



# WOAH ASF TWINNING PROJECT

THEOPHILUS ODOOM  
ACCRA VETERINARY LABORATORY  
VETERINARY SERVICES DIRECTORATE  
ACCRA GHANA



# Veterinary Services Directorate

## MISSION

- ▶ The Mission of the Veterinary Services Directorate of the Ministry of Food and Agriculture is to ensure a stable animal health situation through the provision of quality animal health care services by both public and private sector veterinary practitioners to enhance livestock, poultry and companion animals' production and productivity.

## ACCRA VETERINARY LABORATORY

- To provide appropriate and timely diagnostic support for the protection of animal and human health through early detection and monitoring of animal diseases



# ACCRA VETERINARY LABORATORY (AVL)

## ▶ LABORATORY SERVICES

- ▶ Anatomic Pathology
- ▶ Bacteriology
- ▶ Food Safety (AMR)
- ▶ Clinical Pathology
- ▶ Parasitology
- ▶ Molecular Diagnosis
- ▶ Serology
- ▶ Vaccine Production
- ▶ \*Covid-19

## BUILDINGS



**BSL-3 & 2 MODULAR LABS**



**MAIN DIAGNOSTIC BUILDING**



**NDI-2 VACCINE PRODUCTION LAB**



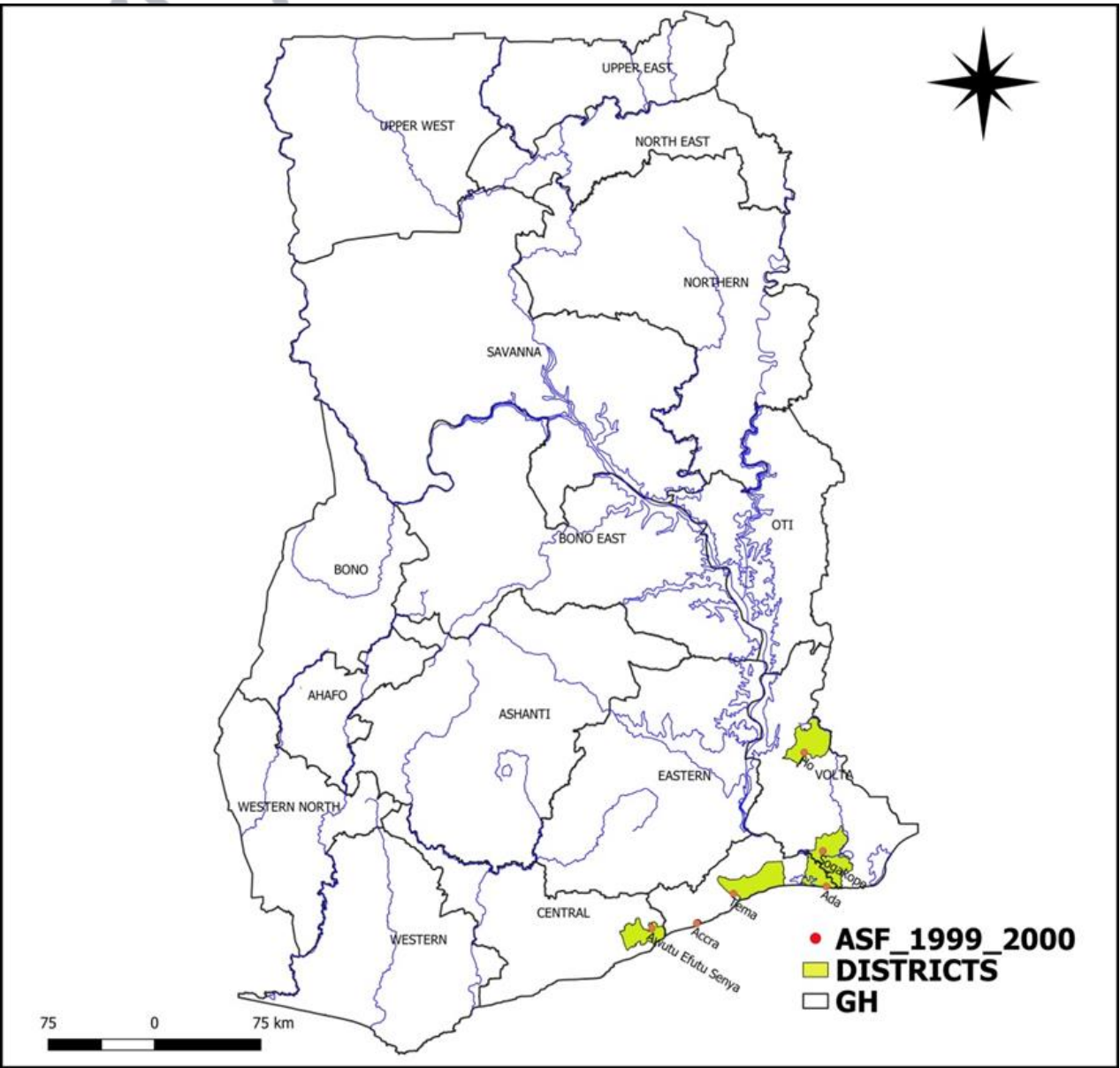
**MOLECULAR LAB**



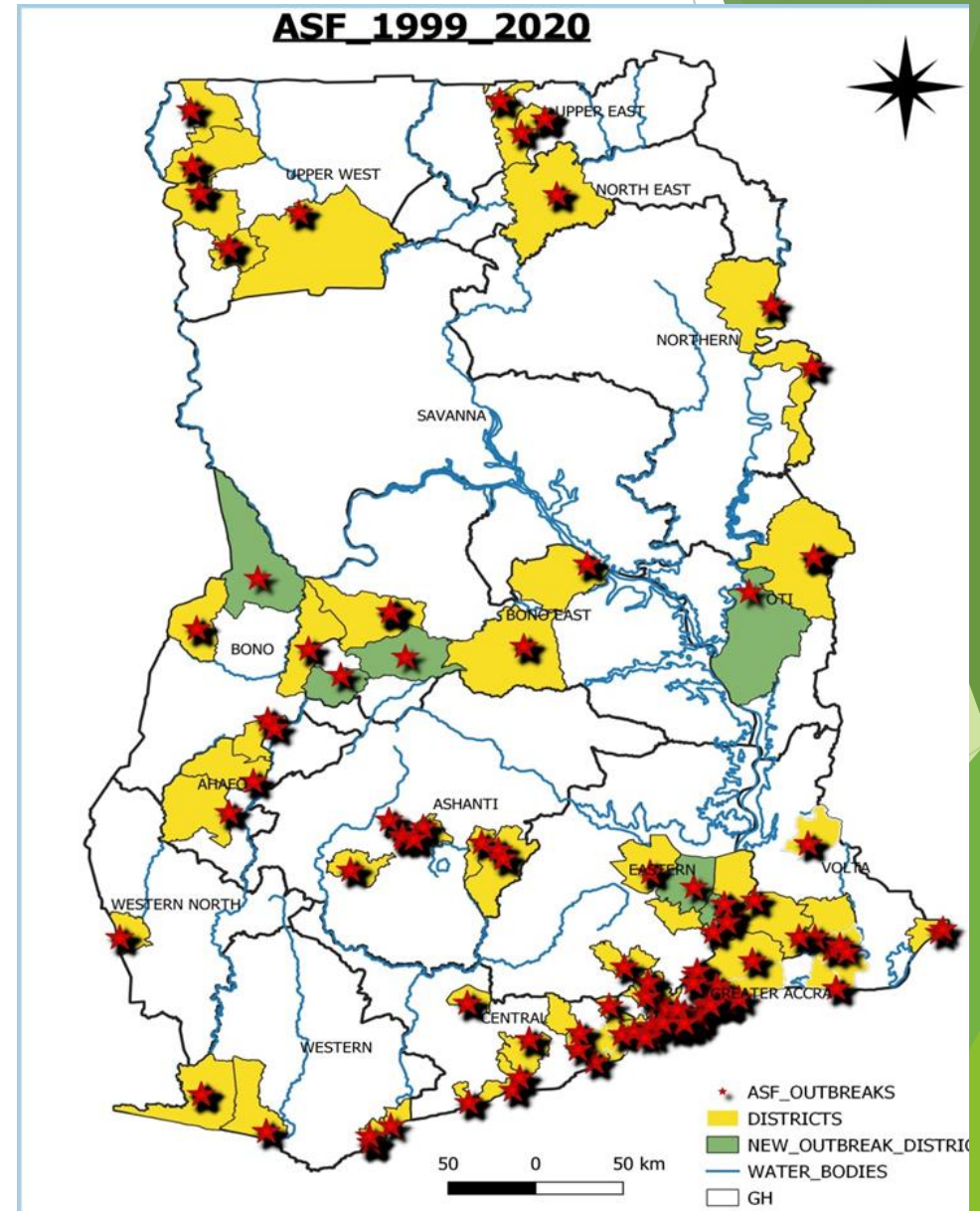
# ASF WORK AT AVL



# ASF OUTBREAK 1999 - 2000

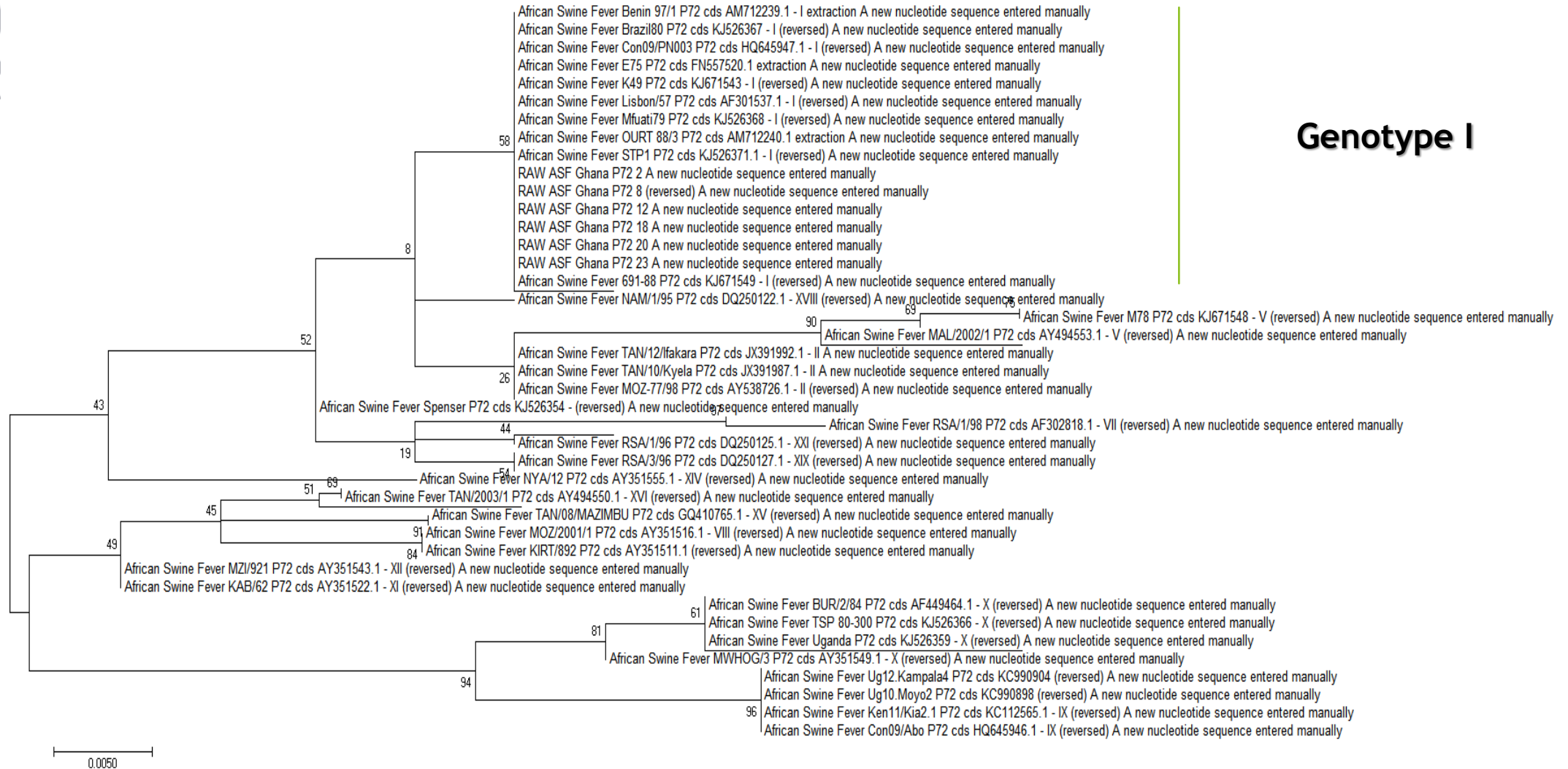


# ASF OUTBREAK 1999 - 2020



# Phylogenetic tree analysis of P72 gene of ASF Isolates from Ghana

## Genotype I

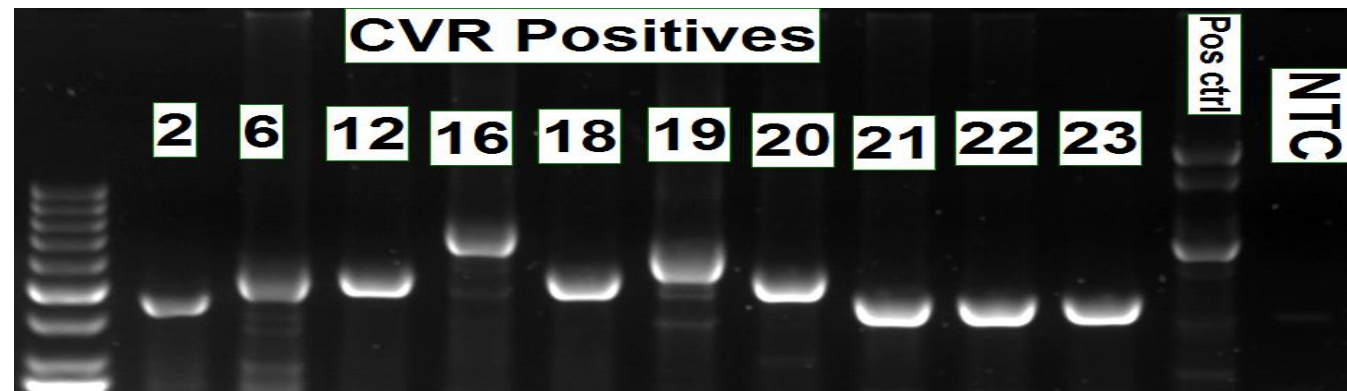


- All isolates from Ghana clustered within Genotype 1

# Phylogenetic tree analysis based on the central variable region (CVR) Gene



0.0050







Article

## The 2022 Outbreaks of African Swine Fever Virus Demonstrate the First Report of Genotype II in Ghana

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<sup>4</sup> University of Illinois at Urbana-Champaign, Champaign, IL 61820, USA

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<sup>†</sup> Authors contributed equally to this work.

