**NATIONAL VETERINARY RESEARCH INSTITUTE (NVRI) VOM**

# 2022 ANNUAL REPORTS

## OUR MANDATE

A) Conduct research into all aspects of animal diseases, their treatment and control.
B) Develop and produce animal vaccines, sera and biological to meet the national demand.
C) Provide surveillance and diagnosis of animal diseases.
D) To introduce exotic stock for improving egg, meat and milk production.
E) Provide extension services and publications to poultry and livestock farmers.
F) Train Intermediate manpower in Veterinary and Medical Laboratory Technology and Animal Health and Production Technology

## OUR MISSION

To conduct research, disease surveillance, diagnosis, development and production of vaccines and biological for the control of animal and zoonotic disease, applying modern technology based on international best practices.

## OUR VISION

To be the Apex Veterinary Research Institute in Africa driven by excellence in Research, Diagnosis, Vaccine Development and Production.

## OUR Core Values

**Excellence:** Products and services that meet international standard and customer satisfaction.

**Integrity:** Good conduct and character in service delivery

**Networking & Collaboration**: To establish good working relationships, sharing information and resources with Institutions and Organisations.

**Accountability:** Responsibility and Commitment.

## Publications and Seminar Committee members

| | |
|---|---|
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## INSTITUTE MANAGEMENT COMMITTEE (IMC) 2021

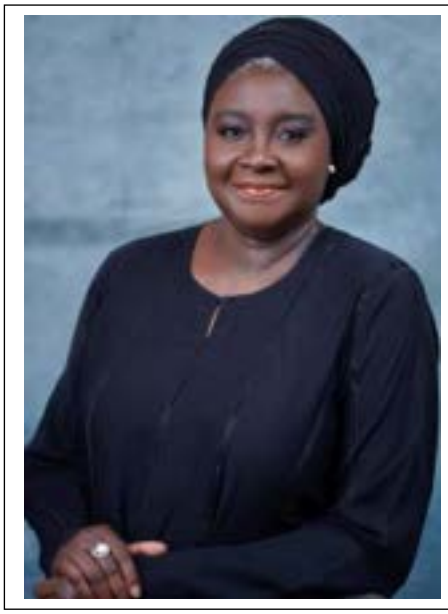
Dr Ocholi, R.A.
Director BVP

Bar Bawul, J.L.
Director HRM

Dr Ngulukun S.S.
Director DS

Dr Ogedengbe, M.E.
Director Planning

Dr Yabubu, B.
Director Biochem& DD



Dr Maryam M.
Director/Chief Executive

Dr Yabubu, B.
Director Biochem& DD

Mrs Abiayi, E.
Director SS

Mr Danboyi, A. W.
Ag Head IA

Dr Kamani, J.
Director LS

# MAJOR 2022 NVRI EVENTS IN PICTURES

Picture 1. UNITED STATES DEPARTMENT OF THREATS REDUCTION AGENCY (DTRA) VISIT TO NVRI VOM ON 29TH AUGUST,2022.

Picture 2. UNITED STATES DEPARTMENT OF THREATS REDUCTION AGENCY (DTRA) VISIT TO NVRI VOM ON 29TH AUGUST,2022.

Picture 3. UNITED STATES DEPARTMENT OF THREATS REDUCTION AGENCY (DTRA) VISIT TO NVRI VOM ON 29TH AUGUST,2022. The team was led by Mr. Williams B. Wheeler, the International Project Manager, others are Mr. Ben Cacioppo and Mr. Olusegun Oladejo. They were received by the D/CE, Dr. (Mrs.) Maryam Muhammad, who took them on a tour of the Institute's laboratories.

Picture 4. COURTESY VISIT BY PALLADIUM GROUP TO NVRI VOM ON 9TH AUGUST, 2022.The visit was principally to strengthen the collaboration with NVRI, identify our challenges and leverage with the Institute towards delivering NVRI key mandates.

Picture 5. Rigan National Executive Visit NVRI Vom.

Picture 6. FAO-ECTAD Laboratory Mapping Tool (LMT) on-site workshop held 19th and 20th May 2022, at NVRI Vom. In partnership with the National Veterinary Research Institute (NVRI), Vom, FAO-ECTAD Nigeria facilitated several engagements on th the LMT that culminated in an institute-wide preliminary assessment to identify the status of our laboratories and delineate gaps for improvement.

Picture 7. VISIT OF THE UNITED STATES CENTRE FOR DISEASE CONTROL (US CDC) TO NVRI VOM-STRENGTHENING NVRI/ NCDC COLLABORATION, MARCH 22ND, 2022. The delegation are Mr. Jagelski A.J, Dr. Mahaney Devon, Mr. Okoye McPaul, Dr. Ikwe Hadley, Dr. Flora Nwagagbo, Ezeomu Olotu, and Mrs. Maryam Muhammad. They were warmly received by the D/CE, Dr. Maryam Muhammad.

Picture 8. VISIT OF THE UNITED STATES CENTRE FOR DISEASE CONTROL (US CDC) TO NVRI VOM-STRENGTHENING NVRI/ NCDC COLLABORATION, MARCH 22ND, 2022.

Picture 9. NVRI VOM READY FOR HUMAN COVID-19 VACCINE PRODUCTIONS. The National Veterinary Research Institute (NVRI) Vom is set to join the comity of FG's COVID-19 Vaccine production. The Minister of Agriculture and Rural Development, Dr. Mohammad Abubakar and Minister of Health, Dr. Osagie Ehanire disclosed this during a one-day working visit to the Institute. The D/CE of NVRI, Dr. Maryam Muhammad received the delegation, which also includes Prof. Mojisola Adeyeye, DG. NAFDAC and Dr. Omatoyo Bulu, Director of Immunization USAID, American Embassy and other dignatories. Federal Government recognizes the importance and capacity of NVRI. Vom.


Picture 10. NVRI VOM READY FOR HUMAN COVID-19 VACCINE PRODUCTIONS. The National Veterinary Research Institute (NVRI) Vom is set to join the comity of FG's COVID-19 Vaccine production.

Picture 11. NVRI VOM READY FOR HUMAN COVID-19 VACCINE PRODUCTIONS. The National Veterinary Research Institute (NVRI) Vom is set to join the comity of FG's COVID-19 Vaccine production.

Picture 12. NVRI VOM READY FOR HUMAN COVID-19 VACCINE PRODUCTIONS. The National Veterinary Research Institute (NVRI) Vom is set to join the comity of FG's COVID-19 Vaccine production.

# Preface

Adjusting to the 'new normal' in 2021 following the restrictions due to COVID-19, NVRI staff weathered the storms and braced up to fulfilling the mandate of the Institute. Consultations and lectures were held to prepare staff emotionally and psychologically to cope with the changing routines post COVID-19. It is heartwarming to note that research, diagnostic, production and extension activities of the Institute were fully conducted as presented in this document.

The Institute was actively engaged in research and surveillance activities on emerging and re-emerging zoonoses such as Monkey pox, Lassa fever, Dengue, Crimean- Congo Hemorrhagic Fever Virus (CCHFv), Zika virus etc. Preliminary data are being compiled.

NVRI has continued to render services as a COVID-19 testing laboratory. The Institute has collaborated with local and international partners in order to strengthen the research activities and to ensure sustainability. Furthermore, our staff have continued to provide assistance and support to students at various levels of training for research project samples analysis using our facilities.

Efforts are ongoing to obtain international registration and certification of some diagnostic laboratories in the institute. Requisite staff have been trained and International accreditation bodies have conducted assessment of our facilities for this purpose. Some of our laboratories will become ISO-17025 certified in 2022. This will further boost the image of the Institute and pave way for international trade in animal products by local farmers.

The Institute hosted several dignitaries during the year under review. Our doors are always open for collaborations as we invite individuals and organizations to visit and explore possible areas for collaboration. Read through this report, identify area(s) of interest and come so that we can build the Institute and Nigeria together.

I wish you happy reading.

Dr. Maryam Muhammad (DVM, MSc, PhD)

Director/Chief Executive""

# 1. BACTERIAL VACCINE PRODUCTION DIVISION

## 2. Function/mandates of the Division

The division continued in her primary responsibility of producing vaccines for prevention of livestock and poultry bacterial diseases of economic and/or public health importance in Nigeria and other West African countries.

In line with the above mandate, the Division produced the under listed Veterinary Bacterial Vaccines are:

I. Contagious Bovine Pleuropneumonia Vaccine (CBPPV).
II. Blackquater Vaccine (BQV)
III. Hantavac Vaccine (HV)
IV. Anthrax Spore Vaccine (ASV)
V. Haemorhagic Septicaemia Vaccine (HSV)
VI. Brucella Vaccine (BV)
VII. Fowl Typhoid Vaccine (FTV)
VIII. Fowl Cholera Vaccine (FCV)

## 3. Specific (notable) activities in the year 2022

The division produced**19,972, 92** doses of the various veterinary bacterial vaccines to meet up with market demands. The details of vaccine production for the year are given in **Tables 1.**

4. **Achievements** (See Table 1 below)

**Table 1:** The total number of bacterial vaccines produced from January – December 2022 in doses.

| Month | ASV | BV | BQV | CBPP | FCV | FTV | HANTAVAC |
|---|---|---|---|---|---|---|---|
| January | - | - | **1,092, 000** | **791, 900** | - | - | - |
| February | 385, 200 | - | - | 1,609, 400 | - | 820, 900 | - |
| March | - | - | - | 752, 100 | - | 784100 | - |
| April | - | - | 1, 209, 000 | 773, 700 | 85, 600 | - | 53, 720 |
| May | 635, 100 | - | - | | - | 808, 900 | 94640 |
| June | 491, 000 | - | - | 1, 212, 900 | - | - | - |
| July | 292, 000 | - | - | 632, 200 | - | - | - |
| August | - | - | 1, 031, 500 | 785, 000 | - | - | - |
| September | 366, 800 | - | - | 776, 300 | - | - | - |
| October | 37200 | - | - | 1, 195, 700 | - | - | - |
| November | - | - | - | 1, 202, 800 | - | - | - |
| December | 455,000 | - | - | 1, 208, 300 | - | - | - |
| TOTAL | 26623300 | | 3, 332,500 | 10,940,300 | 85,600 | 2,413900 | 148360 |

Keys: ASV – Anthrax Spore Vaccine; BV – Brucella Vaccine; BQV – Black Quarter Vaccine; CBPP – Contagious Pleuropneumonia; FCV-Fowl cholera vaccine; FTV-Fowl typhoid vaccine; HSV-Haemorhagic Septicaemia Vaccine; HV-Hantavac Vaccine

## 5. Challenges

I. Inadequate staffing - It is recommended that a staff should not be involved in producing more than one type of vaccine to minimise cross over contamination.
II. There is shortage of water supply to the Division. This is an impediment to the production of vaccines.
III. The need to increase the number of production laboratories as it is expected that one vaccine should be produced in a laboratory.
IV. There is also the challenge of adjuvanting both HSV and FCV, perhaps using a friendly adjuvant as sodium alginate.
V. Similar shelf-life experiments could also be carried out on Fowl cholera vaccine (FCV) which is similar in many ways to HSV.
VI. There is also the challenge to bring to fruition the experiment on the production of freeze-dried Anthrax Spore Vaccine (ASV), to possibly replace the bulk liquid ASV currently being produced. The pilot experiment conducted showed good promises although its potency in Guinea pigs and Sheep/Goat were yet to be conducted.
VII. All production laboratories do not have Biosafety Cabinets. These are required as safeguard against contamination of vaccines.
VIII. Training of vaccine producers on the relevant techniques to improve vaccine quality in the institute.

## 6. Research Highlight

I. Validation of Hantavac Vaccine Strain *Clostridium novyi* (Oedematiens Type B) alpha toxin.
II. Anthrax Spore Vaccine ASV safety test in Guinea pigs.
III. Molecular Isolation and Identification of *Escherichia coli* from Cattle faeces in Jos South LGA.

