



# BIOSECURITY, SURVEILLANCE AND DIAGNOSIS OF ASF

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NVRI, Vom



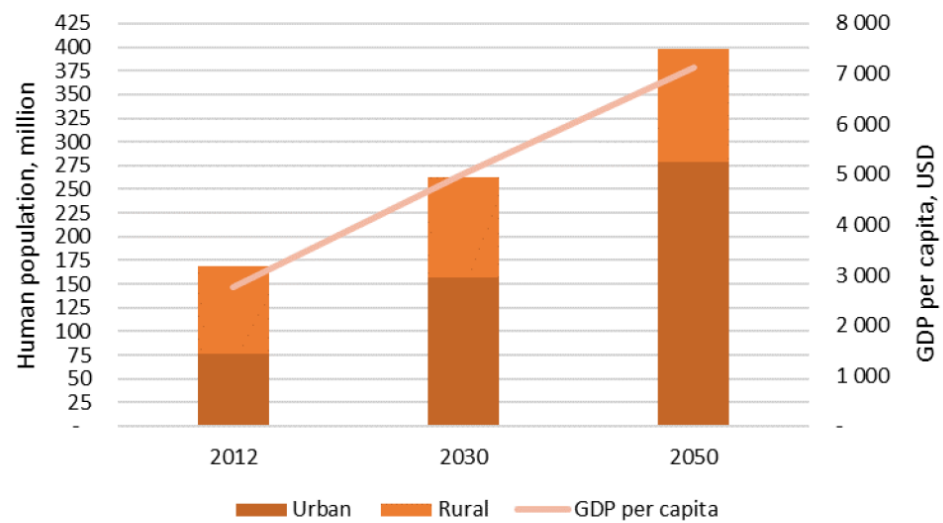
# Situational analysis of the pig sector in Nigeria

- ▶ High potential for growth due to rising demand for pork
- ▶ Driven by Population growth, Income-per-capita, and urbanization (Satterthwaite et al. 2010)
- ▶ -The pig population is >7m (+222% by 2050)
- ▶ □ Pigs contribute to livelihoods and income to meet emergency needs and school fees



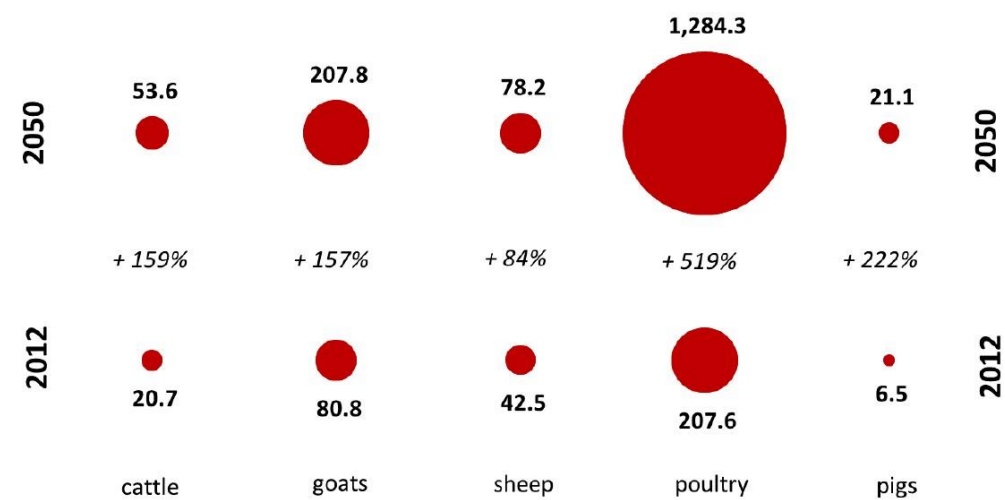


**Fig. 1.** Nigeria: Current and projected population and GDP per capita, 2012-2030-2050



Source: UN 2017, 2018; SSP, 2016

**Fig. 5.** Nigeria: Current and projected livestock population by species (million heads), 2012-2050





# Background of Smallholder Pig Value Chains

- Smallholder pig value chain activities - commenced in 2020
- Funding support: AU (ASF-RESIST), REDISSE
- ▶ Key objective: Identify participants and knowledge of the disease along the value chain
- ▶ Methodology
- ▶ Focus Group Discussion,
- ▶ Key Informant interview,
- ▶ Participatory Epid



- ▶ A questionnaire survey was conducted during a meeting with one hundred and thirty (130) pig farmers and other value chain actors between the 8 - 21st November 2020.
- ▶ The participants were from 20 pig-producing states of Nigeria (Lagos, Ogun, Osun, Oyo, Akwa Ibom, Rivers, Edo, Delta, Enugu, Imo, Abia, Ebony, Gombe, Taraba, Adamawa, Nasarawa, Niger, Benue, Plateau and Kaduna state).

