GF-TADs Africa

GLOBAL FRAMEWORK FOR THE PROGRESSIVE CONTROL OF TRANSBOUNDARY ANIMAL DISEASES

Food and Agriculture Organization of the United Nations

World Organisation for Animal Health
Founded as OIE

African Union

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Diagnostic Capacities and Challenges With Regards to CBPP and the Role of National Laboratories as Regional Service Laboratories

Tesfaye Rufael (Dr.), Director General
Animal Health Institute, Sebeta Ethiopia

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Introduction

Animal Health Institute (AHI), Sebeta Ethiopia

- Animal Health Institute established by Federal Democratic Republic of Ethiopia Proclamation No. 1263/2021 article 46. Merging of NAHDIC and NICETT
- The objectives:
  - Cconducting research and diagnostics applicable for prevention and control of animal diseases.
  - Control and eradication measures in areas affected by tsetse fly and trypanosomosis.
  - Training and advisory services on animal health.

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Introduction

- **Vision**
  - By 2032 to be a center of excellence for Research, Diagnosis and Training on animal diseases and other zoonotic diseases.
- **Mission**
  - Diagnosis of animal diseases and related health problems
    - Outbreaks investigation
    - Conduct surveillance and monitoring activities on animal diseases
    - Export and Import Animal testing
  - Applied Research work on animal disease
  - Control and eradication tsetse fly and trypanosomosis
  - Provide training to enhance diagnostic capacity of National and regional veterinary laboratories

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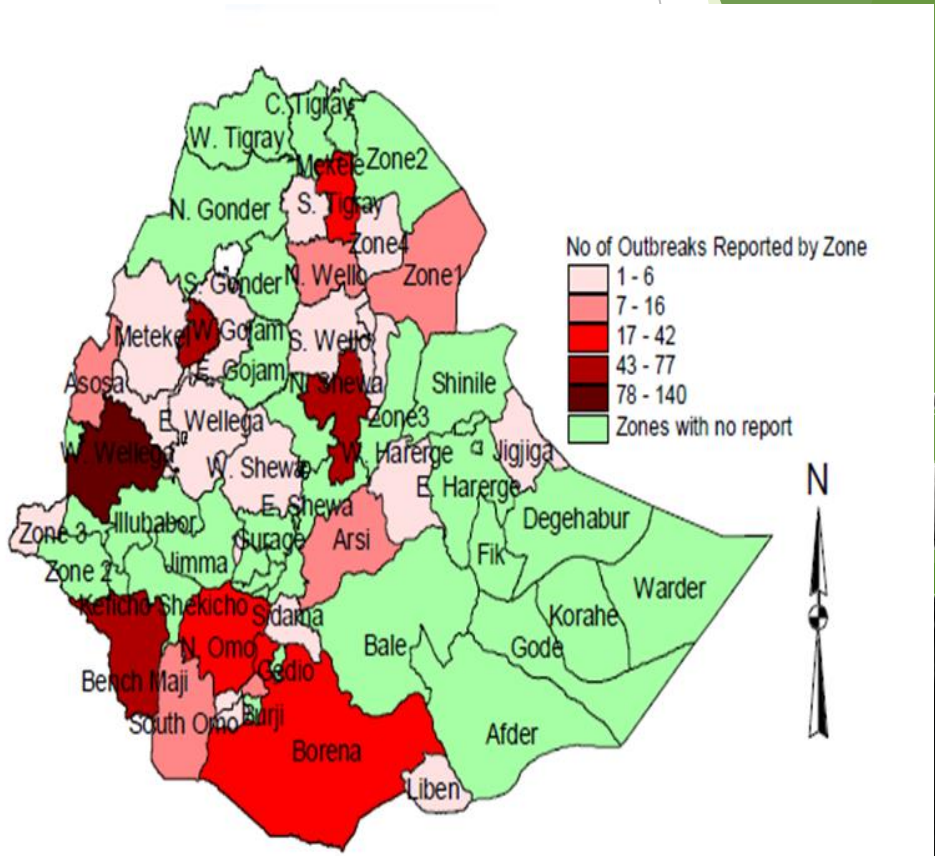
CBPP situation in Ethiopia

- CBPP is endemic in Ethiopia
- CBPP impacts animal health:
  - Decreased animal productivity
  - Reduced food supply and
  - The cost of control measures.
- Map Showing CBPP Outbreaks Reported by Passive surveillance from 1996 - 2001



