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Laboratoire National de l'Elevage et de Recherches Vétérinaires (LNERV)

CBPP in Senegal
field and diagnostic laboratory activities

Dr Fatou Tall Lo

ISRA / LNERV

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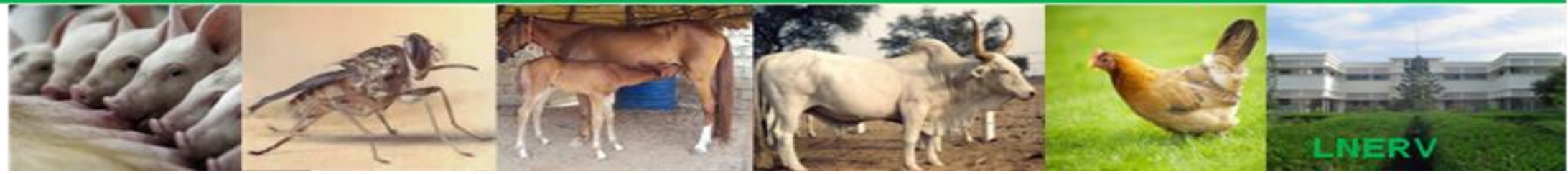


CBPP in Senegal: field and diagnostic laboratory activities

INTRODUCTION

SURVEILLANCE

-Passive

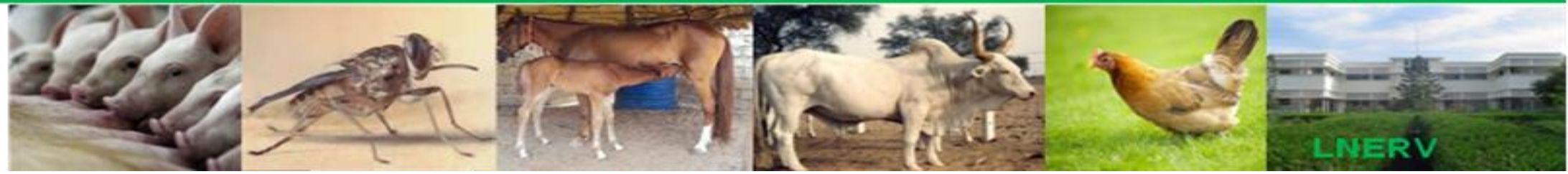
-Exemple of protocol of serological evaluation of vaccination campaigns against CBPP in Senegal

- CBPP seromonitoring protocols in Senegal

LABORATORY ACTIVITIES

CONCLUSION AND PERSPECTIVES

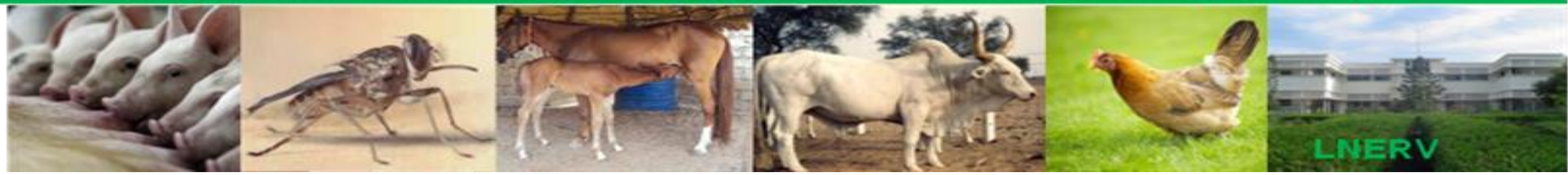
Senegal is a country located in West Africa: 196,710 Km2, population : 17,196,308 inhabitants



CBPP in Senegal : field and diagnostic laboratory activities

Contagious bovine pleuropneumonia (CBPP), caused by Mycoplasma mycoides subsp. mycoides, small colony variant (MmmSC) represents a major obstacle to cattle production in Africa.

It is indeed considered one of the great scourges of livestock.



CBPP in Senegal :field and diagnostic laboratory activities

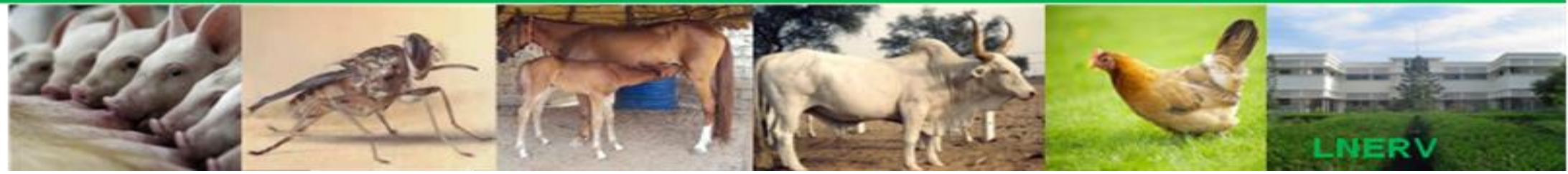
In Senegal The disease seemed to be well controlled following massive vaccination combined with strict control of animal movements .

However, it has made a spectacular comeback, affecting unscathed regions.

CBPP in Senegal :field and diagnostic laboratory activities

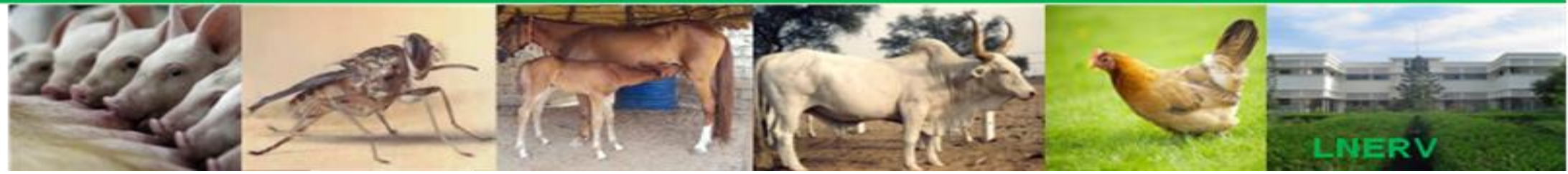
- the ability to recognize the disease in the field
- the capacity to accurately confirm its diagnosis in a laboratory

are very important components of epidemiological surveillance for CBPP. Such monitoring can provide the information essential to the choice of control strategies



