and-Mouth Disease (COSALFA), which published Resolution VIII, which calls for this Pan American Health Organization (PAHO) to create, coordinate and promote the commission instituted[19].

The creation of this commission was mainly recommended at the XXIX Seminar organized by the Pan American Center for Foot-and-Mouth Disease (CPFA), held in Rio de Janeiro, Brazil, in December 11971, with the participation of the directors of Disease Control Programs of South America, in which the need to have an interregional cooperation mechanism for the purpose of

studying was justified, coordinate and evaluate the activities carried out at continental level for the control and eradication of foot-and-mouth disease. The first meeting took place in February 1973[19].

The committee meetings are governed by a statute establishing as main members the directors of Animal Health of the Foot-and-Mouth Disease Programs of Argentina, Bolivia, Brazil, Colombia, Chile, Ecuador, Guyana, Paraguay, Peru, Uruguay and Venezuela. At the request of these countries, the CPFA acts as secretariat ex officio in common agreement and accepts other countries and international organizations as observers [19].

In view of the need to evaluate, analyze, and exchange information on the main technical aspects of foot-and-mouth disease control and eradication, the committee has asked PAHO to hold seminars that precede ordinary meetings and whose conclusions and recommendations are adapted by the Commission. The themes chosen include areas of epidemiology, administration, planning, communication and health education and immunization programs against foot-and-mouth disease [19].

In 1973, it was requested to include in the next meeting as the theme a study on "Free and controlled areas". Already in 1974, the 1st Action Plan (Continental Plan for Foot-and-Mouth Disease Research) was approved. In 1977, the document "Foot-and-mouth disease-free areas"[19] was approved.

In the 1970s, the Campaign to Combat Foot-and-Mouth Disease (CACOFA), a program financed by the IBRD (International Bank for Reconstruction and Development), coordinated by MAPA/MT [9] was established.

The strategy of this campaign was focused on the eastern region of the former state of Mato Grosso, composed of TrêsLagoas (administrative headquarters of the program), Anaurilândia, Bataguassu, Brasilândia, Água Clara, Aparecida do Taboado, Paranaíba, Inocência and Cassilândia - a region that had the largest bovine population at the time, since the cattle ranch of Mato Grosso was scarce[20].

At that time there were no refrigerators in this region, Mato Grosso do Sul had 04 refrigerators (02 in Campo Grande, 01 Anastácio and 01 in Dourados), which led to a greater movement of cattle (Fig.10) for the slaughterhouse and also fattening in the neighboring state of São Paulo[9][21].

Fig.10: Means of transport of cattle by the river

This campaign brought immense progress to the state's livestock, because through it began to carry out the work of animal health defense that consisted of registering the properties, adapting them through minimal structures (corrals and pickets) and the requirement to vaccinate at least one dose for transit of these animals [20].

After the creation of the state of Mato Grosso do Sul, TrêsLagoas became a training center of this program for veterinarians who registered, attended a vaccination stage on site and then disseminated these learnings in their municipalities, implementing cacofa[20][9].

The year 2008 was characterized by the consolidation of the High Surveillance Zone (Zav), which was implemented in response to the recommendations of the OIE mission. Its status is similar to that of a Buffer Zone, with more rigorous actions such as: individual identification and traceability of cattle, buffaloes and small ruminants, vaccination of cattle and buffaloes performed by the official service, registration of geographical location of all rural properties with susceptible animals. The structure of the official veterinary service has been strengthened especially for ZAV. The General Standards and Guidelines for the implementation of the veterinary surveillance system at ZAV were described by Normative Instruction No. 63, 2008, which determined the maintenance of a minimum structure of animal health defense for the region [22].

The condition of free area without vaccination was restored to the High Surveillance Zone (ZAV), in the border region of Mato Grosso do Sul with Paraguay and Bolivia, in February 2011 [23].

In 2015, Brazil continued to chair the OIE Regional Commission in the Americas, participated in the World Assembly of Animal Health and meetings of the Standing Veterinary Committee of the Southern Cone - CVP[24].

That same year, Brazil also participated in the group of experts who developed the "Technical Guide for the last

stage of the PHEFA", approved at the 5th Extraordinary COSALFA held in Cuiabá, MT. meetings were held between the official surveillance services (SVOs) of Brazil, Peru and Bolivia at international borders to discuss issues of common health interest. The SVOs of Mato Grosso and Mato Grosso do Sul supervised vaccination, updating cadastral and promoted health education actions together with producers in a 15 km strip of the border [24].