# 1. BACTERIOLOGY RESEARCH DIVISION

## FUNCTION AND MANDATE OF THE DIVISION

1. Conducting research on important bacterial diseases of economic and public health importance which include but not limited to:
   a. Mycoplasma infection
   b. Pasteurella infection
   c. Brucella infection
   d. Campylobacter infection
   e. *Salmonella* infections
   f. *Escherichia coli* infection
   g. Aeromonas infection
   h. Other Bacterial infection as the need arise.
   i. Antimicrobial susceptibility Testing and AMR pattern of isolated bacteria

## SPECIFIC NOTABLE ACTIVITIES OF THE YEAR 2022

**Brucella Research laboratory**

**ACTVITIES:**

**i) Antigen production project Work done**

A vial from a different batch of strain S99 was reconstituted and inoculated into TSA with antibiotics in duplicates. No growth was observed after two weeks of incubation. This process was repeated with different vials until we got one with a pure growth of Stain S99. The pure isolate was stored in the refrigerator for future use.

**ii) ROUTINE DIAGNOSTIC REPORT**:

Routine serological diagnosis of Brucellosis was carried out by RBPT on 198, serum samples consisting of 120, from bovine, 22 from Canine, 32 from Caprine, 15 Human, 3 Porcine, 2 Equine and 1 Ovine serum samples.

iii) Routine cultural diagnosis was also carried out on samples,12vaginal swabs

**RESULTS:**

i) A total of 8 samples were positive by RBPT.

ii) No Brucella isolate from culture samples.

## Mycoplasma Research Laboratory

**Activities:**

**i) Routine Laboratory Diagnosis:**

Four hundred and sixty-one (461) bovine nasal swabs were analysed, eighty-four were positive (84). Twelve (12) lung tissues and twenty-seven (27) bovine sera were collected. Six (6) avian samples and three (3) caprine lungs were collected, analysed and were all negative.

**ii) Research Activities**:

A PhD student from University of Nigeria Nsukka and six HND students conducted their research work in the laboratory.

iii) **Sectional Research Project**

i. A collaborative work on caprine mycoplasma with CIRAD France is on-going. Isolates will be collected and confirmed by PCR in the institute.
ii. Isolate bank for the prevalent strain of Bovine Mycoplasmas will be obtained.

## Salmonella Research Laboratory

**Summary of specific notable activities carried out in Salmonella/AMR Laboratory, 2022**

**i. Clinical Diagnostic samples analysed in the laboratory.**

| S/N | Animal Species | Types of sample | No of samples | Diagnosis | Result |
|---|---|---|---|---|---|
| 1 | Avian | Liver | 10 | Salmonellosis | No Salmonella isolated |
| 2 | Bovine | Swab | 1 | Salmonellosis | No Salmonella isolated |
| 3 | Canine | Liver | 1 | Salmonellosis | Salmonella spp isolated |
| 4 | Equine | Liver<br>Lungs<br>Kidney<br>Heart | 1<br>1<br>1<br>1 | Salmonellosis | No Salmonella spp isolated |
| | Total | | 16 | | |

### ii. Research Samples analysed in the laboratory

| S/N | Educational Level | Animal Species | Sample type | No of sample | Diagnosis | Result |
|---|---|---|---|---|---|---|
| **1** | PHD | Local poultry | Cloacal swab | 403 | Commensal<br>ESBL E.coli<br>Pathogenic E.coli | Commensal - 236<br>ESBL – 13<br><br>71 |
| **2** | MSc | Poultry | Cloaca swab | 100 | Screening for Salmonellosis | So Salmonella isolated |
| **3** | PGD | Poultry | Feacal droppings | 126 | Salmonellosis<br>Commensal E.coli | No Salmonella isolated<br>47 commensal E.coli |
| **4** | HND | Pigs | Feacal sample | 112 | Salmonellosis<br>Commensal E.coli<br>ESBL E.coli<br>Pathogenic E.coli | No Salmonella isolated<br>99 Commensal E.coli<br>68 ESBL E.coli<br>7 Pathogenic E.coli |
| **5** | HND | Poultry | Feacal sample | 100 | Staphylococcus aureaus<br>Enterococcus | S. aureaus – 11<br>Enterociccus - 8 |
| **6** | HND | Poultry | Feacal sample | 100 | Campylobacter | Campylobacter - 9 |
| **7** | PGD | Pigs | Feacal sample | 100 | Salmonella<br>ESBL E.coli<br>Commensal E.coli | Salmonella – 4<br>ESBL E.coli – 27<br>Commensal E.coli - 32 |
| **Total** | | | | **1,041** | | |

**Achievements**

**A.** Antimicrobial Susceptibility Testing on bacterial isolates were successfully carried out; and 224 different bacterial isolates wher obtained. The isolates consist of the following; Bacillus spp(6), S. aureus (13), Klebsiella species (6), E. Coli(103) ESBL E.coli ( 75) Enterococcus(7) Camphylocater(6) and Salmonella(8)

**B.** Four cycle of proficiency testing from EQuAFRICA and VETQAS were carried out for various samples usingConventional and Automated (MALDI-TOF and Vitek Compact methods which were all successful.

**Students on Industrial Training in the Division.**

Sixty-four students on Industrial Training from different Universities, Polytechnics and Colleges across the States in the country were posted and trained in the division.

**Challenges for the Division**

- Inadequate laboratory equipment such as UPS, stabilizers and functional refrigerators
- Inadequate media and reagents for bacterial isolation.
- Lack of office space for staff
- Lack of reagents and consumables for Vitek MS and Vitek 2 compact machines.
- Inadequate equipment for the work (Autoclave and Freezers).
- Delay in disbursement of funds.
- Lack of technical staff.
- Erratic water and power supply

**Research highlights**

Use of automated machine (Vitek MS and 2 Compact) for confirmation of bacterial isolates stored in the laboratory bio repository and writing of publication to that regard.

## 2. BIOCHEMISTRY DIVISION

**Functions/Mandate of the Division:**

- To conduct Research into all aspects of Veterinary diseases, their treatment and control
- To conduct Research into all aspects of animal nutrition
- To conduct Research into all aspects of Veterinary toxicology

**Specific (notable) activities in the year 2022:**

1. Biochemistry Division hosted the 2022 NEF-NVRI toxicology internship virtually. Fifteen Interns from across Africa participated in the internship.
2. The Division wrote a memo for the production of laboratory water (distilled water, de-ionized water, etc) in the Water Section.
3. Biochemistry Division is carrying out a research with Livestock Investigation Division (LID) to determine baseline data of goats and sheep in the pens of LID. The parameters are oxidative stress markers (Malondialdehyde, Glutathione, Catalase) and Serum biochemistry markers (Alanine amino transferase, Aspartate amino transferase, Gamma glutamyl transferase). The aim is to monitor how these parameters change with age and disease in the study animals. The research will generate reference values for these parameters in animals for use by researchers and students.
4. The Division has written a proposal titled "Anti-coccidial effects of *Khaya senegalensis* and *Azadirachta indica* extracts on Layer Birds experimentally infected with Eimeria species"

**Achievements:**

Biochemistry Division hosted the 2022 NEF-NVRI toxicology internship virtually, with fifteen Interns from across Africa.

**Challenges:**

The major challenges are equipment. We need a spectrophotometer.

We will appreciate installation of the following equipment in our Division:

- Atomic Absorption Spectrophotometer
- Gas Chromatography Mass Spectrometer
- Amino acid analyzer,

**Research highlights:**

Biochemistry Division is carrying out a research with Livestock Investigation Division (LID) to determine baseline data of goats and sheep in the pens of LID. The parameters are oxidative stress

markers (Malondialdehyde, Glutathione, Catalase) and Serum biochemistry markers (Alanine amino transferase, Aspartate amino transferase, Gamma glutamyl transferase). The aim is to monitor how these parameters change with age and disease in the study animals. The research will generate reference values for these parameters in animals for use by researchers and students.

## 3. BIOTECHNOLOGY CENTRE

Uses biology to solve problems. 'Is a life science economic development organisation that helps bring ideas to market''.

**OBJECTIVES OF BIOTECHNOLOGY CENTRE**

- Standardize, facilitate research and apply series of high-quality biotechnology laboratory techniques for the essence of and diagnosis.
- Coordinate and disseminate advances in biotechnology to meet environmental challenges.
- Conduct innovative research dedicated to investigating the complex interactions that define our environment.
- Committed to maximizing the benefits of biotechnology in research and diagnosis.

**MANDATE OF BIOTECHNOLOGY CENTRE**

- Development and validation of biotechnology techniques for national use in diagnosis and research.
- Investigation of animal disease pathogens using molecular techniques.
- Development of biologicals for animal diseases control.
- Investigation into emerging and re-emerging zoonotic agents.
- Conducting trainings on biotechnology methodologies for diagnosis and research.
- Serve as Centre for biotechnology in collaboration with
    - ❖ International research institutions and Universities
    - ❖ DNA barcoding of animals, disease vectors and invasive pests
    - ❖ National Animal Genetics Resource (NAnGR)

**SPECIFIC ACTIVITIES**

1. 1 week PCR Training for University of Jos Postgraduate student of Medical Laboratory science
2. In-house Nanpore Sequencing training for staff of the division
3. Laboratory project of sampling blood samples from dogs and cattle in Jos South for survey of infectious diseases commonly present in these animals

**ACHIEVEMENTS**

- Training of 34 Postgraduate Medical Laboratory students from the University of Jos
- Departmental projectof sampling blood samples from dogs and cattle in Jos South for survey of infectious diseases commonly present in these animals

## CHALLENGES

The major challenge faced in 2022 include the following:

1. Lack of sequencing platform to make the gene analyses easier.
2. Lak of nanaodrop equipment to allow for measurement of DNA, RNA and protein.
3. Limited office space for staff of the division; more office spaces is needed
4. Paucity of funds for sampling within Plateau and other States
5. Scarcity of reagents for ELISA and molecular detection.
6. Shortage of storage space in the -80 degrees freezers.

## RESEARCH HIGHLIGHTS

Table1: Research and diagnostic activities on samples submitted within NVRI

| Sample source | Disease/Pathogen | Number of samples | Submitting Division |
|---|---|---|---|
| Pigs | ASF | 159 | CDL+Biotech |
| Dogs | Rabies | 10 | Quality Control |
| sheep | PPR Virus | 2 | VRD/CDL |
| cattle | FMD | 1 | CDL |
| Brucella | Brucella | 5 | Bacteriology |
| Human | T.B | 4 | CDL |
| | | | |
| Total samples analyzed | | 182 | |
| | | | |
| | | | |

## Samples Submitted from outside NVRI and Processed on Commercial Basis

| | | | | | |
|---|---|---|---|---|---|
| Genetic Variation | Cattles | PCR | 30 | MSc | 30,000 |
| Genetic Variation | Sheep& go | PCR | 30 | MSc | 30,000 |
| Genetic Variation | Camels | PCR | 30 | MSc | 30,000 |
| Genetic Variation | Chicken | PCR | 30 | MSc | 30,000 |
| Training | Unijos | PCR | 40 students | Msc | 750,000 |
| sarcocystis | Cattles | PCR | 50 | PhD | 50,000 |
| Proteus | culture | PCR | 12 | MSc | 160,000 |
| Training | Unijos | PCR | 2 students | MSc | 75,000 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | **Total** | **1,245,000** |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

# 4. DERMATOPHILOSIS RESEARCH DIVISION

## 1. FUNCTIONS/MANDATE

i. To conduct research on the bacteria *Dermatophiluscongolensis* of livestock.

ii. Production of Ethno-veterinary products.

## 2. SPECIFIC (NOTABLE) ACTIVITIES

(1) Microbiology lab

Human Samples processed = 1,126

Animal Samples processed = 66

i. Bovine Scabs = 47
ii. Avian samples =10
iii. Ovine =4
iv. Canine =5

(2) Production Unit

i. Dermatocide -3M Soap = 6,110 tables
ii. Dermatocide-3M ointment = 600 pcs
iii. Dermasol ointment = 1,560 pcs
iv. Lamstreptocide = 300 liters
v. Dermatocide shampoo =50 pcs

## 3. ACHIEVEMENTS

i. Various fungal and bacterial species diagnosed from 1,126 human samples and 66 animal samples.
ii. Revenue generated through sales of:
   a. 8,320 of Dermatocide products produced.
   b. 300 litres of Lamstriptocide A&B produced

New product (Dermatocide shampoo) developed, which is on clinical trial.