CBPP in Senegal :field and diagnostic laboratory activities

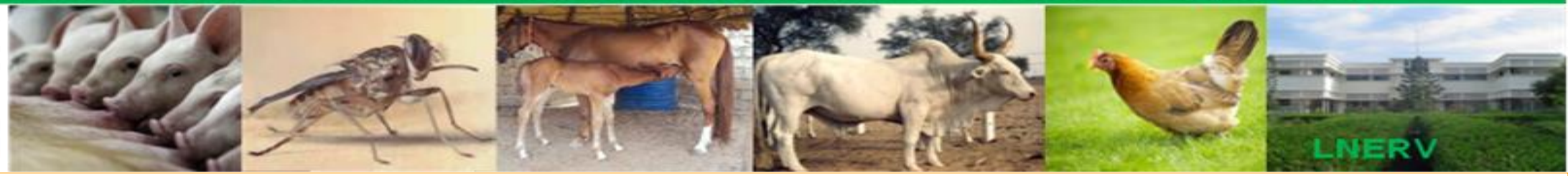
- In Senegal, the last confirmed outbreak of CBPP was in 1977.
- However, it could be considered as a country where there is no outbreak of CBPP
- Thus, vaccination against the disease was stopped at 2005 (DSV, 2014).
- In 2012, Senegal lost its status as a country provisionally free of CBPP, following the appearance of an outbreak in December 2012, in the locality of Lounthy, town of Bala, region of Tambacounda.



CBPP in Senegal :field and diagnostic laboratory activities

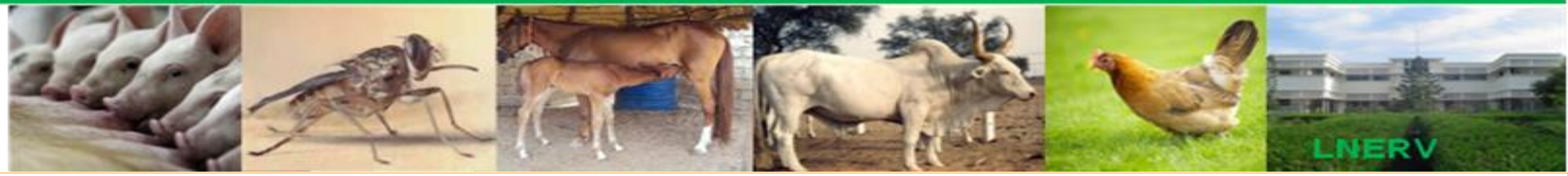
-In 2014 seven outbreaks were confirmed
-Five outbreaks in 2015
-In 2016 cases were confirmed from other regions

To better manage the disease, Senegal has set up a new epidemiological surveillance plan



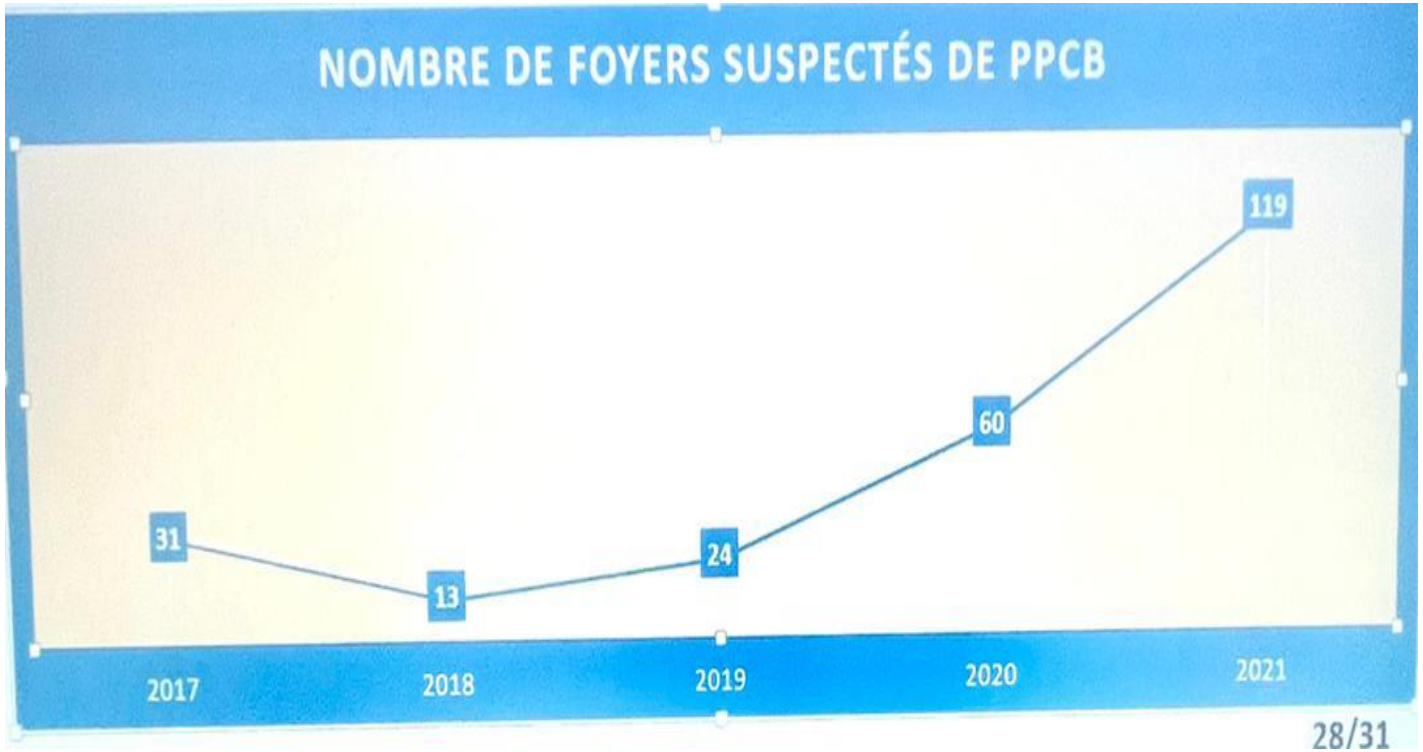
EPIDEMIOLOGICAL SURVEILLANCE OF CBPP IN SENEGAL

- Passive surveillance is carried out within the framework of the National Epidemiological Surveillance System (SNSE) throughout the country.
- Case investigations carried out when necessary depending on the epidemiological situation
- Serological surveys were conducted for CBPP.



EPIDEMIOLOGICAL SURVEILLANCE OF CBPP IN SENEGAL

As part of passive surveillance, 247 suspected outbreaks of CBPP were reported between 2017 and 2021.