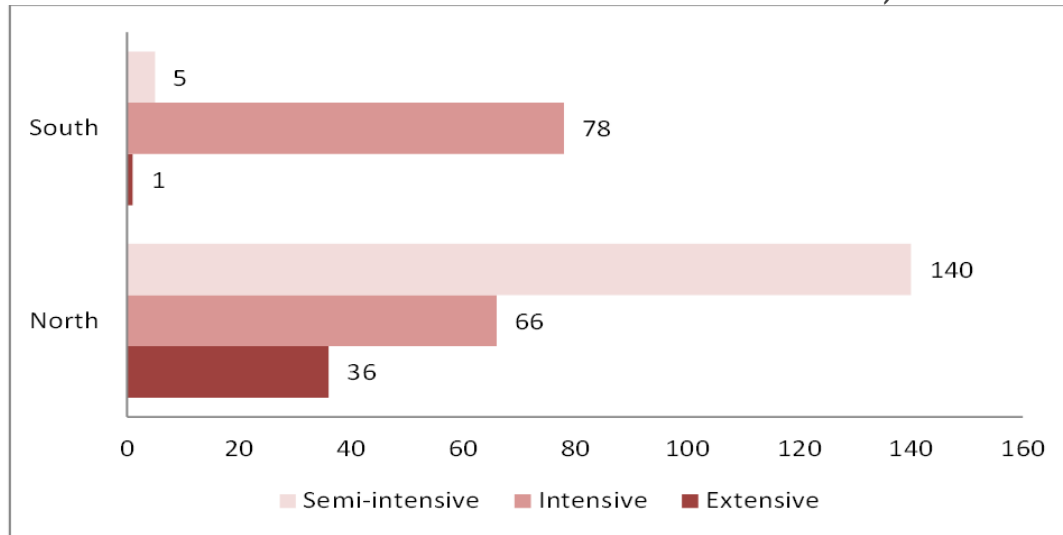


Figure 3: Barplot showing pig production systems practiced by pig farmers in northern and southern Nigeria

	Frequency	Percent	2.5 %	97.5 %
<u>(Intercept)</u>			-906.931	108.564
<b>Role</b>				
Farmers	61	58.7		
Others	19	18.3	-0.579	1.779
Veterinarian	11	10.6	-0.167	3.441
Processor	7	6.7	-2.460	1.174
Transporter	4	3.8	-64.575	665.453
Traders	2	1.9	-4.350	2.515
<b>Gender</b>				
Male	83	79.8	-0.958	1.281
Female	21	20.2		
<b>Education</b>				
Tertiary	81	77.9	-3.293	0.760
Secondary	15	14.4	-2.999	1.383
Primary	8	7.7		
<b>Total</b>	104	100.0		



# Farmers and value chain analysis

**TABLE 3 ASSOCIATION OF ASF OUTBREAK WITH PARTICIPANTS' DEMOGRAPHICS**

<i>Variables</i>	<i>Not Experienced ASF No (%)</i>	<i>Experienced ASF No (%)</i>	<i>Total</i>	$\chi^2=$	<i>df</i>	<i>Cramer's V</i>	<i>Fisher's p</i>
<i>Role</i>				4.915	5	0.217	0.447
<b>Farmers</b>	25 (7.6)	36(53)	61(58.7)				
<b>Others</b>	6(16.2)	13(19.4)	19(18.3)				
<b>Processor</b>	3(8.1)	4(6)	7(6.7)				
<b>Traders</b>	1(2.7)	1(.5)	2(1.9)				
<b>Transporter</b>	0(0)	4(6)	4(3.8)				
<b>Veterinarian</b>	2(5.4)	9(13.4)	11(10.6)				
	37(100)	67(100)	104(100)				
<i>Gender</i>				0.000	1	0.026	0.803
<b>Female</b>	8(21.6)	13(19.4)	21(20.2)				
<b>Male</b>	29(78.4)	54(80.6)	83(79.8)				
	37(100)	67(100)	104(100)				