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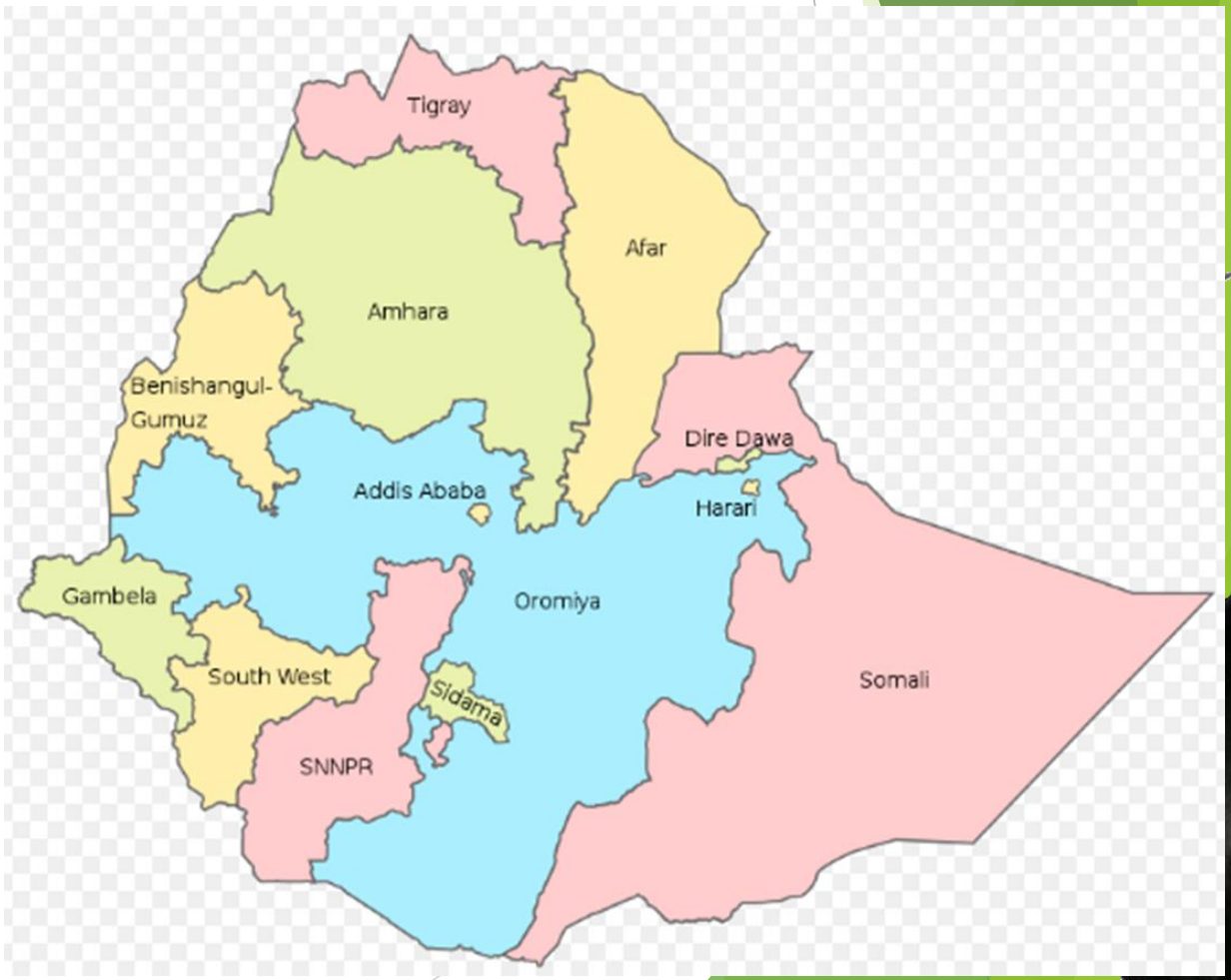
CBPP situation in Ethiopia

- Seroprevalence CBPP in different regional states ofEthiopia :
  1. 7.13% in Afar,
  2. 1.29% in Amhara,
  3. 12.05% in B/Gumuz,
  4. 19.72% in Gambella,
  5. 5.17% in Oromia,
  6. 5.44% in SNNPR,
  7. 0.9% in Somali
  8. 6.11% in Tigray
     - *(Darsema, 2011)*