In 2019, with the recommendation of the OIE, the High Surveillance Zones and other regions of Mato Grosso do Sul were unified, thus forming a single free area with vaccination. Approval was ratified during the General Assembly 88, in May 2020, Resolution No. 7 [25].

e) Epidemiological control of foot-and-mouth disease

Epidemiological control for foot-and-mouth disease consists in strengthening actions related to inspections at strategic points such as: airport, ports, fixed posts located on intermunicipal, interstate and national borders. It is also linked to the control of property registration, in the verification of animals susceptible to the disease. The existence of vaccination, control of distribution, storage and commercialization of vaccination. Conducting epidemiological serum studies for the detection of circulating agents. And perhaps the main one, the work of health education and social communication in the population, guiding them, with simple and objective language[26].

The control of foot-and-mouth disease in the state of Mato Grosso do Sul is carried out by the implementation of the National Program for the Eradication of Foot-and-Mouth Disease – PNEFA, using compulsory vaccinations at 2 specific times of the year, the months of May and November being the conditions defined as mandatory vaccination of cattle and buffalo herds, and serological surveys with frequency and design defined by the Ministry of Agriculture [26].

Also according to BRAZIL (2018), a quality control based on 6 parameters is carried out in vaccines produced and destined to trade, which are emulsion stability, safety, tolerance, sterility, potency and antibody research against non-structural proteins. The vaccine should be bivalent, containing subtypes A and O of inactivated aphthovirus[27].

Actions such as improvement of the care and surveillance system, supervision of animals, products and by-products, diagnosis, definition of areas of greater susceptibility (risk) are part of the epidemiological control of the disease[26].

In the state of Mato Grosso do Sul, since the end of 1993, the use of vaccines with oily adjuvant, with trade controlled by the Agency, and responsibility for acquisition and application by producers[28] is mandatory.

The aim of this study was to describe the story through narrations, actions and facts related to the control and eradication of foot-and-mouth disease in Mato Grosso do Sul, through the work developed by IAGRO.

II. MATERIAL AND METHODS

a) Research Design

This work, as far as its nature is, will be a bibliographical research with a qualitative lyused approach, since it is intended to narrate the story through personal narratives, actions and recorded facts and or personal communication, on the control and eradication of foot-and-mouth disease in Mato Grosso do Sul. In this study, no statistical methods and techniques will be used, the approach will be case report [29].

The research will be delineated through a case study. "The case study refers to the survey with greater depth of a given case or group in all its aspects. However, it is limited because it is restricted to the case studied, which cannot be generalized"[30].

The research is characterized with an explanatory nature, providing greater familiarity with the problem and identifying the factors that determine or contribute to the occurrence of phenomena[31] (GIL, 2008).

b) Data collection

Data were collected from official documents, theses and dissertations, scientific articles, folders among others, which served as the basis for the elaboration of this scientific work.

c) Personal Communication

Interviews were conducted with active and inactive IAGROpublic service personand alsoMAPApublic service person, through visual recordings made via mobile phone and also by telephone, where this information was transcribed contributing to the narration of the facts and the history of the creation of IAGRO and the control and eradication of Foot-and-Mouth Disease in Mato Grosso do Sul.

d) Personal document analysis

Because it is a case report work, official documents were collected in iagro archives, and these were analyzed and studied with the objective of supporting the accomplishment of this work. Data obtained from the E-SANIAGRO system, which is the official data system of IAGRO and the compilation of data generated by all

existing departments in IAGRO, documents that are under the care of the health education division were also used.

III. RESULTS AND DISCUSSION

a) Health education

IAGRO has always held lectures with the municipalities with the help of representativeentities (trade unions, associations and small producers) where animal health defense programs were addressed - distribution of folders on the programs, held courses of agents in animal health, municipal seminars for animal health, seminars for high school teachers and delivered educational material in the barriers of supervision [8].

In 2007 began a project called Pedagogical Workshop on Animal and Plant Sanitary Defense, with the objective of bringing the work of agricultural sanitary defense closer to educational practices developed in schools. This project worked the teacher through booklets, where he acquired technical and scientific knowledge, and then he used it in the classroom with his students. From its creation until 2017, 20 Workshops were given with a total of 1949 participating teachers and 16433 kits distributed to students. This project is no longer active today, due to lack of investment and pedagogue [32].

In Law 3.823 of 2009 in Art. VII, the Socio-Educational Seminar was established for the producers, where they attended two lectures related to agribusiness and animal health defense and carried out a questionnaire. This seminar before the pandemic was held once a month in person simultaneously throughout the state, in the regional municipalities. Since September 2020, 643 seminars have been held with an audience of 9.232 listeners [32].