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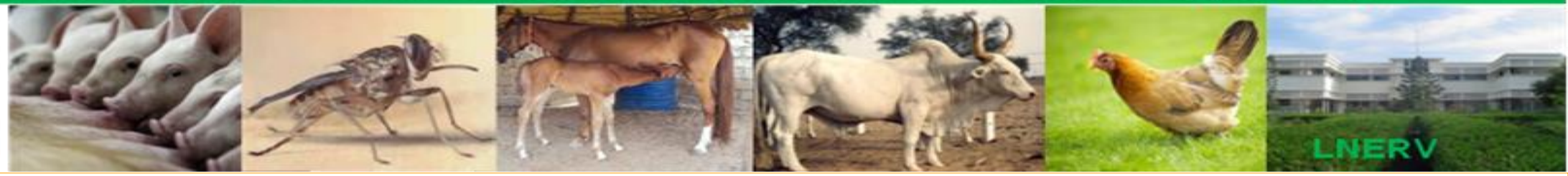

EPIDEMIOLOGICAL SURVEILLANCE OF CBPP IN SENEGAL

Protocol of serological evaluation of vaccination campaigns against CBPP in Senegal

- The objective of this protocol is to describe the organization and operation of serological surveys for producing a estimate of the national prevalence for CBPP

EPIDEMIOLOGICAL SURVEILLANCE OF CBPP IN SENEGAL

Protocol of serological evaluation of vaccination campaigns against CBPP in senegal

Sampling plane:

Epidemiological Units:

- The chosen primary is the municipality.
- The secondary EU is the village.

Senegal has 557 municipalities of which 95 will be selected for serological surveys; which represents a percentage of 17%

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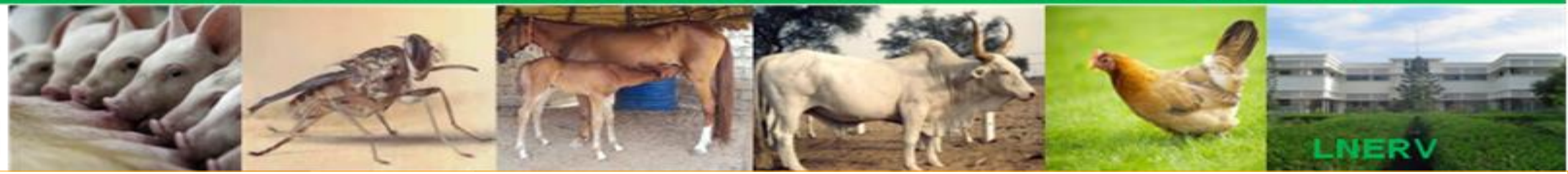
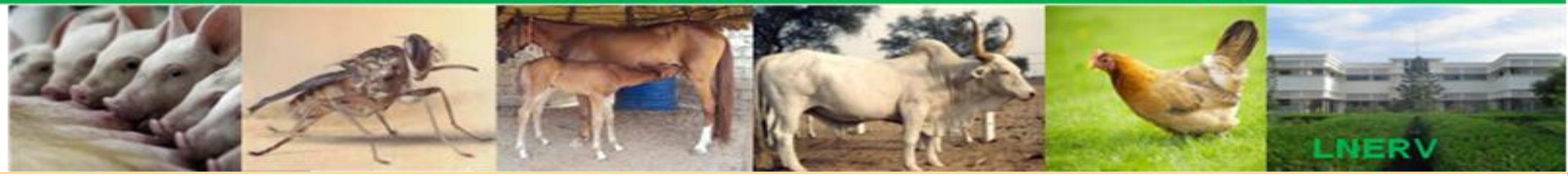


EPIDEMIOLOGICAL SURVEILLANCE OF CBPP IN SENEGAL

Protocol of serological evaluation of vaccination campaigns against CBPP in Senegal

Number of municipalities to be surveyed per region

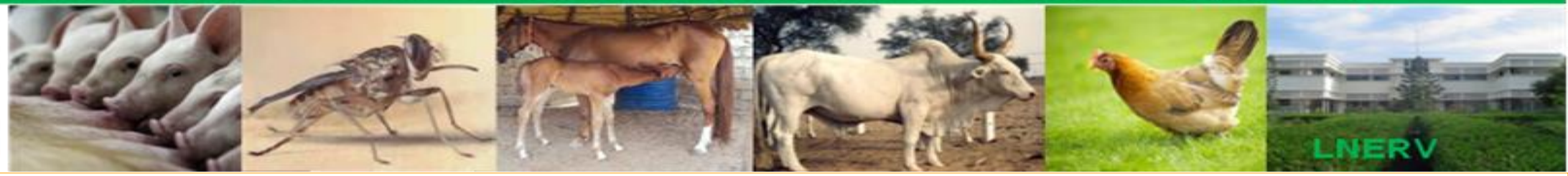
Régions	number of municipalities	Number of municipalities to be surveyed
Dakar	54	6
Diourbel	40	7
Fatick	40	7
Kaffrine	33	6
Kaolack	42	7
Kédougou	19	3
Kolda	40	7
Louga	56	10
Matam	46	8
Saint-Louis	38	6
Sédhiou	43	7
Tambacounda	47	8
Thiès	49	8
Ziguinchor	30	5
Total Général	557	95



EPIDEMIOLOGICAL SURVEILLANCE OF CBPP IN SENEGAL

Protocol of serological evaluation of vaccination campaigns against CBPP in Senegal

- the municipalities are selected randomly by drawing lots.
- The number of villages to be sampled depends on the total quantity within municipality.

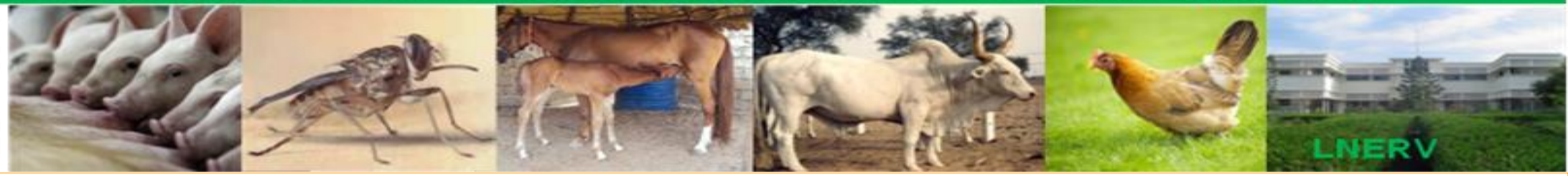


EPIDEMIOLOGICAL SURVEILLANCE OF CBPP IN SENEGAL

Protocol of serological evaluation of vaccination campaigns against CBPP in Senegal

Minimum sample size of villages to be drawn within each municipality.