## 4. CHALLENGES

i. Shortage of man power, which affects productivity
ii. Inadequate reagents for work in microbiology laboratory.
iii. Lack of reagents for Immunology work
iv. Inadequate regents/materials for mass production of Ethno veterinary products

# 5. DRUG DEVELOPMENT DIVISION, NVRI, VOM 2022 ANNUAL REPORT

## FUNCTIONS OF THE DIVISION

The Division is primarily a research division saddled with the responsibility of conducting research for the discovery of substances that can be used for the prevention, diagnosis, treatment and mitigation of diseases. These research activities include projects initiated by the division staff or projects conceived by clients outside the institute but requiring the services and expertise of the division personnel. Thus, the mandate of the division is outlined as follows:

- Research and develop substances from natural and synthetic sources for the prevention, treatment, and control of diseases.
- Research into the safety of substances from natural or synthetic sources used in the prevention, treatment, and control of diseases.
- Provide services to researchers/scientists from other establishments/institutions working in the area of drug development and related research.
- Establish and maintain a herbarium for archiving medicinal plants
- Training of students on industrial attachment and laboratory posting

## NOTABLE ACTIVITIES

The Division knowing the importance of literature to successful research, embarked on research and literature review in areas of interest to the Division for the purpose of publishing the findings.

## ACHIVEMENTS

As a result of the activities carried out, the achievements recorded were:

1. Published an article on Scientometric assessment of *Euphorbia hirta* (a medicinal plant) that is subject of study in the division due to its widely acclaimed medicinal properties.
2. Carried out a survey and published article on zootherapeutic practices within Jos and Bukuru environs.

3. Continued research project of the division titled “Isolation of antimicrobial compounds from *Euphorbia hirta*.
4. Carried out research to identify and document medicinal plants found within the NVRI environment. The data has been collected and a manuscript is in advanced stage of development.

## CHALLENGES

1. Lack of basic equipment such as:
    a. Sensitive weighing balance: This slows down work and makes it more cumbersome because we have to go to another laboratory every time.
    b. Large soxhlet extraction apparatus: There is usually need to extract large quantities of materials which requires a large extraction set up.
    c. Rotary evaporator: After extraction, there is need to evaporate solvent and dry extract as soon as possible. This will be enhanced when a rotary evaporator is available.
    d. Chromatography accessories: There is need to isolate phytocompounds from crude extracts of medicinal plants therefore basic equipment such as columns, TLC development tank and ultra-violet viewer are required.
    e. Broken down water distiller and freeze dryer.
2. Lack of laboratory space: The division has one laboratory only; thus, every activity is carried out within the same laboratory including animal experiments, chromatography, and drying plants and extracts.
3. In adequate office accommodation and furniture: There is no office for the Head of Division and some staff thus making the administrative aspect of the work to suffer.
4. Inadequate staff: There is no technician in the division and no divisional secretary; this poses a challenge to the research staff because they have to engage in other duties that interfere with their core duties.

## FUTURE PLAN

The Division plans the following for 2023 and beyond:

1. Establish a journal club for the division to discuss publications and make presentations in order to improve the writing and communication skills of staff members.

2. Intensify the research on isolation of antimicrobials from plants in order to tackle the scourge of antimicrobial resistance.
3. Develop protocols for quantification of phytochemicals from plants.
4. Organize a workshop on *in silico* evaluation of compounds isolated from medicinal plants and other sources, and thereafter use the technique to screen libraries of compounds for various pharmacological actions.
5. Formulate products using the antimicrobial plants as active ingredients.
6. Pursue wider collaboration with other researchers within and outside the institute in order to increase productivity.
7. Seek and apply for grants as external source of funding in order to improve on the activity and productivity of the division.

## RESEARCH HIGHLIGHTS 2022

1. Continuation of the research projects of the division titled "Isolation of antimicrobial compounds from *Euphorbia hirta*.

   Within the period under review, the plant sample was harvested, dried, pulverized and extracted. Sourcing of bacterial and fungal isolates is on-going. Protocol for the fractionation and isolation of compounds from the plant is being developed.
2. Published three (3) articles from the review and survey activities of the division.

# 6. FOOT-AND-MOUTH DISEASE LABORATORY DIVISION

## MANDATE

- To conduct research, undertake surveillance and diagnosis of economically important transboundary livestock diseases in Nigeria.
- To develop vaccine and biological (antiserum) with reference to African swine fever, Foot and mouth disease, African horse Sickness and other transboundary livestock diseases.

## SPECIFIC ACTIVITIES

- During the period under review, a total of 18 epithelial tissues/vesicular fluids, 2229 sera samples from camel, cattle, sheep and goats were receipt.
- Out of the number of sera tested for 3ABC non-structural antibodies against Foot and mouth disease virus (FMDV), 1191 sera were positive.
- FMDV Serotypes A, SAT 2 were detected using antigen detection ELISA.
- The laboratory also participated in the 2020 World FMD Diagnostic Proficiency testing.

## ACHIEVEMENTS

- Capacity building and development of 3ABC in-house enzyme linked Immunosorbent assay kit through collaboration with the Canadian National Center for Foreign Animal Disease (NCFAD) on capacity building for the development of a diagnostic kit (In-house ELISA) as part of a National and Regional Foot-and-Mouth Disease Control Strategy (2019 –2022)
- Certification on ISO17025 management system.
- Setting up of molecular laboratory platform and successful diagnosis of FMD using the real-time RT-PCR.

## CHALLENGES

- The Division urgently needs the following equipment, reagents and materials to enable us cope with our research and diagnostic activities and also fulfil the requirement of ISO17025 management system:

i. A new ELISA machine with its full complement which includes printer, CPU, monitor, and a keyboard.

ii. About 16 laboratory stools and office chairs and table.

iii. A laptop, gel electrophoresis machine and transillumination device.

iv. A wash-up facility

v. Two more laboratory technician and research officer.

vi. Reagent like fetal calf serum and ELISA kits for timely diagnosis, serotyping of samples.

## ON-GOING PROJECTS

- Study on evaluating vaccination strategies and vaccine types for FAST diseases. EUFMD funded.
- Global partnership for animal and zoonotic disease surveillance.
- The laboratory is participating in 2022 FMD Diagnostic Proficiency testing.

## RESEARCH HIGHLIGHT

- Development of FMD vaccines with improved efficacy including onset & duration of immunity.
- Comparing the safety of combined vaccines of different type of vaccine and address the knowledge gaps in protective immune response elicited by the vaccine.
- Effectiveness of emergency vaccination approaches/strategies in the control of diseases

- Optimization and validation of FMD serotypes specific In-house ELIS kit development.
- Surveillance and outbreaks investigation of FMD in Nigeria.

# 7. HUMAN RESOURCES MANAGEMENT DEPARTMENT

MANDATE

The Department is charged with the responsibility of the general administration of the National Veterinary Research Institute. It oversees all administrative matters including advising, coordinating and handling of policy issues of the Institute.

**FUNCTIONS OF THE DEPARTMENT**

The functions of the department include the following:

i. Recruitment, Confirmation of Appointment, Promotion, Discipline and Exit of staff.
ii. Preparation and up-dating of Nominal Roll
iii. Interpretation of Government Rules, Regulations, Policies and Circulars
iv. Liaising with the Office of the Head of Civil Service of the Federation and other Agencies on establishment matters.
v. Staff Welfare Matters.
vi. Responsible for Management and Maintenance of the Institute's security matters.
vii. Serve as Secretariat of the Institute's Standing and Ad-hoc Committees.
viii. Coordinating Training and Development of staff.
ix. Management of NVRI Stores
x. Maintenance of the Physical Structures of the Institute; and
xi. Maintenance of Utility Vehicles of the Institute

## DIVISIONS IN THE DEPARTMENT

The Department has three (3) Divisions which include:

### 1. APPOINTMENT, PROMOTION AND DISCIPLINE

This Division is headed by an Assistant Director and deals with the appointment, promotion and discipline of both senior and junior staff, establishment matters and records of staff in the Institute.

The division has two (2) sections namely:

i. Establishment section

ii. Records section

## SECTIONS UNDER THE APPOINTMENT, PROMOTION AND DISCIPLINE DIVISION:

### i. ESTABLISHMENT SECTION:

Establishment Section is saddled with the responsibility of handling appointments, promotions and disciplinary cases for both Senior and Junior Staff and is the custodian of Staff records. It also coordinates general duties and activities in the Open and Secret registries, liaises with the Records Section to update Staff Nominal Roll and preparation of quarterly/annual reports. The Section interprets Government Circulars and regulations and assists in implementing the Institute policies.

The Establishment Section is saddled with the responsibility of:

1. Appointment, Promotions, Disciplinary cases for both Junior and Senior Staff.
2. Handling of both Open and Secret Registries of Junior and Senior Staff.
3. Preparation of Quarterly/Annual Reports for the Department.
4. Liaising with the Records Section to update Staff Nominal Roll.
5. Coordination of General Duties.
6. Being the custodian of Staff records.
7. Assist in implementing Institute's policies.
8. Interpreting Government Circulars, extant Rules and Regulations.

### ii. RECORDS SECTION:

The Records Section handles the following schedules which include maintaining staff record of service, processing of staff leave and compiling documents for both Senior and Junior Staff's graded files. The Section also keeps records of employment, retirement, deaths, dismissal and termination of both Senior and Junior Staff as well as updating Nominal Roll as at and when due.

The Records/Documentation Section of the Institute is saddled with the following responsibilities:

- Maintenance of Staff Records of Service.
- Processing of Staff Leave
  - Maternity Leave
  - Annual Leave
  - Examination Leave
  - Sick Leave
  - Casual Leave

  And any other Leave as may be approved by the Director/Chief Executive.

- Compilation and processing of documents for both Junior and Senior Staff Graded Files.
- Keeping of records of both Junior and Senior Staff on:
  - Appointments
  - Severance
  - Retirement
  - Deaths
  - Dismissal
  - Termination
  - Updating of Staff Nominal Roll
  - Trainings

### 2. STAFF WELFARE AND TRAINING DIVISION:

The Staff Welfare and Training Division is saddled with the responsibility of welfare and training of Senior and Junior staff in the Institute.

## SECTIONS UNDER THE STAFF WELFARE AND TRAINING DIVISION:

### I. Pension Section:

The Pension Section is responsible for handling the Institute's Pension matters, Group Life Assurance Scheme for staff.

### Ii. National Health Insurance Scheme (Nhis) Section

The National Health Insurance Scheme (NHIS) Section of the Institute is saddled with the responsibility of:

1. Handling all issues relating to the good health care services of Staff (i.e. enrolees).

2. Registration of new Staff into the Scheme.

3. Keeping custody of NHIS various forms/assist Staff in the completion of same for submission to NHIS.
4. Obtaining periodically updated list of NHIS enrolees (Staff) in liaison with the Health Maintenance Organization (HMO) and NHIS Plateau State Office.

**Iii. NYSC, Siwes & Industrial Attachment Section:**

This Section coordinates students on Industrial training, National Youth Service Corps (NYSC), members posted to the Institute, Graduates on National Directorate of Employment (NDE) as well as those on Internship training. The Section also conducts Students/Participants from various Institutions who come for Educational Visits to the Institute.

**Iv. Training Section:**

The training Section advises on training needs of staff, recommends staff for appropriate training in accordance with the Institute's training policy and process staff requests for training. The Section also recommends appropriate refund of monies paid in respect of staff on completion of course of study as well as liaising with the Records Section in keeping records of Staff on training.

**V. Security Section:**

The Security Unit is charged with the responsibility of providing overall security of lives and properties of staff, students, and visitors to the Institute. The Unit is also responsible for advising the Management on security matters as well as liaising and collaborating with other security agencies to ensure safety of lives and property.

The Department is headed by the Director, Human Resource Management and assisted by two Assistant Directors i.e., Assistant Director, Appointment, Promotion and Discipline (APD) and Assistant Director, Staff Welfare and Training (SW&T).