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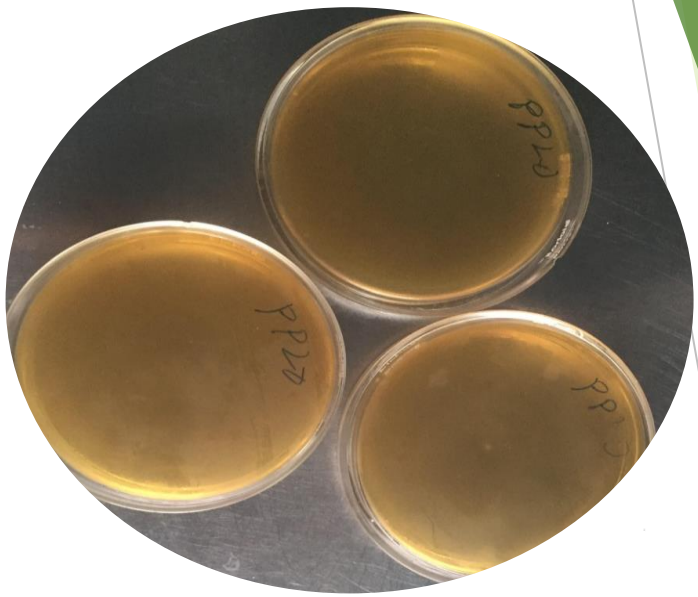
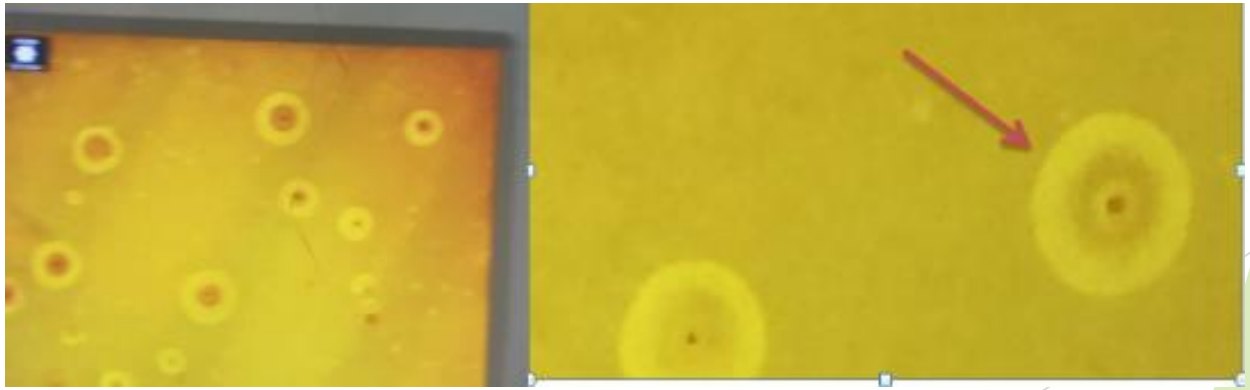
Diagnosis capacities of CBPP at AHI

1. **Mycoplasma isolation & characterization**
   - Mycoplasma supernatant
   - PPLO Agar and PPLO Broth
   - Culture positives samples (tissue & exudate)