Population size	Taille de l'échantillon
0 – 5	Toutes
6 – 9	5
10 – 14	6
15 – 39	7
40 +	8



EPIDEMIOLOGICAL SURVEILLANCE OF CBPP IN SENEGAL

Protocol of serological evaluation of vaccination campaigns against CBPP in Senegal

Choice of animals

- The target population is all adult cattle that have not been vaccinated in the last 3 months.
- the number of samples is set at 10000
- the number of samples to be taken at the level of each village is 15 animals (by favoring those with clinical signs) with a maximum of 7 villages to be retained for each municipality. This corresponds to 9,975 sera

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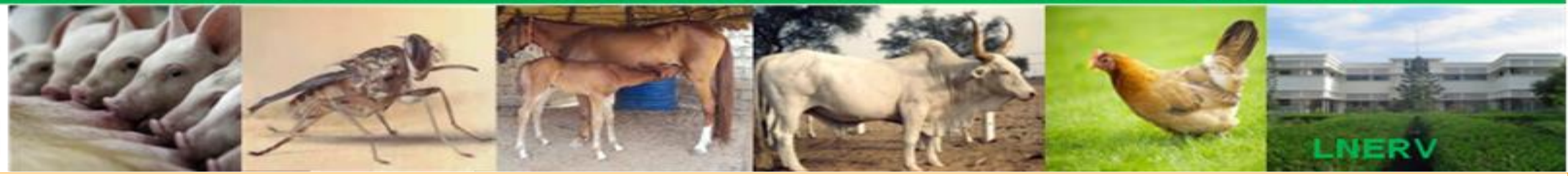


EPIDEMIOLOGICAL SURVEILLANCE OF CBPP IN SENEGAL

Protocol of serological evaluation of vaccination campaigns against CBPP in Senegal

IMPLEMENTATION

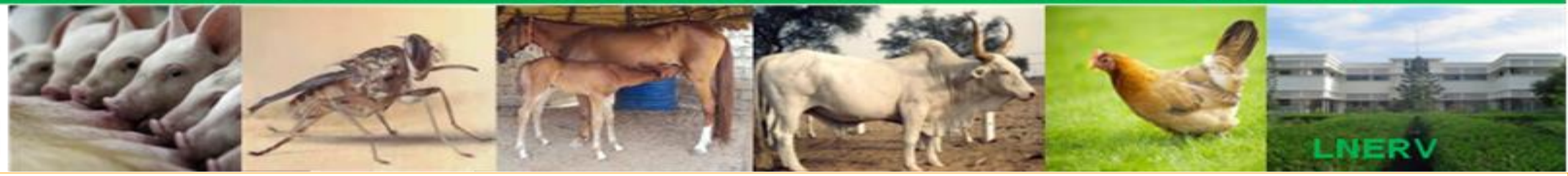
Roles and missions of the different actors involved:

The actors involved in the seromonitoring survey are listed below:

Decentralized services

-Chief Veterinary Officers (CPV) and Agent: are responsible for taking the samples and filling in the survey forms on Kobotoolbox.

NB: Samples must be taken and completed between August 1 and September 30 of each year.



EPIDEMIOLOGICAL SURVEILLANCE OF CBPP IN SENEGAL

Protocol of serological evaluation of vaccination campaigns against CBPP in Senegal

-Heads of Departmental service of Livestock and Animal Production (SDELPA) :

will be responsible for sending the samples to the regional services (sample quality, identification of tubes, verification and validation of the quality of the data on KOBOTOOLBOX).

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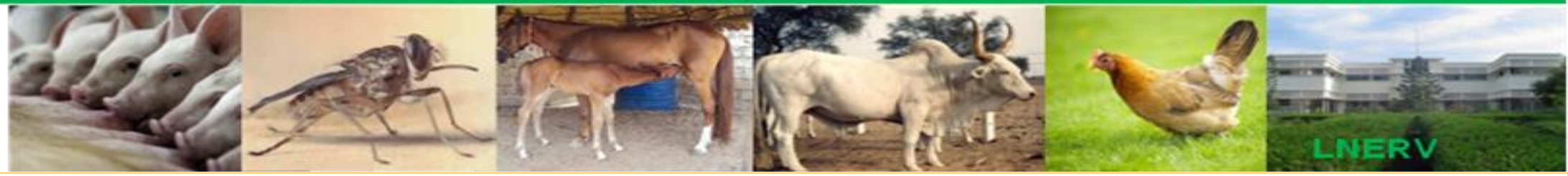

EPIDEMIOLOGICAL SURVEILLANCE OF CBPP IN SENEGAL

Protocol of serological evaluation of vaccination campaigns against CBPP in Senegal

-Heads of Regional Livestock and Animal Production Services (SRELPA)

-The centralization and sending of samples from the field to the Directorate of Veterinary Services (DSV) .

-verification and validation of the quality of the data on KOBOTOOLBOX.

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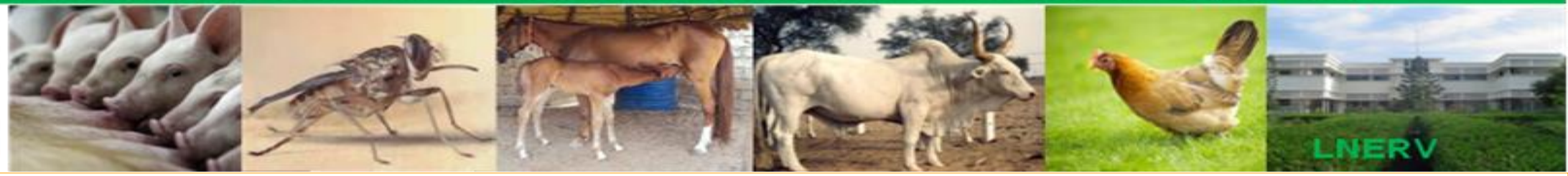

EPIDEMIOLOGICAL SURVEILLANCE OF CBPP IN SENEGAL

Protocol of serological evaluation of vaccination campaigns against CBPP in Senegal

NB:

-Sorting must be done by the veterinary service during the month of October.

-Sample must be sent to the veterinary service direction no later than October 31 of each year.