The fundamental function of the Internal Security Unit has been the protection of lives and properties. The Unit has been working round the clock alongside with other Private Security Outfit to complement it. These Private Security Outfits are Pahek and Executive Guards Limited. In addition to these Private Guards are the Conventional Policemen, Civil Defence and Professional Hunters that are authorised to operate in the Institute.

## 3. GENERAL SERVICES DIVISION (Two Sections) Namely:

### i. Workshop Section:

Is saddled with the general works on staffquarters, plants and equipment, plumbing, mechanical, electrical, generating machines etc. The Division also provides transport facilities and handles of vehicles maintenance.

### ii. STORES SECTION:

This Section is responsible for accepting into and issuing out all items of store. This includes keeping for safety and issuance of vaccines, stationery, equipment and machinery, laboratory equipment, diesel etc.

### iii. ENVIRONMENTAL SECTION:

The Environmental Section is responsible for landscaping of the Institute's environment as well as daily cleaning of the entire environment including Offices/Laboratories.

## B. UNITS UNDER THE DIRECTOR/CHIEF EXECUTIVE:

### I. Special Services:

The Special Services Unit is headed by a Director who is answerable to the Director/Chief Executive. The main function is usually directed by the Chief Executive on special assignments in nature including Servicom monitoring.

### Ii. Protocol Section

The Protocol Unit is saddled with the responsibility of receiving, accommodating, entertaining and transporting visitors and very important (VIPs) of local and International repute to the Institute.

### iii. Servicom

SERVICOM is an acronym for Service Compact with all Nigerians which was established in 2004. A commitment to improving service delivery for citizens with support at the highest level of government and also an engine for the service delivery programme.

**Functions:**

- To coordinate the formulation and operation of Servicom Charters.

- Service improvement plans in MDAs.

- Monitor and report progress and performance of MDAs under Servicom obligations through compliance.

- Evaluation using the Servicom Index.

**Iv. Legal Services**

The Section serves as adviser to the Institute on legal matters. It also handles criminal and civil cases of the Institute in liaison with the External Solicitors and the Legal Department of the Federal Ministry of Agriculture and Rural Development.

## ACTIVITIES OF THE DEPARTMENT IN THE YEAR 2022

During the year under review (2022), the Department handled the following activities:

1. Promotion
   - Senior staff - 136
   - Junior staff - 28
2. Advancement/conversion
   - Senior staff - 16
   - Junior staff - 5
3. Disciplinary cases
   - Senior staff
   - Junior staff

   Confirmation -
   - Senior staff - 57
   - Junior staff - 2

4. Retirements - 14
5. Deaths - 6
6. Employment/recruitment - 81
7. Dismissal - Nil
8. Termination of appointment - Nil
9. Resignations - Nil
10. SIWES -
11. NYSC - 25
12. Educational visits - 52
13. Training
    - Junior staff -
    - Senior staff -

**ACHIEVEMENTS**

1. Successful documentation of newly employed staff in the year under review
2. Successful enrolment of staff scheduled for retirement between January to December, 2022
3. Successful processing and payment of deceased staff of the Institute's group life insurance (for the year 2022)

**CHALLENGES OF THE DEPARTMENT**

1. Insufficient provision of working equipment e.g. computers (Laptops and Desktops), printers and photocopiers
2. The department is in dire need of an overhaul of her cabinet system which are obsolete
3. The department is aback in staff training and workshops to meet up with global standard.

## 8. INTERNAL AUDIT DIVISION

**Mandate**

The mandate of the Internal Audit Department is to provide comprehensive and continuous audit of the accounts and records of the institute, and to carry out management audit (evaluation of the efficiency of operation).

Management audit is a managerial control which functions by measuring and evaluating the effectiveness of Internal Control System in an organization.

**Main Functions Of The Internal Audit Includes:**

i. Ensuring compliance with rules, regulations and procedures in the conduct of government business.

ii. Ensuring that adequate and accurate books of accounts and records of all activities of the institute are kept in accordance with the necessary standard operations.

iii. Examining the procedures and processes of all major operations of the institute with aim of identifying areas where efficiency and effectiveness can be improved.

iv. Ensuring that proper Internal control, checks and balances are put in place and operational so as to ensure that activities and resources are channeled towards the overall goals of the organization.

v. Liaising with the external Auditors in ensuring that accounts are prepared in accordance with the international standards.

**Notable Activities**

i. We carried out 100% prepayment audit in the year.

ii. We carried out monthly post-payment checks of staff salaries under IPPIS and ensure that where staff who retired or transferred their services were promptly deleted from the pay roll.

iii. We also ensured that contracts were executed according to the terms of the contracts and ensured that necessary tax deductions were affected.

iv. We interacted with the accounts department on ways and means of improving internal control.

**Achievements**

i. We attained 100% prepayment audit on all transactions sent to the audit.

ii. Post-payment Audit: We carefully reviewed vouchers to ensure that proper retirements were done with adequate supportive documents.

iii. Observations and Recommendations were made to the chief executive on strengthening of internal control and improving efficiency.

iv. Ensuring that goods supplied in Dagwom farm, Poultry and LID were properly inspected and verified base on the contract agreement specification.

**Challenges**

i. Due to paucity of funds we were not able to carry out routine audit of the outstation laboratories

ii. Staff of the department have not participated in workshops/seminars in the field of Auditing and ICT for quite some time.

**Future Plan**

We hope to widen our scope to cover more on operational audit and risk assessment in line with modern auditing.

# 10.LIBRARY DIVISION

**Functions and Mandate:**

- To provide the research scientists access to the right information in the right format at the right time.
- To establish a computerized information system for easy access to the current information on Animal health from all over world.
- To provide an opportunity for all states of the federation gain access to scientific information on the country's animal health and production activities.
- To create and manage local databases on the country's animal health and production research activities.
- To provide extension workers nationwide access to expert systems which cover a wide range of problems and solution to enable them transfer this knowledge to end users.
- To provide scientific information services to university researchers and academics polytechnics, other institutions of higher learning, businessmen and policy makers.
- To link up with international computerized information systems such as CAB Abstracts, Agricola Database, Medline, FAO Agrindex and Agris Databases, CD ROM by the consultative Group on International Agricultural Research. Biosis reviews Chemical Society Abstracts, Food Science and Technology Abstracts on Tropical Agriculture.

**Achievements**

Circulation Section

In the year under review the section was able to attend to 302 users comprising of both the Institute staff and user on referral to the Institute library, and also student on Industrial attachment. 11 books were charged to users and 22 staff thesis were received. The unit attended to 65 queries from clientele.

Serial Section

A total of sixty-two (62) publications were acquired through donations, which were journal titles in veterinary science and technology, emergence infectious diseases, annual and technical reports from NVRI, National and International Organisations. In addition, eighty nine (89) bibliographic queries were received and attended to.

Technical Section

A total twelve (12) book titles were received through donation and 22 staff thesis/projects were submitted. All were processed and made available for the library users.

**Challenges**

1. Exfoliation on the walls due to seepage of water during rainy season, which resulted in the formation of mould on the walls.
2. Lack of ICT facilities such as desk top computers, scanner, and printer.
3. Total revamping of the E-library is needed.
4. The Library complex requires urgentrenovation.

# 11.LIVESTOCK INVESTIGATION DIVISION

## i. Functions And Mandate of The Division

The major activities of the Division are those of adaptation of exotic animals through cross breeding (Artificial Insemination), provision of animals for vaccine production and for research, production of livestock forage and feed formulation.

The farm is divided into eleven (11) sections: Health, Dairy, Beef, monogastric, Goat and Sheep production. Others are pasture management and development, Feed-mill, Laboratory cattle and replacement, Farm Machinery and Agronomy, Artificial Insemination & Liquid Nitrogen.

## ii. Specific Activities in The Year 2022

- Semen collection, evaluation, processing, and preservation in chilled and frozen state.
- Improving indigenous breeds of cattle through artificial insemination with semen of Friesian breeds processed at NVRI Vom for improved milk and meat production.
- Herd health fertility check and selection of animals for planned breeding programmes
- Manpower development in artificial insemination through capacity building.
- Stocking, selection of breed or multiply dairy cattle as well as milk production and milk products.
- Research and teaching ground for staff and students of the college and other students on industrial training.
- Management of exotic Friesian bulls and other cross bred bulls.
- Maintenance and management of weaned calves to heifers and yearling bulls or bull calves.
- Record keeping of animal herd
- Daily observation of animals to assess their health status.
- Spraying of animals with acarida to control parasites.
- Directly or indirectly in weaning of calves.
- Herd health inspection
- Prophylactic de-worming of the herds in the farm.
- Routine spraying and dipping of all the cattle and goats in the farm respectively using acaricide.
- Annual vaccination of all the herds on the farm against Heamorrhagic Septicaemia, Black quarter, Contagious Bovine pleuropneumonia, PPR, ASV, Hantavac, FMD,LSD

- Daily head count of the herd.
- Fattening of cattle for vaccine production through feedlot operation.
- Management of pasture grasses and legume in the paddocks and fields.
- Preparation/cultivation of land for the production of silage and hay.
- Maintenance, repairs and servicing of farm tractors, implements and machineries.
- Formulating and production of feed for various classes of animals on the farm.
-

**iii. Achievements**

- Maintenance and periodic assessment of preserved bovine frozen semen
- Herd health fertility check of all herds to determine their reproductive status.
- Successful calving of 28 calves in the year 2022.
- Total milk production was 3964 litres of milk for the year 2022.
- Low mortality.
- Successful collaboration of research into the behavioural pattern of pigs with an international organisation. The farm has a functional piggery unit now.
- **250** metric tons of silage were produced on **14.8** hectares of land.
- **4,140** bales of hay were stored, and baled.
- Production of 2000 bales of hay and fresh soilage
- Provision of 9tons of fresh *Cassia alata* to Dermatophilosis Division
- All yearlings were properly managed to bull and stingers and eventually distributed to dairy and beef section according to the scale of preference.
- Practical demonstration of farmers, undergraduate and postgraduate students on excursions, SIWES students and other visitors.
- Training centre for students of FCAH&PT Vom, as well as other students on Industrial Training.
- Derivation of revenue for the running of the farm through the sales of milk.

**iv. Challenges**

- Electricity supply on the farm is frustrating.
- Incessant fire outbreak on our paddocks has greatly affected good production of hay.

- Delay in the supply of drugs.
- Lack of standard laboratory setting, equipment, and offices for AI operation.
- Lack of electro-ejaculator for semen collection.
- There is urgent need for renovation of the bull pens.
- Lack of adequate and sustained supply of liquid Nitrogen.
- Lack of tables, chairs and offices for staff.
- Lack of provision of protective wears for the workers e.g., rain-boots, raincoats, overall and hand gloves, nose mask, goggles etc.
- Inadequate working equipment e.g., wheelbarrow, shovels, garden forks milking machine and water borehole.
- The Institute has only **one (1) Tractor Operator**
- The tractors are old and constantly breakdown thus draining the resources of the institute.
- The Institute has a very old silage harvester.
- The serviceable parts for the tractors are always **insufficient** and always provided very **late.**
- The farm input and agro-chemicals (fertilizer, herbicide, seeds, and seed-dress) are always supplied late into the farming season.
- Security challenges on the farm.
- No toilet facility.

**v. Future Plan 2023**

- There is need for Electro Ejaculator (Electro Jac 6)
- Good management of the 100% **AI FRIESIAN BULL**
- Continuous production of chilled and frozen semen for use.
- Synchronization and insemination of all the heifers.
- On-farm and on-station insemination as planned as well as on request.
- Breeding plan for 2023.
- Selection of only dairy cattle breeds with high dairy potential for the section.
- Increase the production capacity of the dairy cattle.
- Cases of sick animal be reported promptly to the appropriate authorities.

- Feeding animals with supplements (concentrates, salt) every morning before releasing them out for grazing.
- There is the need for new tractors, disc mower, silage harvester and silage trailers.
- There is the need for baling twine on time for hay making.
- Overgrown pasture in the paddocks be trimmed and feed to animals so as to ensure uniform growth.
- Elimination of weeds from the pasture grass the paddocks.