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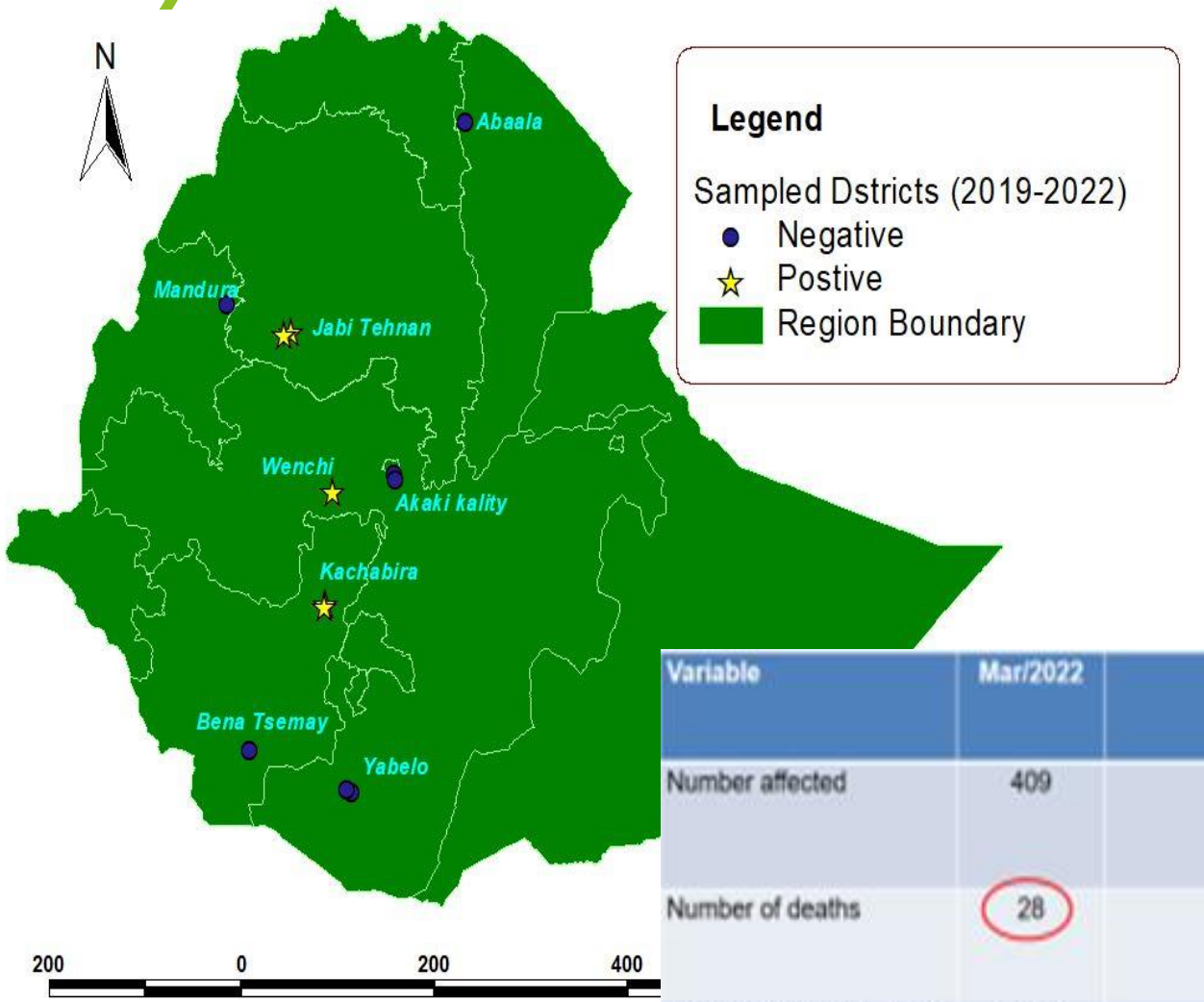
CBPP Outbreaks Investigated by AHI (2019-2022)

- 8 locations
- 93 animals sampled
- 8 animals positive Mmmsc



Variable	Mar/2022	%
Number affected	409	18
Number of deaths	28	1.2
Total number susceptible	2267	

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Diagnosis capacities of CBPP at AHI

2. **Identification and characterization**

- **MALDI-ToF mass spectrometry** is a tool for rapid and accurate identification of bacteria (400 samples/2hr)
- Used also for the diagnosis of CBPP
- identify novel immunogenic proteins (Data base)

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CBPP Diagnosis capacities of CBPP at AHI

3. **Serological tests for** active surveillance of **CBPP at AHI**

- Complement Fixation Test (CFT) and
- Competitive Enzyme Linked Immunosorbent Assay (c-ELISA)

Year	Specimen type	No. tested	No. pos	%
2017	serum	11705	2247	19.2%
2019-2022	Serum	1896	533 (CFT, c-ELISA)	28%

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Diagnosis capacities of CBPP at AHI

4. **Molecular analysis of CPPP at AHI**
   - PCR is used for diagnosis of CBPP
   - RFLP, bands that correspond to DNA fragments for MmmSC
   - CBPP-PCR products run on 2% w/v Agarose gel

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Diagnosis capacities of CBPP at AHI

5. Sequencing of MmmSC

- sequencing facility was established at AHI by support of DTRA.
  - illumina Nextseq 500
  - Bioinformatics
- useful for the diagnosis and epidemiological studies of bacterial pathogens

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Quality Management System(QMS) (ISO 17025)

- AHI has implemented (QMS) of ISO/IEC17025:2005 since 2008
- Accredited in 2012 by SANAS
- Accredited in 2020 by Ethiopian accreditation service (EAS)
- 12 tests Methods
- Scope: Serology, Molecular biology, Bacteriology