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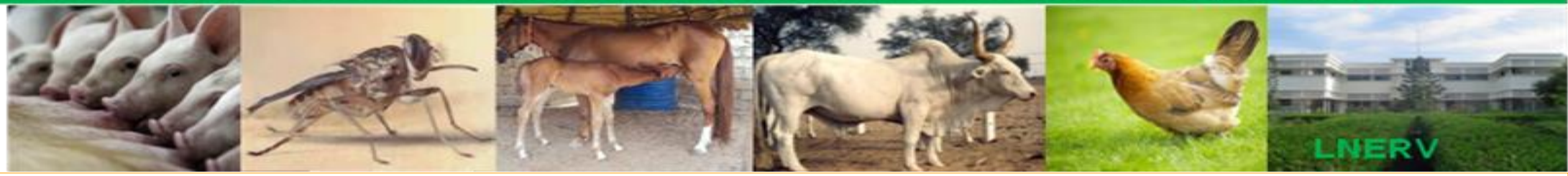

SURVEILLANCE EPIDEMIOLOGIQUE DE LA PPCB AU SENEGAL

Protocol of serological evaluation of vaccination campaigns against CBPP in Senegal

IMPLEMENTATION

-central level

- **Direction of veterinary service**:

-will be responsible for carrying out a final sorting and control of the samples, the quality of the data and

-sending the samples to the National Laboratory of Livestock and Veterinary Research (LNERV)

- **The Laboratory** will ensure the processing of the samples and provide exhaustive results.

NB: The LNERV must ensure the return of analysis results 45 days after the date of receipt of the samples.

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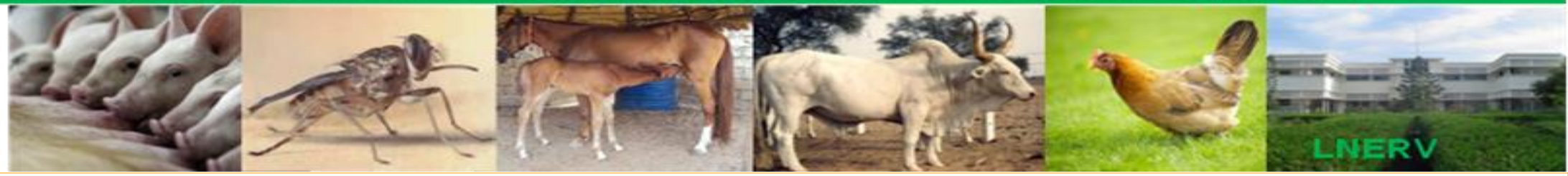
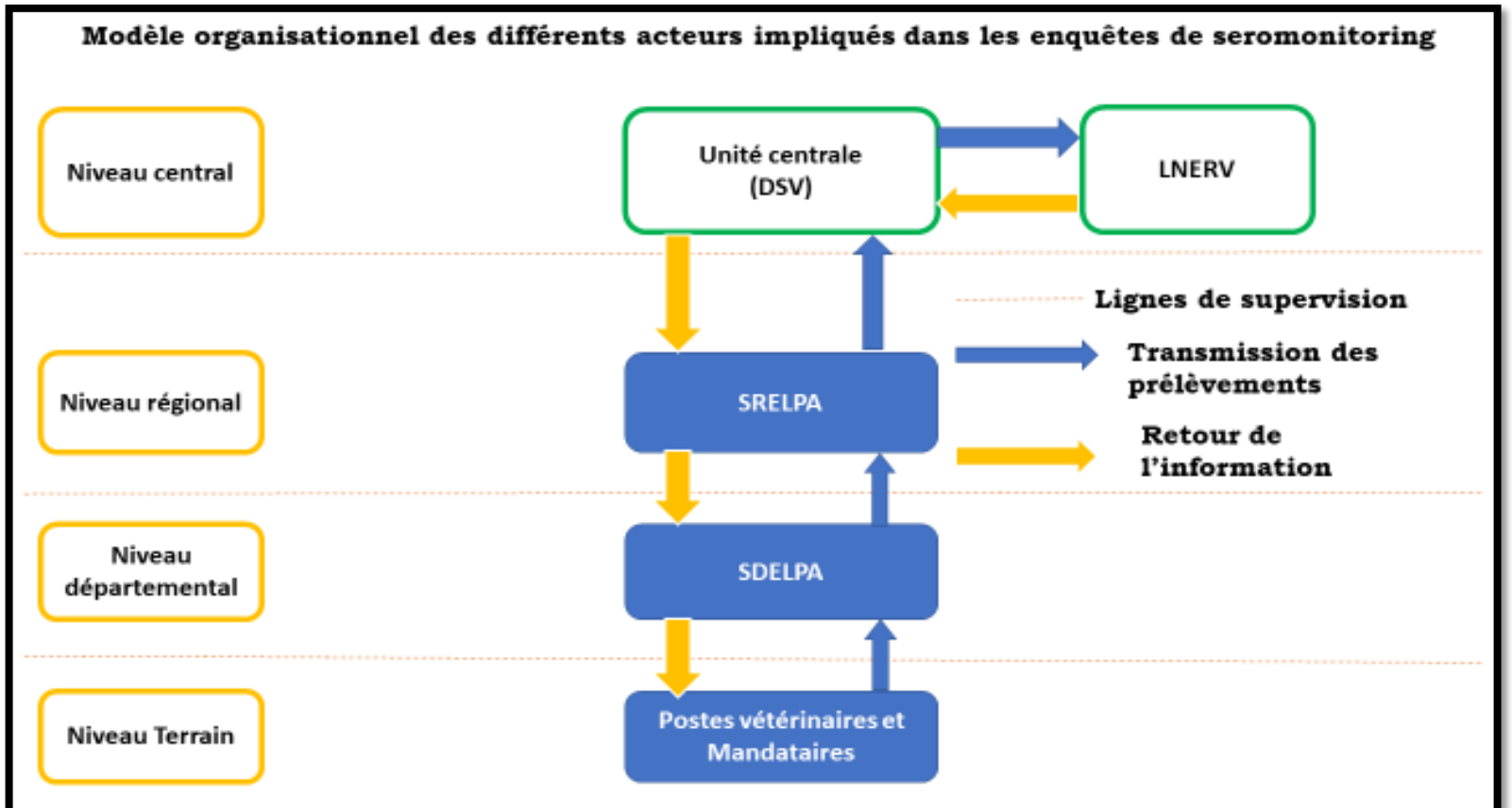


EPIDEMIOLOGICAL SURVEILLANCE OF CBPP IN SENEGAL

Protocol of serological evaluation of vaccination campaigns against CBPP in Senegal