**vi. Requirement**

- There is need for adequate feeding and water troughs in the holding pens and the grazing fields.
- There is need for protective wears for the workers (rain-boots, overalls, raincoats, hand gloves, goggle etc.).
- There is need for timely provision of farm inputs and working equipment e.g.Herbicide fertilizer, wheelbarrow, shovels, garden forks etc.
- There is also need for salt lick.
- Tractor and tractor implements.

**vii. Research Topics**

1. Pregnancy rate (PR) of indigenous cattle following artificial insemination using Vom Cryopreserved semen and imported Cryopreserved semen.
2. Fertility and hatchability trials of poultry eggs following artificial insemination.
3. Fertility and seminal characteristics of Friesian bulls raised on the Jos Plateau.
4 Successful collaborations of research into the behavioural pattern of pigs with an international organisation. The farm has a functional piggery unit now.

# 12. PARASITOLOGY DIVISION

**(a) Functions/mandates of Parasitology Division:**

Parasitology Division consists of six sections which include; Molecular Parasitology, Helminthology, Protozoology/Diagnostic Parasitology, Entomology, Ethno-veterinary and Parasite Immunology that are saddled with the mandate to conduct research and diagnosis of all economically important parasitic diseases of livestock and poultry and to proffer treatment and control strategies.

**(b) Specific (notable) activities the year 2022:**

Screening of dog samples from Lagos State for exportation using both classical and molecular diagnosis for Babesioses, Leishmeniasis and Dilofilariasis.

**(c) Achievements:**

The Division had about two (2) step down trainings within the year. They include the following:

1. Step down on Foundation of Biosafety and Biosecurity in a Research Institute (June 2022)

2. Step down training and awareness on Monkey pox: infection, prevention and control (IPC)(October, 2022)

3. Step down on Laboratory Mapping Tools (LMT) no date

**(d) Challenges:**

1.Irregular water supply for diagnosis in our laboratory.

2. Inadequate funding for research activities in the Division.

3. Insufficient binocular light microscopes, reagents and consumables for molecular analyses.

**Recommendations**

Research activities will be facilitated if these are provided in the Division.

**(e) Research highlights:**

None

Samples ranging from blood, fecal, worms, ticks etc., from different animal species were received and analysed within the year as presented on the Tables below.

**PROTOZOOLOGY UNIT**

| S/N | Animal species | Number of samples | Type of samples | Parasites found |
|---|---|---|---|---|
| 1 | Bovine | 620(3 Brain) | Blood and Brain | *Babesiabigemina, Babesiabovis,Trypanosomaspp.,Anaplasmamarginale*and*Theleria spp.* |
| 2 | Canine | 123 | Blood | *Babesiacanis, Babesia spp.* |
| 3 | Caprine | 45 | Blood | *Babesia spp.* |
| 4 | Lioness | 1 | Blood | NPF |
| 5 | Ovine | 7(1 Brain) | Blood and Brain | *Babesiaovis* |
| | TOTAL | **796 (4 Brain)** | | |

In the protozoology unit, a total of 796 blood and 4 brain samples were submitted, many of which were positive for *Babesia spp., Anaplasmamarginale, Theleria spp.* and *Trypanosoma* spp. All brain samples submitted were negative for *Ehrlichia* (*Cowdriaruminatium*) infection. NPF = No Parasite Found

**HELMINTHOLOGY UNIT**

| S/N | Animal Spp. | Number of Samlpes | Type of sample | Parasites Found |
|---|---|---|---|---|
| **1** | Avian | 412 | Faecal /Intestine | *Eimeria spp., Ascaridiagalli* |
| **2** | Bovine | 420 | ,, | *Strongyle eggs, Ascarislumbricoides* |
| **3** | Canine | 14 | ,, | - |
| **4** | Caprine | 43 | ,, | |
| **5** | Crocodile | 1 | ,, | NPF |
| **6** | Equine | 7 | ,, | |
| **7** | Laprine | 7 | ,, | *Eimeria spp.,* |
| **8** | Ovine | 37 | ,, | *Strongyle egg, Eimeria spp.,* |
| **9** | Porcine | 6 | ,, | |
| **10** | Cysts | 4 | | |
| **11** | Worms | 12 | | |
| | **TOTAL** | **963** | | |

A total of 963 fecal and intestinal samples were submitted to this Unit, some of them were positive for various intestinal helminthes and protozoan eggs and cysts. NPF= No Parasite Found.

**ENTOMOLOGY UNIT**

| S/N | Animal Spp. | Number of Samples | Type of sample | Results |
|---|---|---|---|---|
| 1 | Avian | 22 | Skin scrapings(21), feather (1) | *Knemidicoptesmutans* (18) |
| 2 | Bovine | 7 | Ticks | *Amblyomma variegatum (11)* |
| 3 | Canine | 3 | Ticks, Skin scrapings | *Rhipicephalussanguineus (5), Haemaphysalisspp* (1) |
| 4 | Caprine | 2 | Ticks, Fleas | *Hylommatruncatum (2), Ctenocephalidesfelis* |
| 5 | Ovine | 1 | Tick | *Hylommatruncatum* |
| 6 | Caprine/ Ovine | 329 | Ticks | *Amblyommavariegatum (202), Hyalommatruncatum (85), Rhipicephalus spp. (42)* |
| 6 | Porcine | 15 | Skin scrapings (10), Ectoparasites | *Sarcoptesscabeiivarsuis (9), Heamatopinussuis(34) , Rhipicephalus spp.(2)* |
| | **TOTAL** | **379** | | 791 |

Seven hundred and ninety-one (791) ectoparasites, 32 skin scarping and 1 feather samples were submitted to the Entomology Unit. The parasites were identified accordingly.

## ETHNOVETERINARY/ PRODUCTION UNIT

| ANNUAL REP. | PRODUTS | | | TOTAL |
|---|---|---|---|---|
| **Jan-Dec.** | **Soap** | **Ointment** | **Lotion** | |
| | 1,269 | 460 | 140 | **1,869** |

Within the period under review, a total number of **1,869 Scabicur® products** comprising Soap (1,269), Ointment (460) and Lotion (140) were produced and supplied to the Consultancy Department of the Institute as presented on the Table above.

**PROJECTS FROM STUDENTS**

During the period under review, 1 PhD student was assisted with his project, 2 MSc. students, 20 undergraduates (BSc. students, HND students and OND students).

Also, Industrial Training students were posted to the Division from various Higher Institutions.

# 13.PLANNING DIVISION

The Planning Division is charged with the responsibility of formulation, co-ordination, collecting, collating, and analyzing all kinds of data for smooth running of the Institute projects and programmes for effective implementation of the institute's mandate. It also serves as the DATA BANK of the Institute.The Division processed several data relating to research, vaccine production, socio-economic activities, Institute's landed properties and Human Resource Planning in the year under review.

**The activities on data collected were as follows:**

1. Prepared an aggregate data of Scientist and Engineers (S&E) in the Institute.
2. Collected and compiled viable research and development (R&D) results and inventions by the Institute and forwarded to National Innovation System (NIS) in Nigeria.
3. We populated the template for National Development Plan (NDP), 2021-2022 implementation plan.
4. Prepared the first quarter 2022 Reporting Templates on the Implementation of Ministerial Mandates.
5. Populated the implementation and financial plan template and forwarded to the National Agricultural Technology and Innovation Policy.

**The Division also carried out the following activities:**

- Handled 2022 capital budget implementation report.
- Inspected the Institute's landed properties in Vom and its environs. Maps of some of the Institute's landed property were produced by National Centre for Remote Sensing and coordinates of some Institutes paddocks were taken to ascertain the area mass.
- Updated the 2022 Institute'snominal roll for the purpose of statistical analysis.
- Distributed the Institute's publications to dignitaries that visited the Institute.
- Processed and produced three hundred (300) PVC Staff ID.
- Compiled and analyzed data of the vaccines produced and alsodata of the vaccines demanded&supplied.

The following figures showed bacterial vaccines produced **(Fig. 1)**; viral Vaccines produced**(Fig. 2)**; vaccines demanded and supplied**(Fig. 3)**and vaccines excess demanded charts**(Fig. 4):**