In addition to the lectures, there were courses of agent in agricultural health aimed at small farmers, there were 47 courses with 712 listeners. There is also distribution of educational material, total of 92.234. IAGRO's health education is also present in agricultural events, has technical terms of cooperation with agribusiness representative entities (SENAR, FAMASUL, EMBRAPA) sharing knowledge, giving lectures, delivering material or even doing training[8].

IAGRO's health education, after the pandemic changed the way the information reached the rural producer, using social media to clarify health events, guidelines and also communication channels where he can ask his questions and ask questions. The information also follows through radio and television campaigns [8].

One of the innovations and achievements was the cooperation agreement signed with the Federal Institute of Mato Grosso do Sul -IFMS/IAGRO, which made possible the idealization and realization of the Specialization in Sanitary Education and Communication in Agricultural Defense for IAGROpublic service persons, showing the need and importance of personal qualification so that we can increasingly make the state of Mato Grosso do Sul strong and competitive in the agricultural sector [32].

a) Interviews

❖ Interview with veterinarian Dr. Gelson Sandoval Jr.

Veterinary Physician graduated from the Federal University of Mato Grosso do Sul (UFMS) in 1982, a servant of IAGRO since 1989 starting in Bodoquena, in 1990 he went to the municipality of Paranaíba, in 1991 he went to Corumbá where he remained for 9 years and after this period, moved to Campo Grande in 1999 working for another 3 years in the Local Unit, after that in the Division of Sanitary Education, where it remains to this day.

He participated not directly in actions with affected animals, but there was an episode of focus at the New Horizon Auction where there were two Comitivas that took the animals to Aquidauana, where it was "bursting Foot-and-mouth Disease"' within the municipality of Aquidauana. Upon learning of the incident, what answered the occurrence was the Local Unit of Aquidauana and the corumbá team was to carry out the interdictionand cleaning (Fig. 11 and 12) of the Novo Horizonte auction venue and it was the only time that the interdiction of the enclosure was seen for two to three months.This occurred in the early 1990s, where The PNEFA was not yet as we know today with all eradication actions.

Fig.11: Vehicle disinfection jobs

Fig. 12: Cleaning and disinfection work

Already official focus where there was personal participation, it was at the end of the 1990s that it was in 1998 in the municipality of Porto Murtinho and then in the focus of 2005/2006 in Eldorado, Japorã and Mundo Novo.

The occurrence in Porto Murtinho was much less stressful because they were in two large properties in isolation in a large municipality that was naturally more isolated, so it was relatively easier to contain the contamination. What he received was the task of performing the periphery vaccination that was done together with the Rural Union of Porto Murtinho.

At the time one wondered what would happen if the Foot-and-Mouth Disease virus entered the area of Settlements, small estates and indigenous villages, and that is exactly what happened in Japorã.

Participation in the focus of Japorã, Eldorado and Mundo Novo began in the middle of November, acting mainly in the dissemination of actions, and interaction with producers who refused to allow the sacrifice of their animals.

Upon arriving, he participated in a meeting at the City Hall where the IAGRO/MAPA team was present, there were angry producers (Fig. 13) especially with the evaluation and the amounts and payment terms for the animals that were being eliminated.Because there were allegations of differentiated amounts paid in the acquisition by the producers and were not the same presented by the evaluation team (formed by technicians from IAGRO, MAPA and Rural Union), values of approximately 50 to 60% of what the producers claimed to have paid in their acquisition, generating a lot of dissatisfaction on the part of the producers.

Fig. 13: Occurrences in the municipality in movements of revolt of producers.

The next day, when he went to start his activities in the municipality of Japorã, when he stopped at the barrier about 10 km before the city, he was instructed to return and take refuge in the Military Police Battalion, because there was a movement of people who were tipping over IAGRO cars, threatening invasion in the Local Unit. It was a very embarrassing situation because everything that should not happen in a focus was happening, such as meetings in positive batches for foot-and-mouth disease and then the producers returned to their lots.

The function of Health Education in the focus was initially the dissemination of actions, what was happening and why it was happening and mainly to overcome the resistance of producers. Explain each of the actions and the time it would take at first to solve them, and before taking a more drastic action against the producer, the conversation to 'break' the resistance of producers to slaughter their animals with all care.

It was a very good experience for the possibility of talking to producers of all kinds and knowing their realities as well as understanding their condition.

What was learned from this whole situation was that IAGRO has a lot to work on in the "relationship with society", there was very clear this deficiency. The Veterinarian has not since his academic training, preparation for this relationship with people, interaction with the community. What needs to be understood is that we depend on the relationship with the producer so that our work is done and well executed, because without this good interaction, there will be no possibility of execution of the work.