IMPLEMENTATION

Organizational model of the different actors involved in seromonitoring surveys

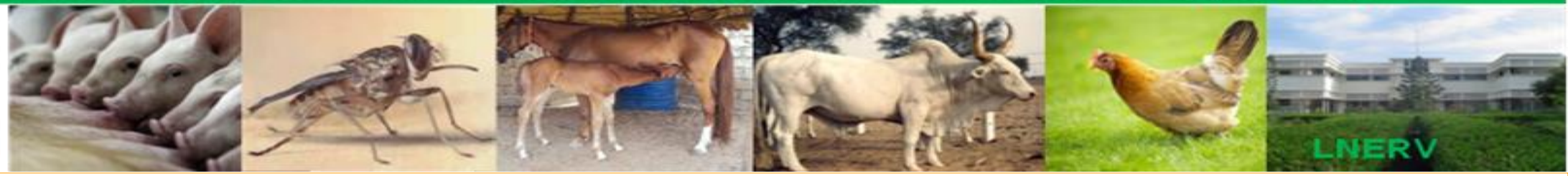


EPIDEMIOLOGICAL SURVEILLANCE OF CBPP IN SENEGAL

Protocol of serological evaluation of vaccination campaigns against CBPP in Senegal

IMPLEMENTATION
DATA MANAGEMENT

In order to be able to analyze and interpret the results, it is important to have a complete and well-documented database.
The database is shared with the laboratory in charge of the analyzes



EPIDEMIOLOGICAL SURVEILLANCE OF CBPP IN SENEGAL

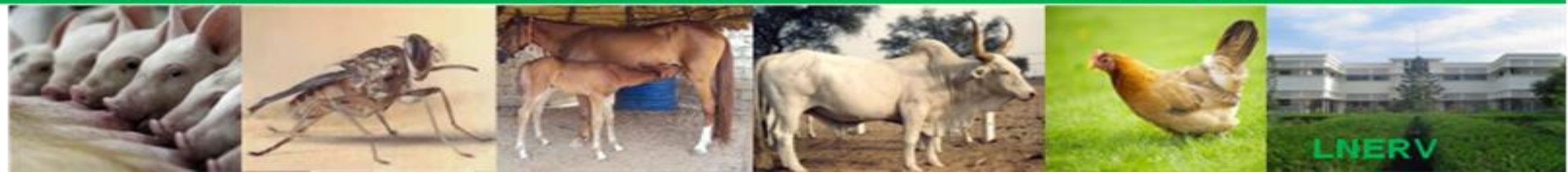
Protocol of serological evaluation of vaccination campaigns against CBPP in Senegal

DATA ANALYSIS AND INTERPRETATION

An initial descriptive analysis of the results consists

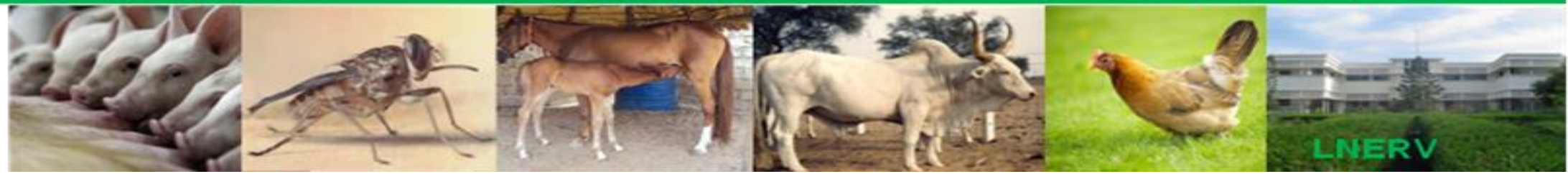
- to classify the villages, then the municipalities as positive or negative
- to calculate the prevalence rate in the study area.

→ A municipality is classified as positive if it contains at least one positive village.



CBPP seromonitoring protocols in Senegal

- This study was carried out for a better knowledge of the epidemiological situation of CBPP in Senegal.
- The work was oriented in 30 departments located in the 14 regions.
- We established the reference situation **(T0)** through a risk survey (from April 05 to May 31, 2017).
- These results are used during the vaccination campaigns (2018; 2019),
- T1 and T2 situations are defined and will help to have the evolution of the prevalence of CBPP in Senegal.



CBPP seromonitoring protocols in Senegal

it is carried out:

-at the same time as the vaccination campaign before vaccinating the animals

-or at least 3 months after the end of the vaccination campaign.

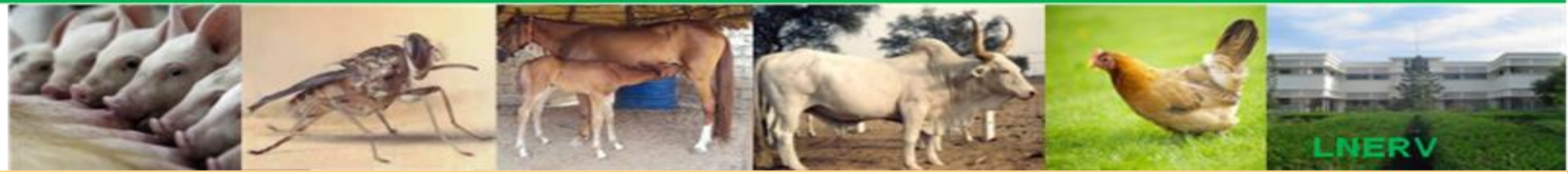
CBPP seromonitoring protocols in Senegal

Vaccination campaign	Number vaccinated	Vaccination coverage rate
2016-2017	1 498 006	39,27%
2017-2018	1 741 381	50,77%
2018-2019	1 751 982	50,58%
2019-2020	1 406 045	38,66%
2020-2021	1 687 153	46,41%
2021-2022	1 870 657	51,13%

CBPP seromonitoring protocols in Senegal

A total of three (3) surveys were conducted from 2017 to 2019.