**Table 4 Participants' knowledge of signs and method of spread of ASF in the study area associated with the history of ASF outbreak (n= 104)**

Variables	Not Experienced ASF No (%)	Experienced ASF No (%)	Total	$\chi^2=$	df	Cramer's V	Fisher's p
<b>Knowledge of stake holders</b>							
<b>Know the cause of ASF</b>							
No	22 (59.5)	34 (50.7)	56 (53.8)	0.420	1	0.084	0.517
Yes	15 (40.5)	33 (49.3)	48 (46.2)				
<i>Total</i>	37 (100)	67 (100)	104 (100)				
<b>Know the Signs of ASF</b>				18.980	1	0.451	0.000
No	18 (48.6)	6 (9)	24 (23.1)				
Yes	19 (51.4)	61 (91)	80 (76.9)				
<b>Total</b>	37 (100)	67 (100)	104 (100)				
<b>Know the breed affected</b>				0.804	2	0.088	0.775
<b>Cross breed</b>	24 (64.9)	40 (59.7)	64 (61.5)				
<b>Exotic</b>	2 (5.4)	7 (10.4)	9 (8.7 0)				
<b>Local</b>	11 (29.7)	20 (29.9)	31(29.8)				
<i>Total</i>	37 (100)	67 (100)	104 ( <u>100</u> )				



Research Article

# Biosecurity breaches on pig farms is associated with the history and spread of African Swine Fever in Nigeria

Rebecca Weka, Isioma Ifende, Ayuba Sini, Philip Ayuba, David Tsokar, and 7 more



**This is a preprint; it has not been peer reviewed by a journal.**



<https://doi.org/10.21203/rs.3.rs-2434973/v1>

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# Diversity and emergence of new variants of African swine fever virus Genotype I circulating in domestic pigs in Nigeria (2016–2018)

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GENOME SEQUENCES

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<https://doi.org/10.1128/mra.00350-21>

## First-Time Presence of African Swine Fever Virus Genotype II in Nigeria



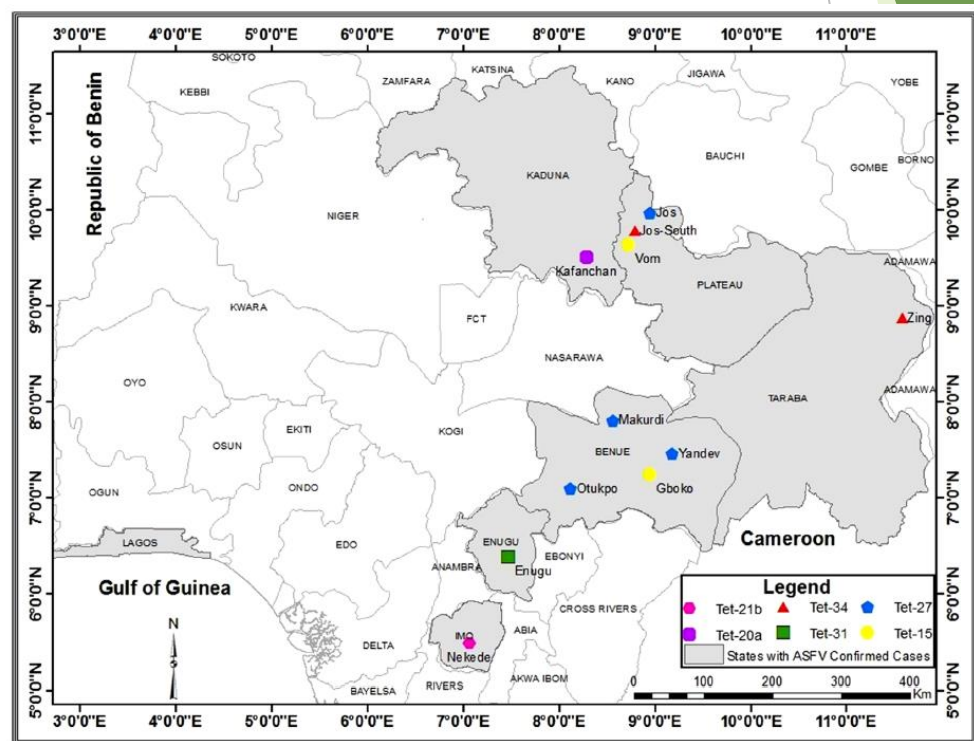
Article

## Characterization of a Novel African Swine Fever Virus p72 Genotype II from Nigeria



**TABLE 1** Distribution of African swine fever outbreaks, samples collected, laboratory results in eight states of Nigeria from 2016 to 2018