**Abstract:** African swine fever (ASF) is a lethal disease of domestic pigs that has been causing outbreaks for over a century in Africa since its first discovery in 1921. Since 1957 there have been sporadic outbreaks outside of Africa, however, no outbreak has been as devastating and as far-reaching as the current pandemic that originated from a 2007 outbreak in the Republic of Georgia. Derivatives with a high degree of similarity to the progenitor strain, ASFV-Georgia/2007, have been sequenced from various countries in Europe and Asia. However, the current strains circulating in Africa are largely unknown and 24 different genotypes have been implicated in different outbreaks. In this study, ASF isolates were collected from samples from swine suspected of dying from ASF on farms in Ghana in early 2022. While previous studies determined that the circulating strains in Ghana were p72 Genotype I, we demonstrated here that the strains circulating in 2022 are derivatives of the p72 Genotype II pandemic strain. Therefore, this study demonstrates for the first time the emergence of Genotype II ASFV in Ghana.

**Keywords:** African swine fever; ASFV; Ghana; Genome

Citation: Spinard, E.; Rai, A.; Osei-Bonsu, J.; O'Donnell, V.; Ababio, P.T.; Tawiah-Yingar, D.; Arthur, D.; Baah, D.; Ramirez-Medina, E.; Espinoza, N.; et al. The 2022 Outbreaks of African Swine Fever Virus Demonstrate the First Report of Genotype II in Ghana. *Viruses* 2023, 15, x. <https://doi.org/10.3390/vxxxx31>

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GENOTYPE II  
IN GHANA



# EXPERIENCE FROM THE AVIAN INFLUENZA WOA TWINNING PROJECT



## PROJECT TITLE

# Enhancing Diagnostic Capacity for Avian Influenza and Newcastle Disease in Ghana

## ► **TWINNING LABORATORY**

National Centre for Foreign Animal Disease Laboratory (NCFAD), Winnipeg, Canada



# OBJECTIVES OF THE AI AND ND PROJECT

## Objective 1)

- Pre-project start meeting to conduct assessment of AVL.