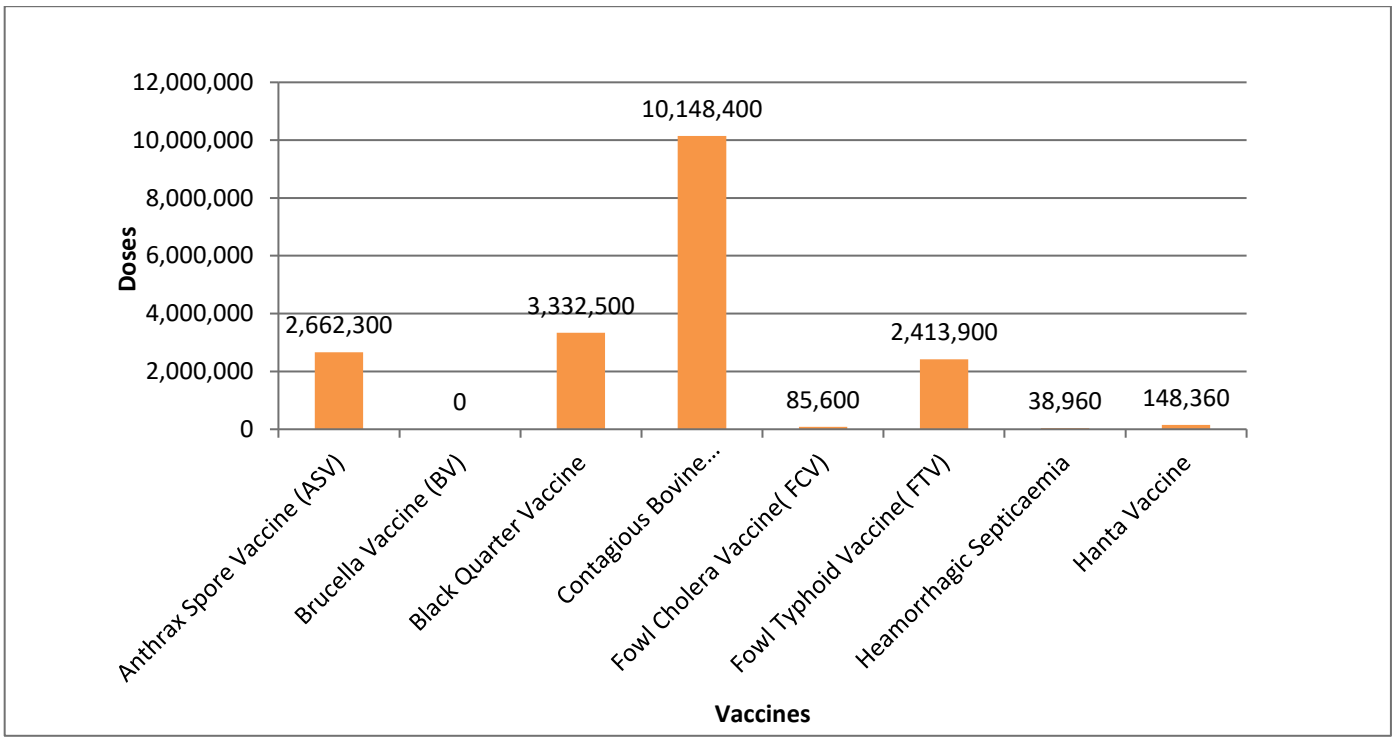



**Fig.1: Bacterial Vaccine Production Chart**

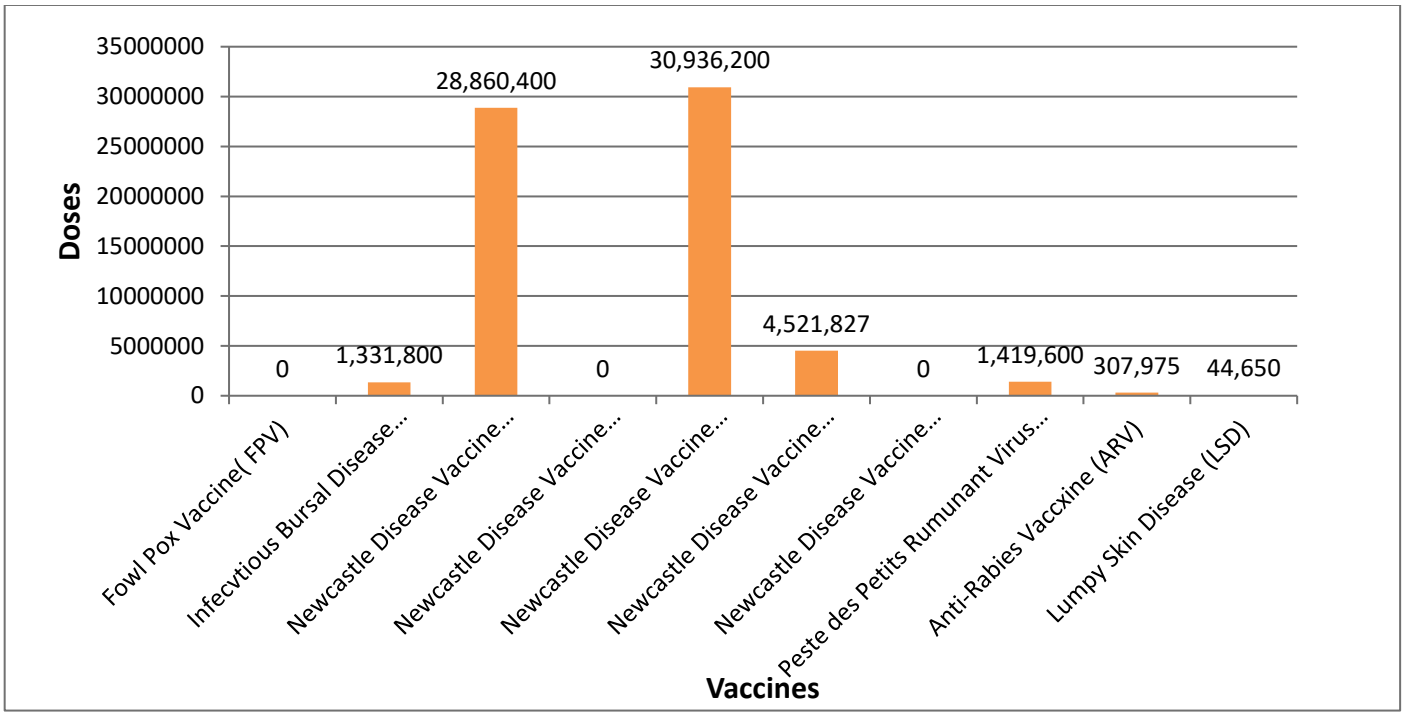
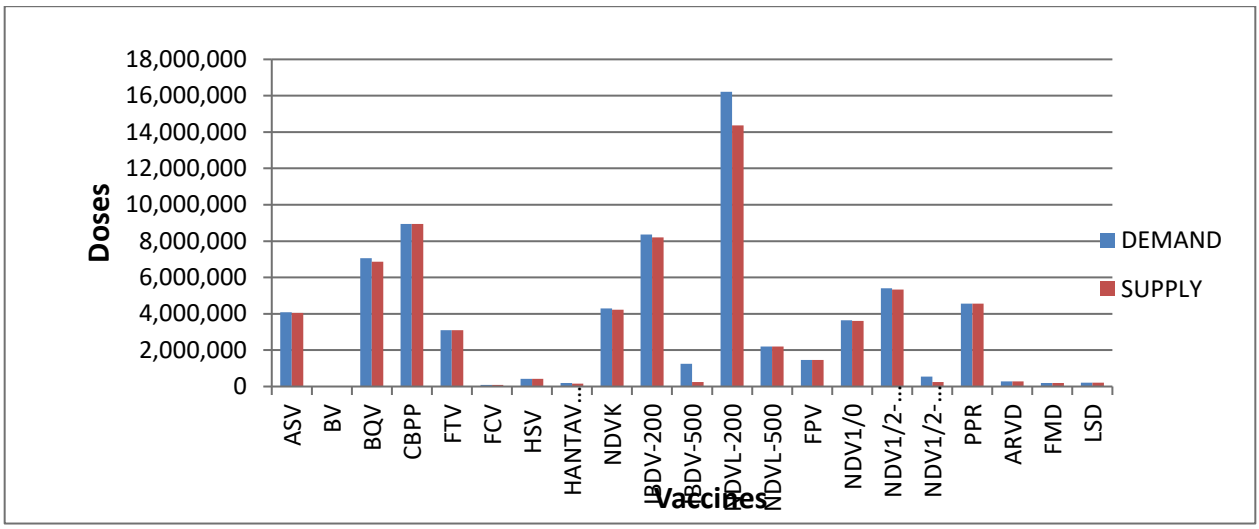



**Fig.2: Viral Vaccines Production Chart**




**Fig,3: Vaccines Demanded and Supplied Chart**

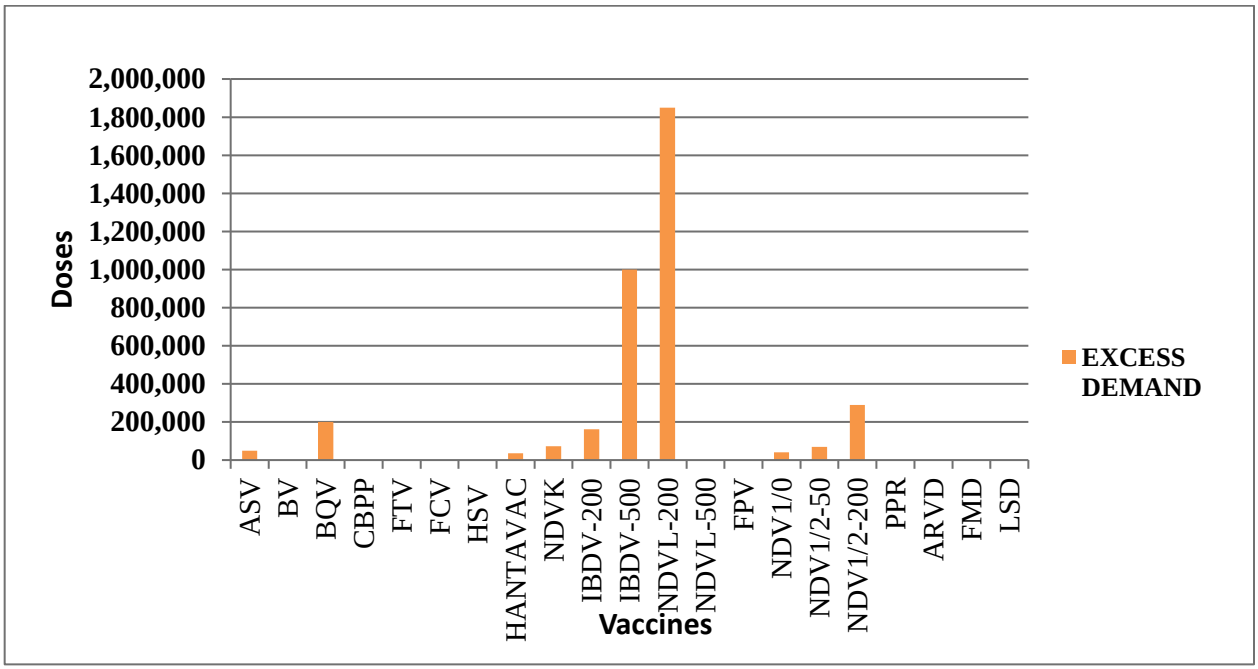



**Fig.4: Vaccines Excess Demanded Chart**

In the year under review, the Division participated in workshops and trained personnels onbudget preparation for the year 2023

**Challenge**

- The Division is not connected to the internet.
- The Division needs a computer server system, softwarepackages and data storage gadgets.
- Inadequate office space for staff and for keeping confidentialdocuments.

**Future Plan**

- To establish effective and efficient information systems to manage the Institute's database.
- Good planning and organizational skills with a strong focus on attention to details, quality and high performance.

## 14. POULTRY DIVISION

### 1. Functions /Mandate

i. To produce fertile eggs for various vaccines production.
ii. To produce chicks for vaccine testing and research purposes.
iii. Investigate diseases of poultry that may hamper productivity.
iv. Investigate nutritional and management aspects of all classes of poultry and their effects on disease management.
v. Introduction, Adaptation, and Disease Management of exotic breeds of poultry.
vi. Teaching/Training of students from Tertiary Institutions, Colleges and Universities.

### 2. Specific notable Activities

i. Production of fertile eggs /birds for vaccine production and research.
ii. Production of birds for research (Ducks, Guinea fowls, Quails, Turkeys, Geese etc.)
iii. Divisional seminars/Publications
iv. Training of Students on Industrial Training.
v. Supervision of Students Project from Federal College of Animal health and Production Technology, Vom.
vi. Hatching and sales of Noiler and Quail chicks

### 3. Achievements

i. Raising birds as replacement for vaccine birds.
ii. Supply of fertile eggs for the vaccine production laboratories.
iii. Provision of fertile eggs for the Research and Quality control laboratories.
iv. Production of quails and other species of birds in the farm.
v. Revenue generation from the sales of poultry and poultry products.
vi. Hatching of quails and other exotic birds for undergraduate and post graduate studies/research.
vii. Provision of fertile eggs for postgraduate research.
viii. Practice of artificial insemination in turkeys.

### 4. Major Challenges

i. Biosecurity of the farm is compromised due to lack of perimeter fence.

ii. Inadequate Junior staff strength.
iii. Lack of offices/conveniences for Junior staff
iv. Dilapidated hatchery due to damage by rainstorm.
v. Old and obsolete incubators that need urgent replacement.
vi. Lack of mini-Poultry processing plant.
vii. Dilapidated administrative block/staff offices with insufficient tables and chairs.
viii. Wet litter from battery cages compromises biosecurity during the rainy season.

| Month | Total production | Broken | Hatched | Virology Setting | B/factory | DEA | Infertile | Dead Embryo | Sales |
|---|---|---|---|---|---|---|---|---|---|
| January | 101438 | 5520 | 1779 | 18810 | 61890 | 2034 | 681 | 1091 | 3150 |
| February | 90077 | 5192 | 1854 | 29410 | 49770 | 2283 | 1627 | 2183 | 1800 |
| March | 101181 | 5640 | 3503 | 22110 | 65370 | 2040 | 1672 | 2440 | 4320 |
| April | 94051 | 5024 | 2684 | 1453 | 75630 | 4855 | 510 | 253 | 6510 |
| May | 89335 | 4023 | 3378 | 1340 | 75060 | 3560 | 315 | 462 | 6390 |
| June | 82546 | 4860 | 2601 | 1730 | 60450 | 2490 | 761 | 976 | 4620 |
| July | 66091 | 4661 | 4025 | 2120 | 47970 | 2280 | 625 | 6778 | 6060 |
| August | 75896 | 5610 | 11915 | 16610 | 34770 | 2800 | 1950 | 4836 | 6630 |
| September | 51624 | 3914 | 4873 | 29480 | 4440 | 1770 | 6393 | 4882 | 4260 |
| October | 48561 | 3795 | 1968 | 24920 | 7440 | 2999 | 4488 | 3591 | 5520 |
| November | 19680 | 1785 |  | 13422 | 6780 | 1650 | 1330 | 1317 | 3180 |
| December | 48825 | 2789 | 10346 | 960 | 16830 | 3660 | 724 | 2928 | 10380 |
| **Total** | **869305** | **52813** | **48926** | **162365** | **506400** | **32121** | **21076** | **31737** | **62820** |

**Table 2:** Vaccine eggs supplied to Production and Research Laboratories in 2022

| Month | NDV | IBDV | AI | Q/C | FPV | RES | ARV |
|---|---|---|---|---|---|---|---|
| January | | | 600 | 210 | | | 18000 |
| February | | | 1200 | 210 | | | 28000 |
| March | | | 900 | 210 | | | 21000 |
| April | | 300 | 739 | 414 | | | |
| May | | 800 | 540 | | | | |
| June | | 500 | 1020 | 210 | | | |
| July | | 500 | 1320 | | 300 | | |
| August | 7000 | 300 | 660 | 570 | | 1080 | 7000 |
| September | 14000 | | 360 | 310 | | 810 | 14000 |
| October | 10170 | | 240 | 210 | | 300 | 14000 |
| November | 11087 | | 720 | | | 120 | 1495 |
| December | | | 300 | 210 | | 450 | |
| **Total** | **42257** | **2400** | **8599** | **2554** | **300** | **2760** | **103495** |