Year	State	No. of outbreaks	Samples collected	Positive samples by PCR
2016	Benue	1	2	1
	Kaduna	1	2	1
	Plateau	3	10	2
2017	Abia	1	1	1
	Enugu	1	2	2
	Imo	1	2	2
2018	Benue	11	38	11
	Lagos	1	2	2
	Plateau	16	47	14
	Taraba	1	4	2
<b>Total</b>		<b>37</b>	<b>110</b>	<b>38</b>



**FIGURE 1** Map of Nigeria showing the distribution of African swine fever virus genotype I variants recovered from outbreaks between 2016 and 2018



# ENHANCED SURVEILLANCE AND DIAGNOSTIC CAPABILITIES



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Transboundary and Emerging Diseases

WILEY

ORIGINAL ARTICLE

# Live pig markets are hotspots for spread of African swine fever virus in Nigeria

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Maimuna A. Habib<sup>5</sup> | Rebecca Weka<sup>6</sup> | Vincent B. Muwanika<sup>7</sup> | Charles Masembe<sup>2</sup> |  
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# Result of surveillance

- ▶ total of 217 sera samples were analysed using ID Screen ASF Indirect
- ▶ (IDVet, Grabels, France),
- ▶ Seroprevalence of 6.9% (16/217),
  - ▶ Dawaki 5.6% (1/18),
  - ▶ Katsit 4.2% (7/167),
  - ▶ Numan 27.3% (6/22) and
  - ▶ Pandam 10% (1/10).
- ▶ A total of 613 samples were collected comprising
  - ▶ 355 tissue and 258 whole blood samples
  - ▶ Overall positivity of 10.77% (66/613).