Health Education failed like other health defense actions, because if it had been well performed, the focus would not occur. After the occurrence is opened, what can

be done in the scope of Sanitary Education, it becomes more difficult to work because we enter a situation of "explaining what will happen", because we fall into a protocol of norms that no longer depends on teaching but on communicating. Credibility takes years to conquer and you lose in minutes.

It was seen that the GEASE process did not meet the small producer, because the slaughtered animal was indemnified, but the small one mainly depended on a small crop, a third-party service, the production of those animals and suddenly nothing else can be done on that lot. The debts of incentive programs had to be forgiven because they could not honor their basic commitments let more bank loans from government programs. So the money paid by the animals only served to make the accumulated debts of previous months paid. In the end, they had no animals, no money and all work was started from scratch.

As a message of what has become of experience, is that we need to improve our relationship with the community. Doing Sanitary Education is doing Health Defense intelligently, and those who do not do sanitary education in their work, are working against themselves.

❖ Interview with veterinarian Dr. Elvio Patatt Cazolla

Veterinary Physician graduated from the Federal University of Santa Maria (UFSM) in 1985 and is a federal public service personsince 2002 in the Ministry of Agriculture, crowded in the Federal Superintendence of Agriculture (SFA) in the Service of Supplies and Animal Health, was a servant of IAGRO until the year 2001.

He had the opportunity to participate in the last three outbreaks of Foot-and-mouth Disease that occurred in Mato Grosso do Sul in 1998 in the municipality of Porto Murtinho, 1999 in the municipality of Naviraí and last in 2005/2006 in the municipalities of Eldorado, Mundo Novo and Japorã, already as a federal servant of the Ministry of Agriculture.

With regard to Porto Murtinho, an anonymous notification was received in the Regional of the time in the municipality of Aquidauana in early February 1998, and the Regional Dr. Adenan summoned him in the Local Unit of Garden and Campo Grande was dr. Afonso who accompanied him.

Upon arriving at the property, the presence of lesions was verified (Fig.14) already healed suggestive of vesicular disease in the animals, and when instilling the employee of the property, they were told that there were pigs also with injuries, but that they only returned at night to collect themselves in the "egg" of the mangueiro.Thus, they returned to the city and scheduled to return to the farm at night. Upon arriving at the Local Unit, they made the first surveys of movements of the property and interdiction of the plug and returned around three in the morning to take samples of the pigs in question.

Fig.14: Inspection in cattle for *injury detection*

It is interesting that the material was collected and there was a positive VIA result, which was the test at the time used for unvaccinated animals (pigs, sheep and goats) and for cattle the EITB was already used.

Thus, there was the confirmation of focus of Foot-and-mouth Disease in Porto Murtinho. It is worth mentioning that this was the first health emergency implemented in the country, this was a reference milestone for Mato Grosso do Sul and Brazil, as it was the first health emergency following the OIE Land Animal Code.

Then, the work began in February and were closed in July with full release. They were in two large properties, which did not hinder the work.

To highlight at this time, that in 1992, there was the reformulation of the Foot-and-Mouth Disease Program, no longer being a control program to be of eradication of the disease making a union between Brazil and the other countries of the continent with the same objective.

Brazil in this objective was well planned, at the time divided into five major livestock circuits and Mato Grosso do Sul being part of the Midwest circuit along with part of São Paulo, Minas Gerais, Goiás, Tocantins and Mato Grosso. The goal of this Circuit was in the year 2000 to be free of Foot-and-mouth disease with vaccination. With the occurrence of this event in Porto Murtinho, there was a concern that the state would be harmed, but as the work was very well executed and coordinated by Dr. Geraldo, now director of the Department of Animal Health, there was also the expectation that it would not hinder the plans of the Circuit, but unfortunately in January 1999, there was another introduction of the virus.

Thus, there was a complication of the process, as they would be in 1999 with the final steps to plead free area with vaccine within the Midwest circuit. There was already a previous work of updating cadastral, seroepidemiological studies to prove the absence of viral circulation, but unfortunately we can not follow the Circuit after this occurrence.

They were at a meeting in the municipality of Cuiabá where the other states were very clear saying they would not expect Mato Grosso do Sul. This caused a great deal of damage to the state because in 2000, Mato Grosso do Sul became a buffer area. The other states of the Midwest Circuit were recognized by the OIE as a free area with vaccination different from the MS, so any animal from the MS that went to these other states should quarantine and serology at the origin and destination, this greatly devalued the value of our animals.

The year 2000 was also marked by a great serology in the state to recover the status of free with vaccination in the year 2001.