**Egg Production And Utilization**

**Table 3**: Egg Production from other species of birds in 2022

| Month | Frizzled Feather | Yoruba Ecotype | Noiler Isa B | Brahma | Turkey | Guinea fowl |
|---|---|---|---|---|---|---|
| January | - | - | - | - | - | - |
| February | - | - | - | - | 4 | - |
| March | 11 | 30 | - | - | 33 | - |
| April | 11 | 24 | 43 | - | 56 | - |
| May | - | - | 957 | - | 54 | - |
| June | - | - | - | - | 44 | - |
| July | - | - | - | - | 31 | 196 |
| August | - | 2 | - | - | - | 301 |
| September | - | 10 | - | - | - | 155 |
| October | - | - | 2919 | - | 3 | 74 |
| November | - | - | 46 | 6 | 31 | 13 |
| December | | | 701 | 6 | 38 | 186 |
| **Total** | **22** | **66** | **4666** | **12** | **294** | **925** |

Table 3: Egg Production from other species of birds in 2022 Cont

| Month | Quails | Ducks | | Geese |
|---|---|---|---|---|
| | | White Pekin | Khaki Campbell | |
| | | | | |
| January | - | 86 | 94 | 24 |
| February | - | 189 | 213 | 31 |
| March | - | 260 | 185 | 5 |
| April | 73 | 259 | 320 | 15 |
| May | 4013 | 348 | 466 | 20 |
| June | 6944 | 343 | 490 | 13 |
| July | 7033 | 413 | 510 | 10 |
| August | 18535 | 413 | 510 | 10 |
| September | 16909 | 315 | 464 | - |
| October | 12083 | 397 | 466 | 6 |
| November | 11647 | 121 | 119 | 13 |
| December | 17142 | 79 | 223 | 15 |
| **Total** | **94379** | **3223** | **4060** | **162** |

## 15. PRINTING AND PUBLICATION DIVISION

### 1. Mandate/Functions

At the start in 1988, a mandate was officially given to the printing press by the management at that time, which stated thus:

i. To handle all the printing requirements of the Institute
ii. To formulate new concept, design, code and printing of all the Institute vaccines labels
iii. To publish/print all Scientific and Technological Research Journals that will be sent to the Divisions.
iv. The functions of the printing and publications division are not limited to but include the printing of the following:

- Vaccine Labels
- Scientific Journals
- Official Sales Invoices
- Officials Receipts
- Yearly Calendar
- Official headed papers, envelops and File Jackets
- Examination answers booklets for the colleges etc.
- Annual Report

## 2. Specific and notable activities

The following jobs were produced during the year under review.

| | | |
|---|---|---|
| NDV-I2 | - | 137,810 pieces |
| PPR | - | 72,722pieces |
| Black quarter | - | 6,676 pieces |
| Hantavac Working Seed | - | 3,712 pieces |
| Lumpy skill | - | 1,700 pieces |
| Sterile diluents | - | 20,600 pieces |
| Fowl cholera | - | 450 pieces |
| FMD Buru Vaccine | - | 200 pieces |
| Staff training manual | - | 300 booklets |
| Official secret files | - | 5000 copies |

## 3. Major Challenges

i. Shortage of Technical staff
ii. Lack of modern printing equipment
iii. Lack of opportunities to attend conferences, Book Fairs and International Printing Exhibitions. The printing festivities feature live display of the various printing technologies from different companies from all over the world and provide the option to choose a printing technology that best suits the Institute's printing need especially the vaccine label.
iv. Renovation /creation of additional offices through partition.
v. Creation of an independent entry/exit into the division.
vi. Creation of toilet convenience for the division.

## Future Plan

Currently, there are several printing technologies evolving with benefits and values. The division will want to pursue a printing technology that will best suit the need of the Institute in these modern times where exciting quality products of goodstandard will be produced. The technology will also include the protection of the Institute's numerous brands and other benefits such as:

i. Revenue generation; the technology will serve the Institute and customers with similar needs.
ii. Speed and efficiency; usually, long production process is cut short and saves time.
iii. Producing at the cheapest price possible will attract more customers.
iv. Deliver goods of the right quality and quantity at the right time, and at the right price.
v. It motivates and boost the morale of staff etc.

## Procurement of Modern Printing Equipment

- We need a modern machine for printing of synthetic vaccine labels compare to other non-tire able water proof labels.

## Need for Technical Staff

We need five (5) technical staff in the Division

**Prepress:** - One (1) technical staff (Graphic) - This deals with electronic pagination, impositioning and plate making.

**Press:** - Three (3) technical staff (Printing Machine) - This is where the printing of Vaccine labels, Scientific Journals, Sales Invoices, Receipts, Letter Heads, File Jackets, Examination answer booklets, Posters and other numerous printing are done.

**Post Press:** - One (1) technical staff - This section is responsibility for finishing all the printing jobs.

- Trimming
- Cutting
- Folding
- Stitching/Gluing
- Collation
- Dispatch

## 16. QUALITY CONTROL DIVISION

### A. Functions/Mandate

The Quality Control Division is responsible for the standardization of services and products to ensure conformity to customer and regulatory requirements. As well as enhancing customer satisfaction through the effective implementation, and continuous improvement, Quality Management System (QMS) for the production of veterinary vaccines, biologicals and general laboratory procedures in the institute. As a routine, the Division conducts quality control tests on various vaccines produced by the Institute to ascertain suitability for use in the field and issues certificates of compliance for each batch of vaccines produced. Periodic assessment and auditing of institute laboratories are conducted to ensure Current Good Manufacturing Practice (CGMP) and Good Laboratory Practice (GLP).

### B. Specific Activities

#### a. Vaccines received for Internal Quality Control

i. **Bacterial Vaccines:** Thirty-Seven (37) batches of various bacterial vaccines were received from Bacterial Vaccines Production Division during the period under review, for the purpose of product assessment for quality and certification. Details of the bacterial vaccines are given in Table 1.

Table 1: Bacterial vaccines submitted to the Quality Control Laboratory in 2022

| S/N | Vaccine Type | Number of Batches |
|---|---|---|
| 1. | Anthrax Spore Vaccine | 8 |
| 2. | Black Quarter Vaccine | 3 |

| | | |
|---|---|---|
| 4. | Contagious Bovine Pleuropneumonia Vac. | 6 |
| 5. | Fowl Typhoid Vaccine | 6 |
| 6. | Fowl Cholera Vaccine | 3 |
| 7. | Hemorrhagic Septicaemia Vaccine | 8 |
| 8. | Hantavac | 3 |
| **Total** | | **37** |

ii. **Viral Vaccines:** Seventy nine (79) batches of vaccines were received from the Viral Vaccines Production Division during the period under review for quality check and certification. Details of the viral vaccines are given in Table 2.

Table 2: Viral vaccines submitted to the Quality Control Laboratory in 2022

| S/N | **Vaccine Type** | **Number of Batches** |
|---|---|---|
| 1. | Anti-Rabies Vaccine | 40 |
| 3. | Fowl Pox Vaccine | 2 |
| 4. | Infectious Bursal Disease Vaccine | 5 |
| 5. | Newcastle Disease Vaccine $I_2$ | 12 |
| 6. | Newcastle Disease Vaccine Komarov | 2 |
| 7. | Newcastle Disease Vaccine Lasota | 10 |
| 9. | Peste Des Petits Ruminant Vaccine | 8 |
| Total | | **79** |

**b. Vaccines sent for external quality control:** As part of quality assurance measure, representative batches of various vaccines are periodically assessed externally in addition to the routine Internal Quality Control. In the year 2022, batches of different vaccines including both bacterial and viral vaccines were submitted to the African Union-Pan African Veterinary Vaccine Centre (AU-PANVAC) for external quality control during the period under review (Table 3).

Table 3: List of vaccines submitted to the AU-PANVACfor external quality control in 2022

| **S/N** | **Vaccine Type** | **Number of Batches** |
|---|---|---|
| 1. | Anthrax Spore Vaccine | 3 |

| | | |
|---|---|---|
| 2. | Anti-Rabies Vaccine | 6 |
| 3. | Black Quarter Vaccine | 2 |
| 4. | Contagious Bovine Pleuropneumonia | 4 |
| 5. | Fowl Typhoid Vaccine | 1 |
| 6. | Hemorrhagic Septicaemia Vaccine | 3 |
| 7. | Newcastle Disease Vaccine $I_2$ | 1 |
| 8. | Newcastle Disease Vaccine Lasota | 4 |
| **Total** | | **24** |

## C. Achievements

### a. Vaccines Testing and Certification

i. Vaccine quality checks have been completed on 35 batches of Bacterial vaccines out of 37 batches submitted during the period of this report and certificates have been issued to the producers. Work is currently on-going on the remaining batches.

ii. Vaccine quality checks have been completed on 63 batches of viral vaccines out of 79 batches submitted during the period of this report and certificates have been issued to the producers. Work is currently on-going on the remaining batches.

### b. Conferences/Seminars Attended

i. Mrs. Mukaila F. B. attended an Annual Conference of the Association of Medical Laboratory Scientists of Nigeria (AMLSN) Plateau state Chapteron Quality Laboratory Output and Patient Care; The Issues and Nexus in the One Health Framework from 10th to 14th May 2022.

### c. Staff Training

i. Dr. Laleye A.T, Dr. A.N Egbuji and Mr. Gyallak K. James attended a training on Calculation of Measurement Uncertainty (Intermediate) Course from 22nd to 24th March, 2022.
ii. Mr. Gyallak K. James attended a training on Monkey Pox from 28th March to 1st April, 2022.
iii. Dr. Benson N. M. attended a training on Regulatory and Certification Framework for Institutions Handling High Risk Pathogens organised by Africa Centre for Disease Control from 23rd to 24th November 2022.

**d. Staff Promotions/conversion:** The following staff were promoted/converted in the year 2022

i. Mr. Akachi Kenneth Unekwu was promoted from the rank of Research Officer I (RO I) to Senior Research Officer (SRO) with effect from 1st January, 2022.

ii. Mr. Haruna Dagwong Kwanga was promoted from the rank of Higher Medical Laboratory Technician (HMLT) to Senior Medical Laboratory Technician (SMLT) with effect from 1st January, 2022.
iii. Mr. Swomen Lawrence Nkwaphad his appointmentconfirmed with effect from 1st January 2022.
iv. Mr. Habila Stephen Luka was converted from Chief Medical Laboratory Assistant (CMLA) to Higher Science Laboratory Technologist (HSLT) with effect from 1st January, 2022.
v. Mr. Maisaje Dachung Francis was converted from Medical Laboratory Assistant (CMLA) to Higher Science Laboratory Technologist (HSLT) with effect from 1st January, 2022.

**D. Challenges**

a. Inadequate capacity for molecular and tissue culture technique
b. The laboratory is deficient in adequately equipped facility required for potency and safety tests.
c. The laboratory has some faulty equipment (such as Biosafety cabinets, autoclaves) without ready access to technical services for repairs, maintenance and/or calibration.

**E. Projections:**

a. Equipping the Molecular Biology section of the Division.
b. Provision of essential equipment, media and reagents required by the Division.
c. Equipping the experimental animal house

## 17. RABIES DIAGNOSIS AND RESEARCH DIVISION

### 1. Functions/Mandates of Rabies Laboratory

Rabies Laboratory is charged with the following specific mandates:

i. To conduct research on rabies and rabies-related Lyssaviruses that cause neurological disorders that are clinically indistinguishable.
ii. To carry out confirmatory laboratory diagnosis of animal rabies infections caused by *Lyssaviruses*, using *in vitro* and *in vivo* methods.
iii. Development and production of rabies antigens and anti-sera for research and diagnosis.
iv. Assessment of antigenicity of rabies vaccine and vaccine viruses by *in vitro* and *in vivo* methods.
v. To conduct clinical trials and field evaluation of NVRI rabies vaccines and sero-monitoring of dogs vaccinated with the vaccine.
vi. Participation in national surveillance of rabies and rabies-related viruses in domestic animals and wildlife.
vii. Participation inrabies proficiency test administered by the Nancy Laboratory for Rabies and Wildlife, France and the Istituto Zooprofilattico Sperimentale Delle Venezie (Izsve), FAO Reference Centre (RC), Italy.
viii. Training and capacity building of personnel.