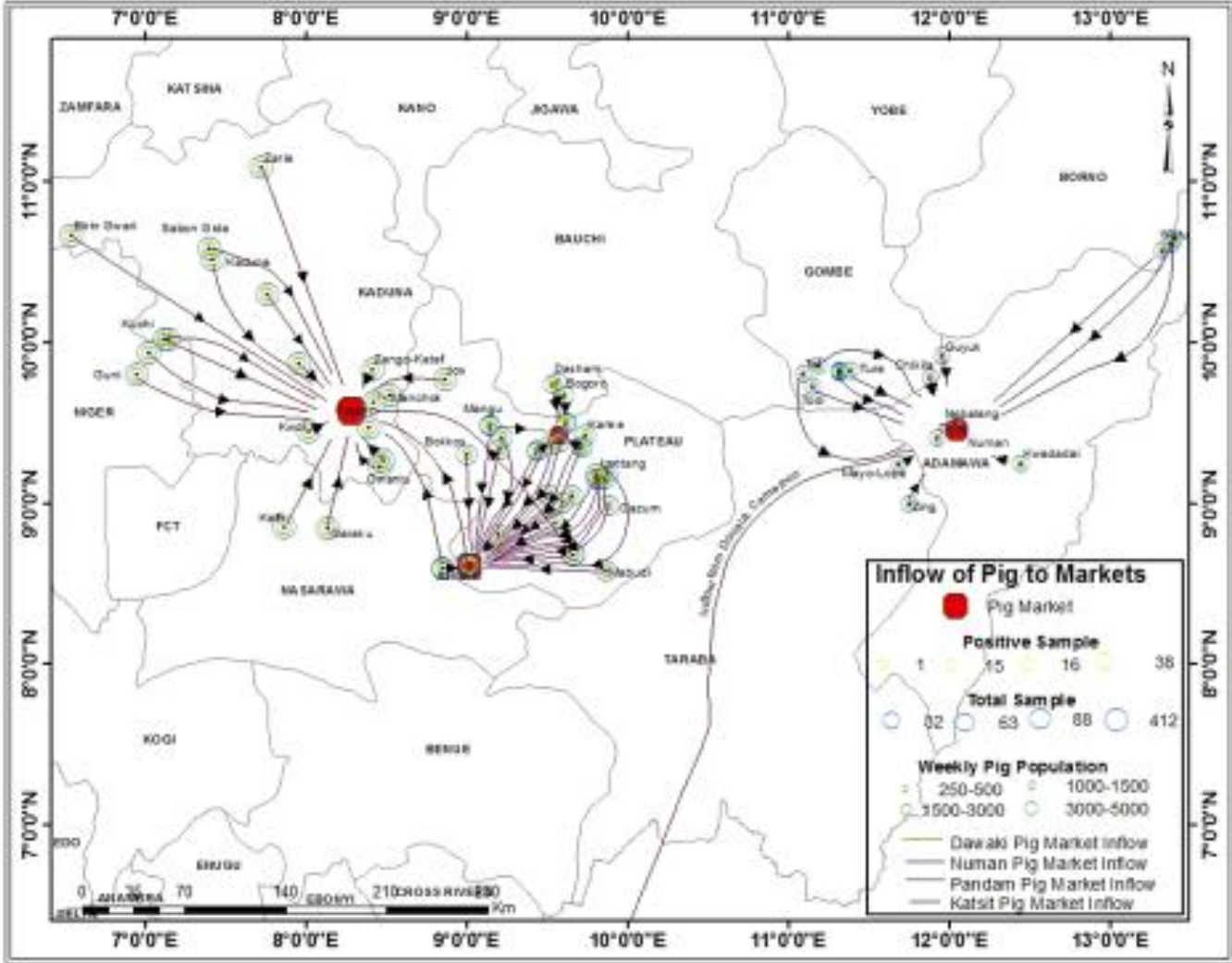


**TABLE 1** Selected live pig markets located in Nigeria where this study was carried out

Market	Village/LGA	State	Market days	Presence of pig slaughter slab within/by a perimeter fence of market
Dawaki pig market	Dawaki/Kanke	Plateau	Thursdays	Yes
Katsit pig market	Katsit/Zangon/Kataf	Kaduna	Thursdays	Yes
Numan pig market	Numan/Numan	Adamawa	Tuesdays	No
Pandam pig market	Pandam/Quan Pan	Plateau	Mondays	No