This story summarizes what were the occurrences of Porto Murtinho and Naviraí that were very similar because they were in two large properties where there were good conditions for the eradication of foci.

A few years later, in 2005, there was reintroduction of the virus in an entirely different condition, with extreme difficulty to carry out the work, in a region with many small rural properties, many roads, an incredible permeability, dry border with the neighboring country. In the investigations conducted together with the police, there were strong indications of irregular ly entering animals from Paraguay, on the other hand this country replied that there was nothing focused on its territory.

With all these difficulties, ends the year 2005 with 33 foci, the confirmations occurred in October and takes almost 4 months to sacrifice all the animals of the foci in Mundo Novo, Eldorado and Japorã, and another appearance occurs in April 2006 on a property in Japorã, taking another week for it to be drunk.

The sequence of the work recommended by the OIE was the sacrifice of the animals followed by sanitary void and introduction of sentinel animals, these sentinels (previously tested and not vaccinated) are followed for 30 days and tested 3 times with clinical inspection and thermometry during this time. At that moment, it was thought that everything was right. There one should go to a seroepidemiological study where paired harvests are made to prove that the measures that were taken were sufficient to eliminate any source of infection of the disease, proving that there was no viral circulation.

Unfortunately, in the serologies performed, a high reactivity was observed, both in the first serology and in the second within the three municipalities, and at the same time serology was performed outside the municipalities where no reactivity was found.

What became clear was that these actions were sufficient to prevent the virus from leaving the contaminated area, but it did not prevent the virus from circulating within that area.

In this, around 34.000 animals had already been sacrificed, from there the Department of Animal Health determines that any type of source of infection be eliminated, including direct and indirect contacts, including epidemiological links, and therefore be referred for sanitary slaughter. Another 44.000 animals were sent to slaughter.

For costs, the economic loss was around 8,5 million in the first phase plus almost 9 million in the second phase, this in dollars.

Situations have passed that are not expected to happen as confrontations, questioning, but what caught the most attention was the mainly political opportunism of people.

They were called to a meeting in the municipality of Japorã by the mayor in the City Council, and the main question of the producers was that they would like to receive in advance the values of the animals that would still be slaughtered, and it was said that it would not be possible by a series of legal procedures that needed to be done. From a certain moment, the mayor said that from that moment on he would no longer support the actions of IAGRO and MAPA and that he would be at the side of the producers, causing a "boiling" within that place.

After this situation, it was perceived that this whole situation was architected in an opportunistic way to promote itself politically. Leaving there, returning to Eldorado, in the early hours, countless buses full of settlers, indigenous, small producers, were arriving in the city. They broke into the iagro office, tried to set fire to the vehicles, tried to break into the parish house that was the warehouse that was guarded by the Civil Defense.

Apart from situations of total interdiction of refrigerators in the municipalities that were the great employers of the region, many people were unemployed, there was very great social movement. Almost 100% of the properties of one of these municipalities were settlements, and there was a case of a lady who had 2 children and was pregnant with a third, looking for the welfare staff, because she was hungry because she had nothing else and had not received the compensation money yet. This greatly impacted the teams that worked there.

Therefore, the importance of our actions and the effective awareness of all actors involved in the eradication of this disease.

The message that remains is that we went through all this and today we are in a much more comfortable sanitary condition, the neighboring countries that we had many problems precisely with sanitary conditions, greatly improved their condition because today the vision is different. Having the idea of the importance in the work of defense so that the sanitary condition is maintained and we continue advancing, after all our state is dependent on livestock, since when an event of this size happens, it is not only livestock that suffers.

IV. CONCLUSION

After more than 40 years of Animal Health Defense, the state is close to being able to receive the status of Free Area Without Vaccination for Foot-and-Mouth Disease. The work so far has been arduous, but the achievements are thanks to the tireless efforts of Iagro'spublic service person, who have often not been recognized as they should. Animal health is due to several factors, among which it is directly linked to health education and social communication.

The advantages of Mato Grosso do Sul in becoming a Free Area Without Vaccination for Foot-and-Mouth Disease are immeasurable, since there will be a reduction in vaccine costs, reduction of losses with injuries and a drop in milk production associated with the vaccination procedure, improving the structure of the official service, since these will be available for the control of other diseases, will stimulate increased exports, improvement of refrigeration plants, among others.

The fact that Mato Grosso do Sul achieved the status of free area for foot-and-mouth disease does not mean that the work of IAGRO is finished, it has just begun. From that moment on, efforts will be more focused on surveillance, that is, the transit of animals and products of animal and plant origin and for the community the guidance in notifying the Official Service in case of any suspected illness, the role of health education becomes much more important.

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