Assessment of AVL biological risk management system to ensure that it is operational and meets the requirements necessary for project activities to begin.

## Objective 2)

- Structure the training on serological, virological and molecular methods used for the diagnosis of avian influenza and Newcastle disease to meet the OIE standards and their local needs.

## Objective 3)

- Establish a system for proficiency testing to help accreditation process

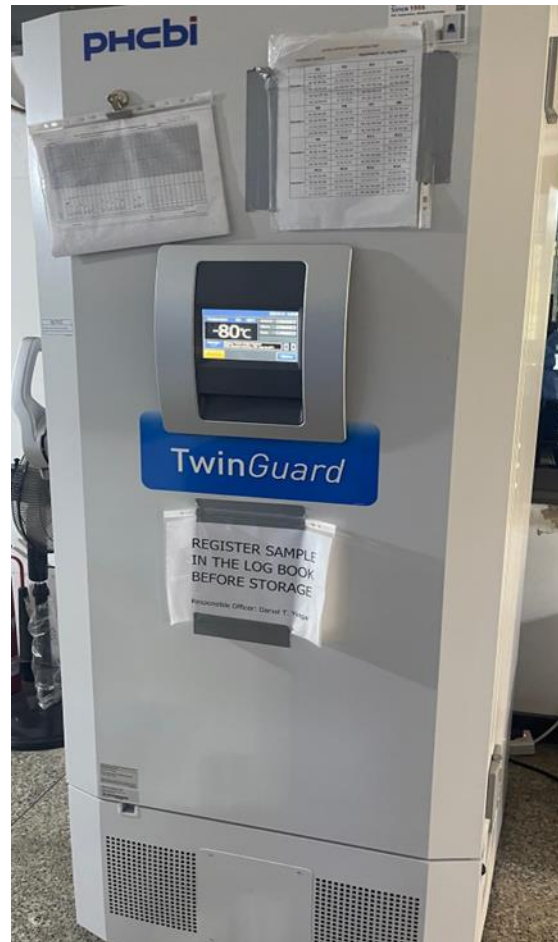
## Objective 4)

- Establishment/improvement of monitoring and auditing programs at the AVL in collaboration with NCFAD.

# KEY ACTIVITIES

## Supply of Essential Laboratory Equipment

- ▶ Real-Time PCR machines (BioRad)
- ▶ CO2 Incubator
- ▶ 70oC Deep freezers
- ▶ ELISA Readers
- ▶ Automated ELISA washer
- ▶ Desktop Computers
- ▶ Laptop computers
- ▶ Centrifuges
- ▶ PCR workstations
- ▶ Qubit fluorometer
- ▶ Minlon Mk1c sequencer
- ▶ Water purifying machine
- ▶ Incinerator
- ▶ etc







# KEY ACTIVITIES

Supply of Essential Laboratory reagents and consumables

- Primers and probes for AI and ND diagnosis
- Primers and probes for Rabies diagnosis
- Primers and for other poultry diseases diagnosis
- PPE's
- Gloves
- Biohazard bags



# KEY ACTIVITIES

- ▶ Training Ghana staff and assessment of training compliance (AVL and CFIA)
- ▶ Training 3 staff at CFIA facility in Canada for a minimum of 3 weeks per visit
  - ▶ Serology (HA & HI and AGID)
  - ▶ Molecular (extraction, qPCR)
  - ▶ virus characterization
  - ▶ SOP development
  - ▶ analysis and equipment maintenance
  - ▶ equipment troubleshooting
  - ▶ equipment verification

Emphasis was placed upon the requirements from an OIE perspective and Quality Assurance (using ISO 17025 as a reference).

Practical daily use of biosafety, good laboratory practices and QA systems in the laboratory were observed. Improvements to the general infrastructure in regards to biosafety and work flow were assessed.