# Live animal market/Movement



12°0'0"N

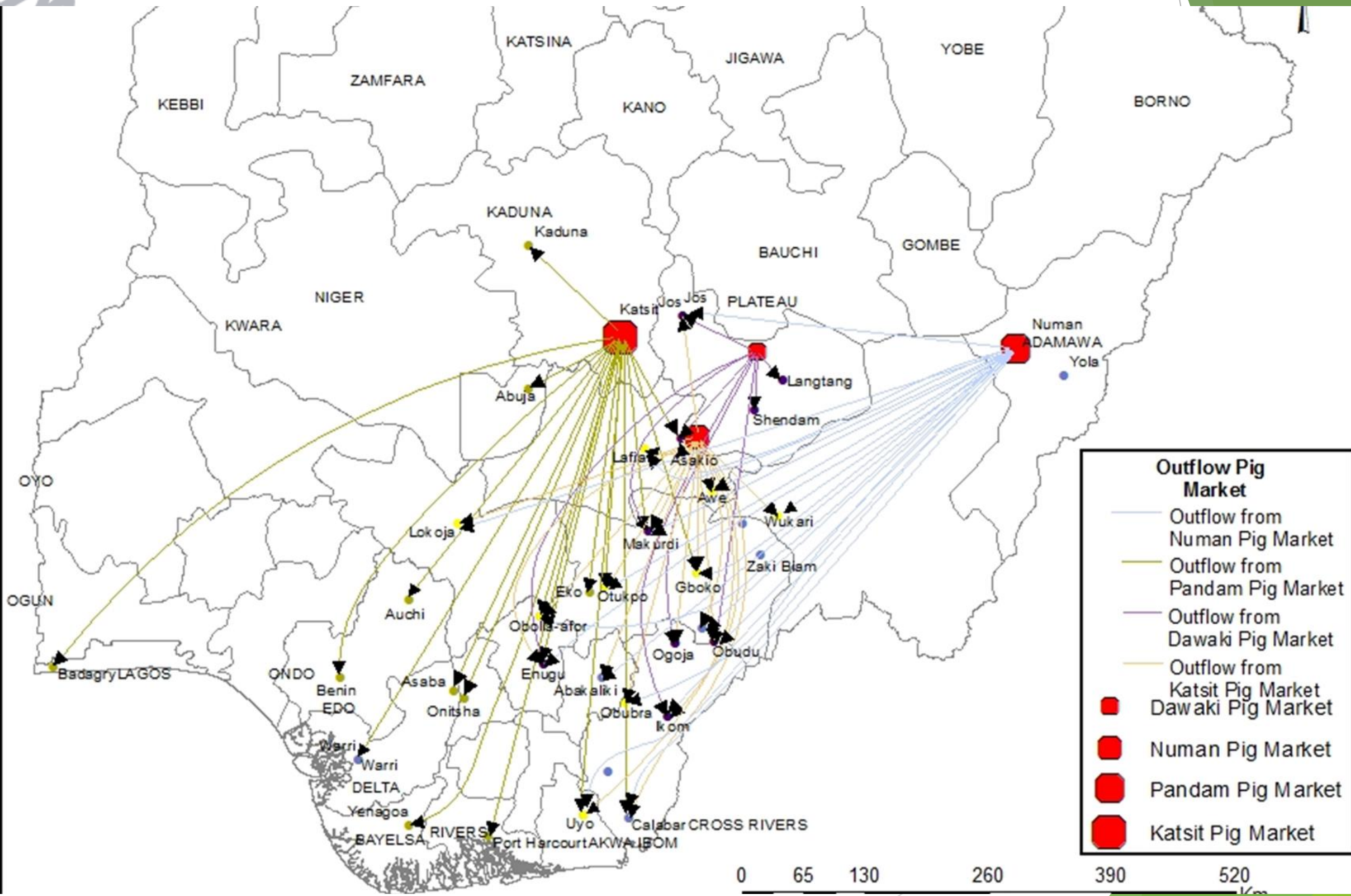
9°0'0"N

6°0'0"N

12°0'0"N

9°0'0"N

6°0'0"N

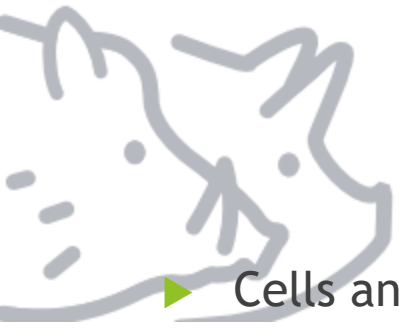


**Outflow Pig Market**

- Outflow from Numan Pig Market
- Outflow from Pandam Pig Market
- Outflow from Dawaki Pig Market
- Outflow from Katsit Pig Market
- Dawaki Pig Market
- Numan Pig Market
- Pandam Pig Market
- Katsit Pig Market

0 65 130 260 390 520 Km





# Rapid and early diagnostic studies

## ▶ Cells and Virus:

- ▶ PLC/Vero, (EURL ASF protocol)

- ▶ ASFV NGR/LGT/2015, 10% TS in PSGA, incubated 40C overnight, filtered using 0.45 µm

## ▶ First Experimental infection:

- ▶ Six 8-weeks old cross-breed large white pigs that were antibody and antigen negative by indirect-ELISA (ID Screen® African Swine Fever) and PCR, respectively were used for this study.

- ▶ 4 were inoculated with ASFV and 2 kept as control (1ml of 10<sup>2</sup> TCID<sub>50</sub>)

- ▶ Blood, ocular and nasal swabs, weight and temperature were collected and viremia assessed using molecular technique.

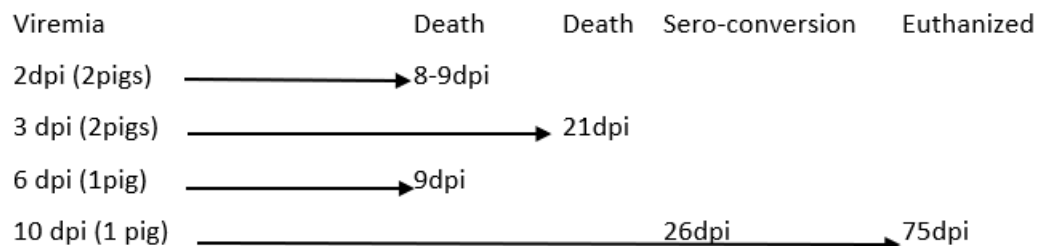
- ▶ clinical signs were observed and survivor euthanized.