It is :
TO-PPCB in 2017
T1-PPCB in 2018
T2-PPCB in 2019

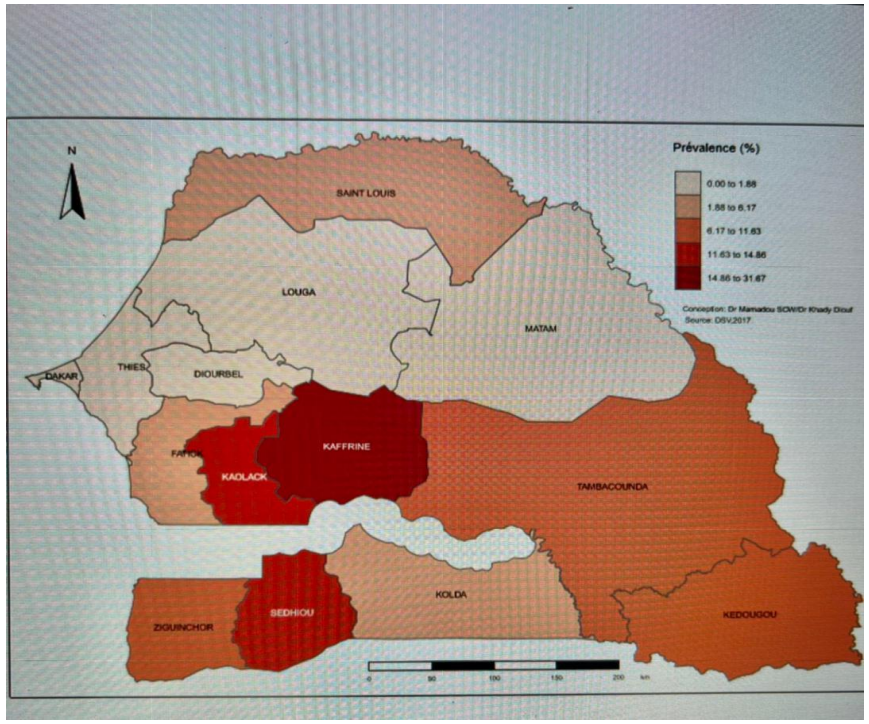


CBPP seromonitoring protocols in Senegal

CBPP seromonitoring surveys carried out and results obtained

T0-PPCB

Individual seroprevalence by region



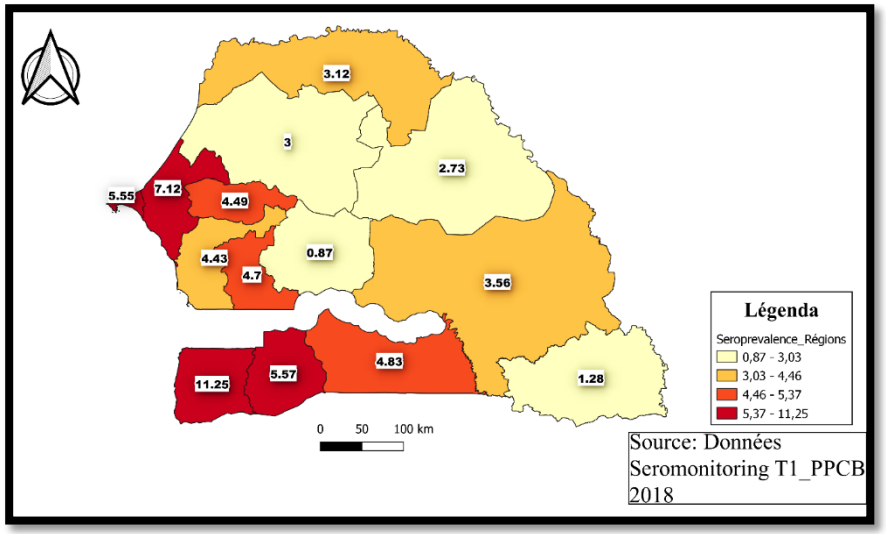
Régions	Positifs	Number of sera tested	Prévalence (%)
Dakar	2	150	1,33%
Diourbel	0	120	0,00%
Fatick	1	28	3,57%
Kaffrine	19	60	31,67%
Kaolack	3	30	10,00%
Kédougou	8	60	13,33%
Kolda	5	81	6,17%
Louga	5	271	1,85%
Matam	0	30	0,00%
Saint Louis	4	150	2,67%
Sédhiou	26	175	14,86%
Tambacounda	20	183	10,93%
Thiès	0	60	0,00%
Ziguinchor	8	90	8,89%
Total	**101**	**1488**	**6,79%**

CBPP seromonitoring protocols in Senegal

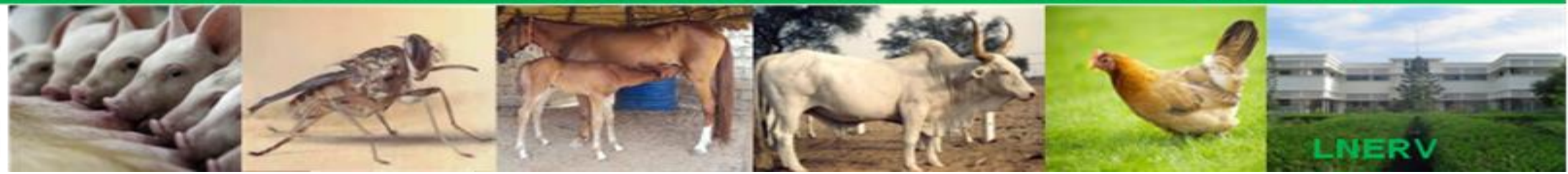
CBPP seromonitoring surveys carried out and results obtained

T1-PPCB

Individual CBPP seroprevalence by region



Régions	Positif	Number of sera tested	Prévalence (%)
Dakar	5	90	5,55
Diourbel	21	468	4,49
Fatick	22	497	4,43
Kaffrine	6	685	0,87
Kaolack	16	340	4,7
Kédougou	3	235	1,28
Kolda	55	1139	4,83
Louga	12	400	3
Matam	6	220	2,73
Saint louis	15	480	3,12
Sédhiou	39	700	5,57
Tambacounda	12	337	3,56
Thiès	23	323	7,12
Ziguinchor	54	480	11,25
Total	**289**	**6394**	**4,52**