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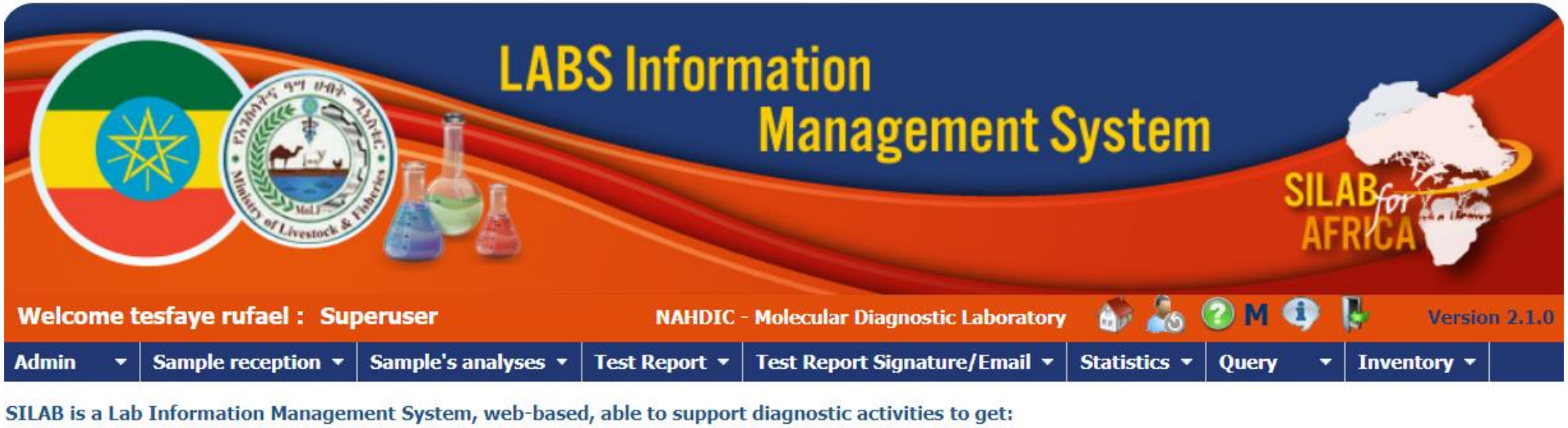
Implemented Laboratory Information Management system in collaboration with IZSAM



- Better delivery of service
- International recognition
- Customer trust
- Reliable data when reporting

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Biorisk management was established

- **BSL-3 Laboratory for the Diagnosis of Zoonotic disease (Ebola, HPAI, Anthrax, Brucellosis, Bovine TB and CVID-19)**
- **Trainings were given for NAHDIC and Regional labs**
- **Documents were prepared (Black and Veatch and NAHDIC staffs).**
- ISO 35001:2019 accreditation for Biorisk management for laboratories was started to implement

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Variable gaps With Regards to CBPP control

1. **Diagnostic kits and reagents**
   - Lack of inputs: consumables and reagents (molecular and sequencing)
   - Luck of local diagnostic kit production (CFT test)
   - Shortage of financial support for cross border surveillance

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Variable gaps With Regards to CBPP control

2. Treatment for clinical disease

- Antimicrobials are still widely used by the pastoralists to treat CBPP in Ethiopia
- Nevertheless, the use of different Antibiotics has been used in the treatment of CBPP
  - lack of antimicrobial efficacy against clinical disease
  - Threat for Anti-microbial resistance

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Variable gaps With Regards to CBPP control

3. use of CBPP vaccines

- There is no any ideal CBPP vaccine has been developed.
- T_1SR was used in combination with rinderpest vaccine during the rinderpest campaign in Ethiopia.
- This approach was very successful for rinderpest eradication campaign but not for CBPP
- The T_1SR vaccine last for short-term immunity

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Variable gaps With Regards to CBPP control

3. use of CBPP vaccines

- Currently freeze-dried live attenuated T1/44 CBPP vaccine is using.
- $T_1$44 induces post-vaccine reactions
- Should be repeated at short time interval (6 months)

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Variable gaps With Regards to CBPP control

4. other control strategies

- **Movement control**
  - In many endemic areas, lack of controlling animal movement
  - lack of animal identification systems
- **Stamping-out through slaughter**
  - stamping-out could not be effectively adopted in many Africa countries
  - Too costly and logistically difficult

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The role of National Laboratories as Regional Service Laboratories

- Improve the Regional labs diagnostic capability for CBPP diagnosis on bacteriological, serological and molecular tests
- Providing reagents for laboratory diagnostic tests
- Standardized test methods and SOPs for Regional Labs

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The role of National Laboratories as Regional Service Laboratories

- Provide CBPP proficiency test (PT) on CBPP for intra laboratories comparison.
- Continuous providing a training on CBPP surveillance
- Technical support to implement QMS, ISO 17025
- Establish and strengthen of veterinary laboratory Network

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Way Forwarded

- Support of financial resources for diagnostic and control of CBPP
- Strong implementation of policies on cattle movement control
- Vaccine improvement and progressive control strategy
- Collaboration work between stockholders and among countries should be strengthen for CBPP control
- Presence of political commitments

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Acknowledgements

- IAEA/FAO, APHL through VETLAB Network
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Thank you

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