# OUTCOME FROM THE AI AND ND TWINNING PROJECT

- ▶ The project was very successful in improving the ND and AI diagnostic capabilities of AVL, Ghana, however in order to maximize future work in the lab, steady funding opportunities from the Ghana government and international partners will be required. A commitment of guaranteed funding for the lab and its activities would ensure that AVL has the required consumables to perform activities and are able to maintain the laboratory equipment.
- ▶ The molecular trainings that was provided to AVL staff on the diagnosis of AIV and NDV is being translated for the diagnosis of other major TAD's and zoonotic diseases such as rabies, FMDV, ASF,
- ▶ The OIE training received by AVL staff in Canada and in Ghana and the provision of the necessary reagents/equipment and test methods to conduct diagnostic tests according to the OIE standards has placed the lab to undertake important diagnostic activities under the “**One Health**” umbrella including testing for human COVID-19 and rabies samples. AVL was one of the testing sites during the COVID-19 pandemic.



# OUTCOME FROM THE AI TWINNING PROJECT

- ▶ The OIE training and acquisition of state of the art laboratory equipment that is required to conduct various diagnostic tests has position AVL is in a better position to diagnose major TAD's and zoonotic diseases, improve their capacity in biosafety/biosecurity, Quality Assurance and lead the way for ISO certification.
- ▶ In addition, the project has allowed to conduct Avian Influenza and Newcastle disease surveillance testing for 3 consecutive years. There are plans to conduct surveillance of other important animal diseases currently circulating in Ghana that have major significance globally. This in turn could be translated into effective control measures and improved disease control could enhance food security and poverty reduction.



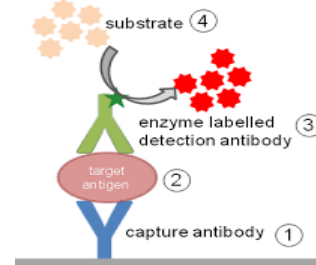
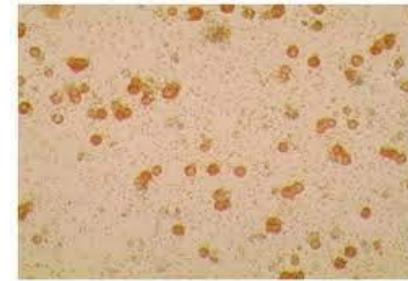
# WOAH ASF TWINING PROJECT WITH OVRI

## KEY AREAS

Virus isolation and Heamadsorption test (HAD)

ELISA for Ag detection

Sequencing



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180 190 200 210 220 230 240 250 260 270 280 290
| | | | | | | | | | | | | | | | | | | | | |
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# SCOPING MISSION FINDINGS



27 AND 28 June, 2023



# OBJECTIVES

- ▶ To confirm the Laboratory capacity to perform basic diagnostic assays for the confirmation of ASF.
- ▶ To develop capacity to perform advanced diagnostic for ASF in support of epidemiological investigations.
- ▶ To strengthen the Quality Management System and assist in accrediting ASF diagnostic capabilities.
- ▶ To establish a framework for the laboratories to provide support the other laboratories within the region.



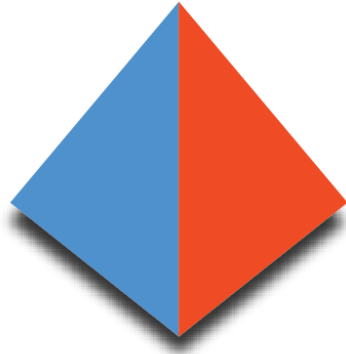
## ACTIVITIES

- ▶ Assessment of the diagnostic capacity of the AVL.
- ▶ Training of AVL staff at ARC-OVRI on advanced diagnostic for ASF in support of epidemiological investigations.
  - ▶ Virus Isolation
  - ▶ Sequencing and Phylogenetic analysis
  - ▶ Detection of ASF variants by RT-PCR
  - ▶ Serological assays for the detection of ASFV antigens
  - ▶ Application of point-of-care (Pen-side testing)
- ▶ Back-stop training at the AVL to assist with the implementation of assays.
- ▶ Assessment of implementation through audits.



# TIMELINES

Activity	07/23 -12/23	01/24-06/24	07/24-12/24	01/25-06/25	07/25-12/25	01/26-06/25
Capacity Assessment						
Training (OVRI)		Virus Isolation Phylogenetics				
Implementation (Accra)			Virus Isolation Phylogenetics			
Training (OVRI)				Antigen detection POC Testing		
Implementation (Accra)					Antigen detection POC Testing	
Accreditation of QMS					Formalization of ISO 17025	Assessment and Accreditation
Final Assessment						Assessment (WOAH ToR)



# GF-TADs

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

*Africa*

African  
Union 