- ▶ Second Experimental infection: 6wks old piglet and one as a control
- ▶ DNA Extraction and conventional PCR/Real-Time - PCR
- ▶ Enzyme-linked Immunosorbent Assay (ELISA)
- ▶ Scoring of ASF symptoms and pathological findings at autopsy
- ▶ Immunoblotting assay



# Result



Pig/ID	Viremia	C-PCR	DB-PCR	ELISA
45	2 dpi	Positive	Positive	Negative
46	6 dpi	Positive	Positive	Negative
121	3 dpi	Positive	Positive	Negative
122	10 dpi	Positive	Positive	<b>Positive</b>
123	Control	<b>Negative</b>	<b>Negative</b>	<b>Negative</b>
124	Control	<b>negative</b>	<b>Negative</b>	<b>Negative</b>
125	3 dpi	Positive	Positive	Negative
126	2 dpi	Positive	Positive	Negative

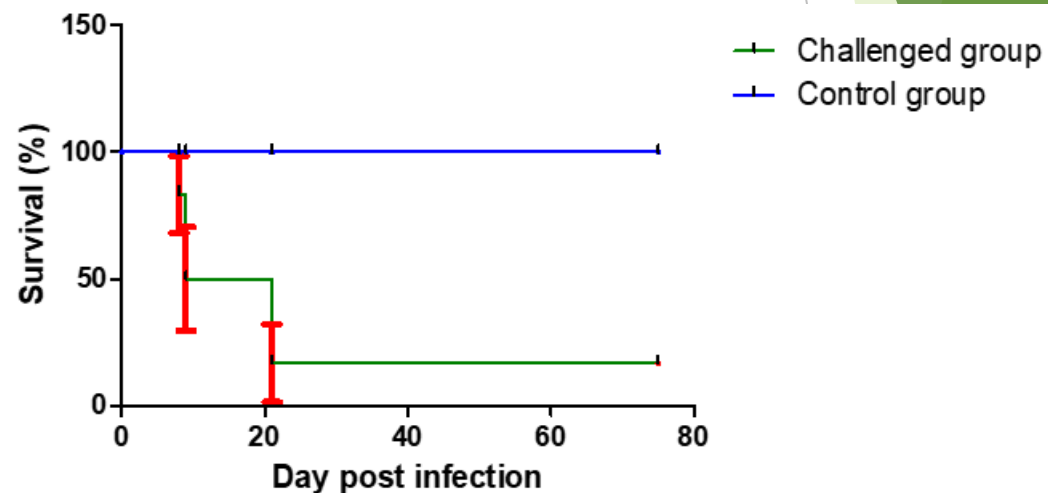


Fig.1. Percentage of surviving animals. Group of pigs (6) were challenged intramuscularly (IM) ( $10^2$  TCID<sub>50</sub>/ml) with LGT\_15 ASFV isolate, genotype I. Days post-challenge (x-axis) and percent survival (y-axis).



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The following is published as supplement to this Gazette :

Act No.	Short Title	Page
12	Animal Diseases (Control) Act, 2022 .. .. .	A269-351



## NATIONAL STRATEGY FOR THE CONTROL OF AFRICAN SWINE FEVER IN NIGERIA, MAY, 2020

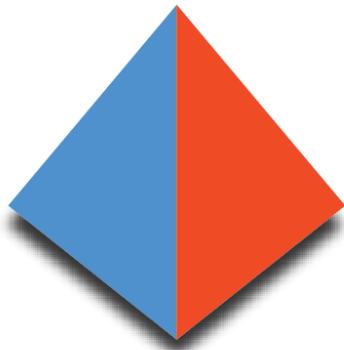
## REGIONAL STRATEGY FOR THE CONTROL OF AFRICAN SWINE FEVER IN AFRICA



Accra, 2017







# GF-TADs

GLOBAL FRAMEWORK FOR THE  
PROGRESSIVE CONTROL OF  
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