CBPP seromonitoring protocols in Senegal

CBPP seromonitoring surveys carried out and results obtained

T2-PPCB results

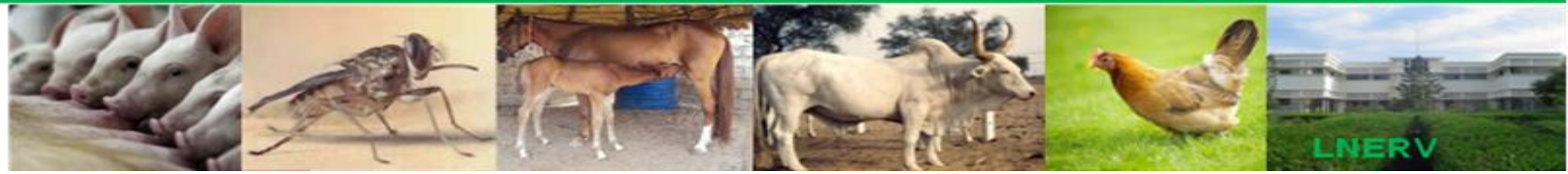
Régions	Positifs	Number of sera tested	Prévalence
Dakar	0	68	0
Diourbel	3	603	0,49
Fatick	5	374	1,33
Kaffrine	26	681	3,81
Kaolack	0	58	0
Kédougou	2	152	1,31
Kolda	4	739	0,54
Louga	3	1041	0,28
Matam	6	204	2,94
Saint louis	15	397	3,77
Sédhiou	9	656	1,37
Tambacounda	20	657	3,04
Thiès	7	472	1,48
Ziguinchor	16	480	3,33
Total	**116**	**6581**	**1,7**

CBPP seromonitoring protocols in Senegal

CBPP seromonitoring surveys carried out and results obtained

- **Comparisons of individual seroprevalence between T0, T1 and T2**

Surveys	Number of sera tested	Positifs	Prévalence (%)
T0	1488	101	6,79
T1	6394	289	4,52
T2	6581	116	1,7



Diagnosis

-The National Livestock and Veterinary Research Laboratory (LNERV) is the only national veterinary laboratory in SENEGAL.

-It is the FAO and ECOWAS regional reference laboratory for transboundary animal diseases and priority zoonoses.

- From 2016 to 2020, the LNERV management was committed to its quality policy, to obtain accreditation to the ISO/IEC 17025 for ELISA test.

DIAGNOSIS OF CBPP

The laboratory can do:

-the diagnosis in the field

-the differential diagnosis,

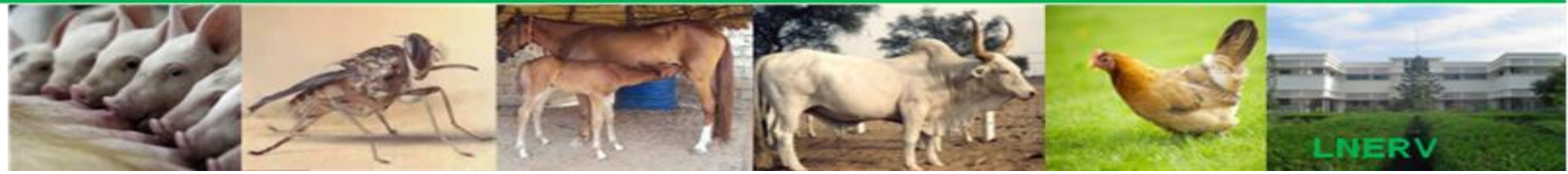
-The direct and indirect diagnosis.

DIAGNOSIS OF CBPP

In the field

This type of diagnosis can be made directly on the living animal from the information collected on the animal:

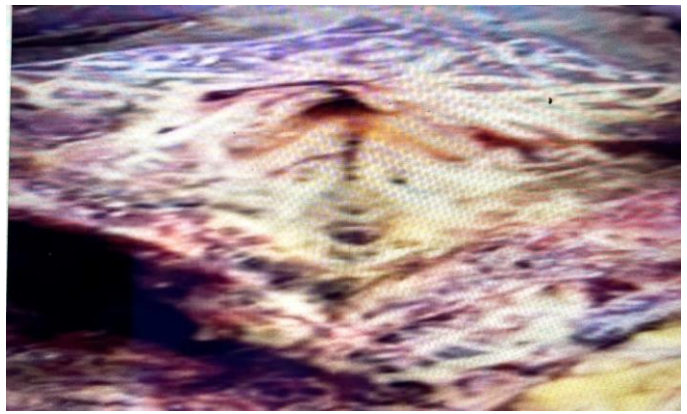
We will suspect CBPP when developing general febrile disorders, accompanied by the appearance of functional signs of pleuropneumonia at rapid progression to fatal respiratory depression, etc.....



DIAGNOSIS OF CBPP

In the field

At the autopsy, we will look for lesions, pleurisy, hepatization of the lungs, sequestrations, the presence of fibrins in the form of "omelettes" on the lung and also of pleural fluid



DIAGNOSIS OF CBPP

Differential diagnosis

CBPP must be distinguished with other respiratory conditions such as septicaemic pasteurellosis of cattle, Paramyxovirus influenza, infectious bovine rhinotracheitis, tuberculosis, etc……

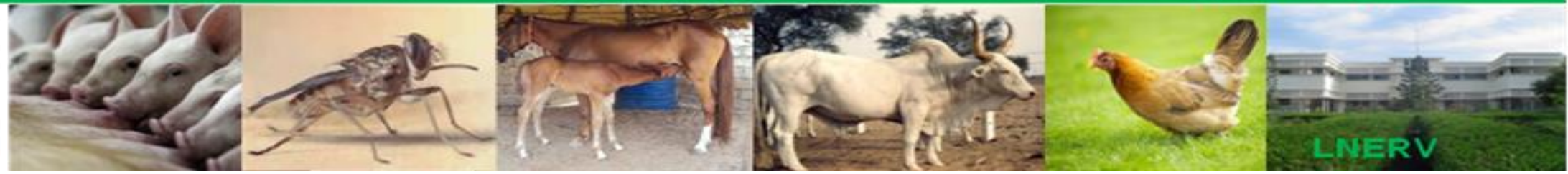
DIAGNOSIS OF CBPP

Direct laboratory diagnosis:

Direct diagnosis corresponds to the isolation of the micro-organism. A distinction is made between: isolation by culture ; genome detection.

Bacteriological: Culture of mycoplasmas in solid medium or in liquid medium

Molecular: conventional PCR for detection of the genome of Mycoplasma mycoides subsp. Mycoides.



DIAGNOSIS OF CBPP

Indirect laboratory diagnosis

Indirect diagnosis allows the detection of specific antibodies in the serum who witnessed the infection.

There are several types of diagnostic test

indirect carried out in our laboratory. Among these tests, we can cite:

- the complement fixation test
- The ELISA test. (IDEXX kit)

Conclusions and perspectives

-Decrease in the individual seroprevalence of CBPP in TO, T1 and T2.

- Carry out awareness caravans on vaccination and marking of animals for each vaccination campaign from 2022.

-Carry out the T3-PPCB surveys in 2022 (planned for 2021 not carried out due to insufficient financial resources.

-Carry out a seromonitoring survey for CBPP every two (2) years.

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THANK YOU FOR YOUR ATTENTION

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