### 2. Notable activities carried out in 2022

#### i) Routine Laboratory Diagnosis

From January 1st to December 31st 2022, a total of 241 specimens from Six (6) animal species (dog, cat, goat, cow, sheep and wild animals) were received and routinely tested for rabiesTable 1). A breakdown from the total specimen received:- domestic dogs 205 (85.1 %), cat 17 (7.1%), sheep 1(0.4%), goat 11 (4.5%) , cow 2 (0.8%) and wildlife 5 (2,1%) respectively. A total of 166 (68.9%) of all samples submitted were confirmed positive, while the remaining 75 (31.1%) were negative. Of the 166 positive samples, 151 (91.0%) were from domestic dogs and 15 (9.0%) from other animals. Also, out of the 75 negative samples, 54 (72.0%) were from domestic dog while the rest were from cat, cow, sheep, goat and wild animals.

**Table 1**: Distribution, by species, of Animal Samples submitted for Rabies routine Diagnosis from 21 States of the Federation.

| **STATE** | **ANIMAL SPECIES** | | | | | | | | | | | | **TOTAL** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Canine | | Feline | | Caprine | | Bovine | | Wildlife | | Ovine | | |
| | **+ve** | **-ve** | **+ve** | **-ve** | **+ve** | **-ve** | **+ve** | **-ve** | **+ve** | **-ve** | **+ve** | **-ve** | |
| Abia | 1 | - | - | - | - | - | - | - | - | - | - | - | **1** |
| Adamawa | - | - | 2 | 4 | - | - | - | - | - | - | - | - | **6** |
| Akwa-Ibom | 1 | 1 | - | - | - | - | - | - | - | - | - | - | **2** |
| Bauchi | 15 | 5 | 3 | 1 | - | 1 | - | - | - | - | - | - | **25** |
| Benue | 1 | 2 | - | - | - | - | - | - | - | - | - | - | **3** |
| Borno | 1 | - | - | - | - | - | - | - | - | - | - | - | **1** |
| Cross River | 2 | - | - | - | - | - | - | - | - | - | - | - | **2** |
| Delta | 2 | 1 | - | - | 1 | - | - | - | - | - | - | - | **4** |
| Ebonyi | 7 | - | 1 | - | - | 1 | - | - | - | - | - | - | **9** |
| Ekiti | 3 | - | - | - | - | - | - | - | - | - | - | - | **3** |
| Enugu | 1 | - | - | - | - | - | - | - | - | - | - | - | **1** |
| Gombe | 7 | 2 | - | - | - | - | - | - | - | - | - | - | **9** |
| Kaduna | 4 | 1 | - | - | 1 | - | - | - | - | - | - | - | **6** |
| Kano | 12 | 4 | - | - | 1 | - | 1 | - | - | - | - | - | **18** |
| Katsina | - | - | - | - | - | - | - | 1 | - | - | - | - | **1** |
| Nassarawa | 2 | - | - | - | - | - | - | - | - | - | - | - | **2** |
| Niger | 2 | 1 | - | - | - | - | - | - | - | - | - | - | **3** |
| Ogun | 1 | - | - | - | - | - | - | - | - | - | - | - | **1** |
| Osun | 1 | - | - | - | - | - | - | - | - | - | - | - | **1** |
| Oyo | 1 | - | - | - | - | - | - | - | - | - | - | - | **1** |
| Plateau | 87 | 37 | 4 | 2 | - | 6 | - | - | 1 | 4 | - | 1 | **142** |
| **TOTAL** | **151** | **54** | **10** | **7** | **3** | **8** | **1** | **1** | **1** | **4** | | **1** | **241** |

Key: +ve = Positive; -ve = Negative

**Figure 1** above, depicts the breakdown of the total samples received and tested in the two sample categories (rabies positive and negative), while **Figures 2** and **3** below depict the breakdown of the numbers and percentages of the 163 animal bite cases reported during the year under review, based on

reported dog and cat bites. Additionally, human exposures from all the 163 samples were also categorized into rabies positive and rabies negative respectively.

In addition to the 241 routine samples tested, a total of 800 dog head or brain samples submitted by students for research purposes, were analysed (**Figure 5**). Of this number, 79 (9.9%) were positive for rabies while 721 (90.1%) were negative (Figure 6). Comparative analysis of the two categories of samples showed that majority of the routine samples (68.9%) had higher percentage of positivity while majority of the students' samples (90.1%) tested negative (Figure 6).

A total of 775 mice were used for inoculation forthe 116 samples submitted for either routine diagnosiswith history of human bite, but turned out to be negative for rabies or for research.

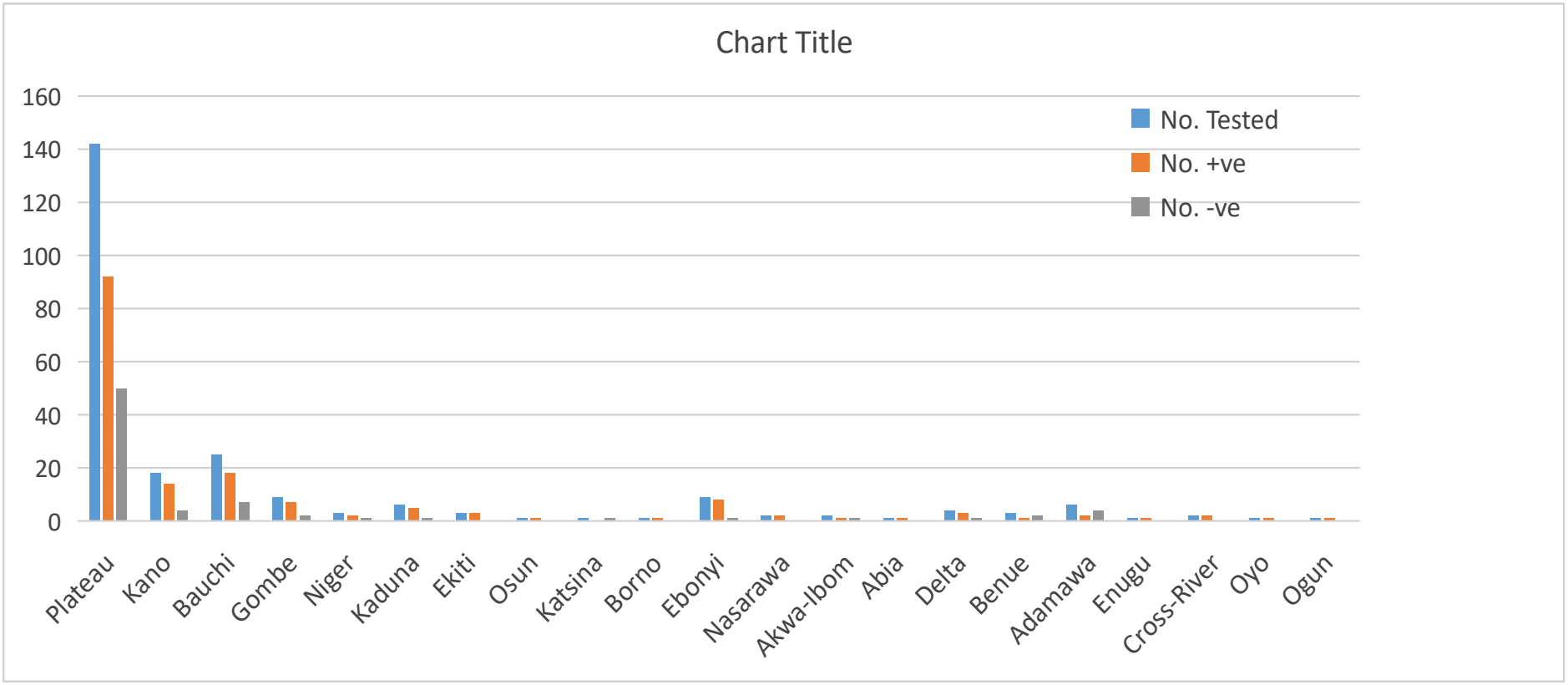



**Figure 1**: Summarised results of samples tested (No. tested, No. Positive and No. Negative) per State

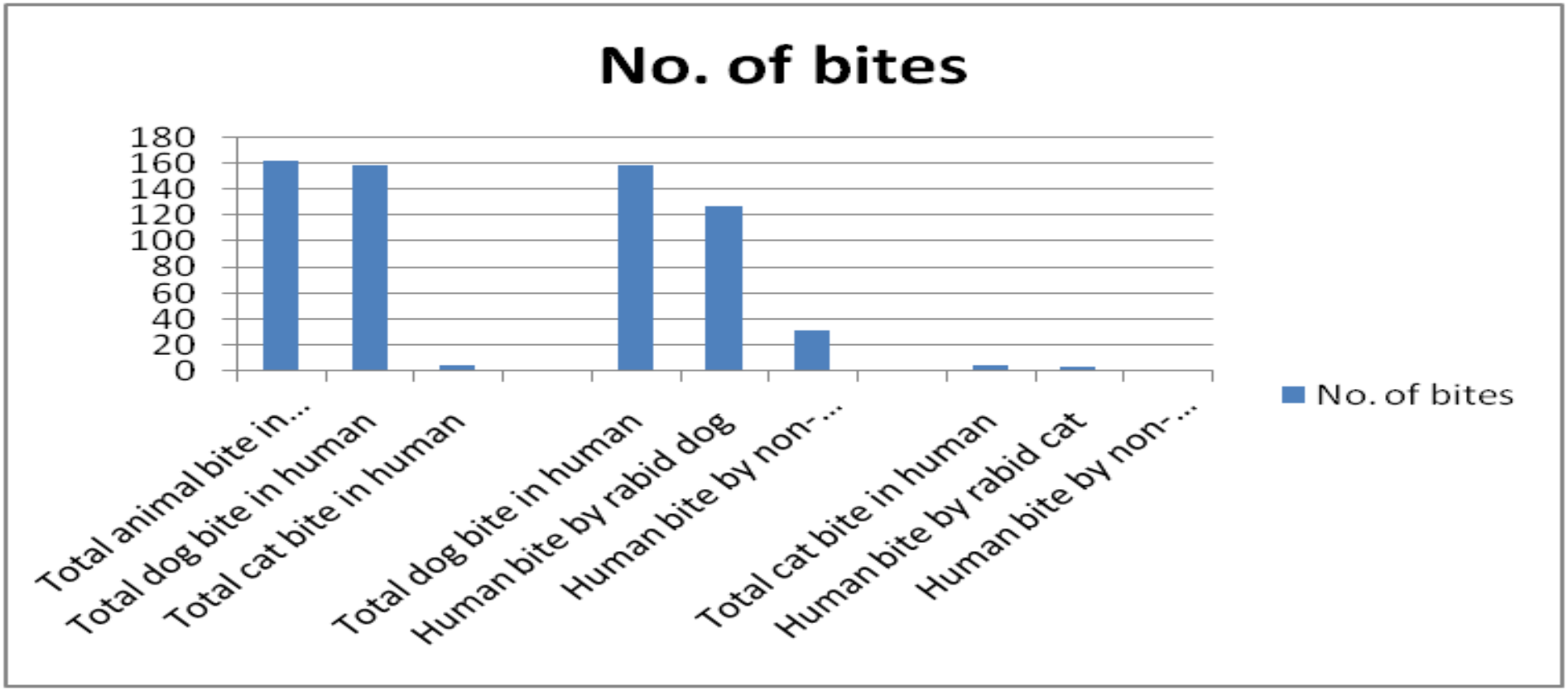



**Figure 2**: Breakdown of the 163 reported animal bite cases in absolute numbers by biting animal type.

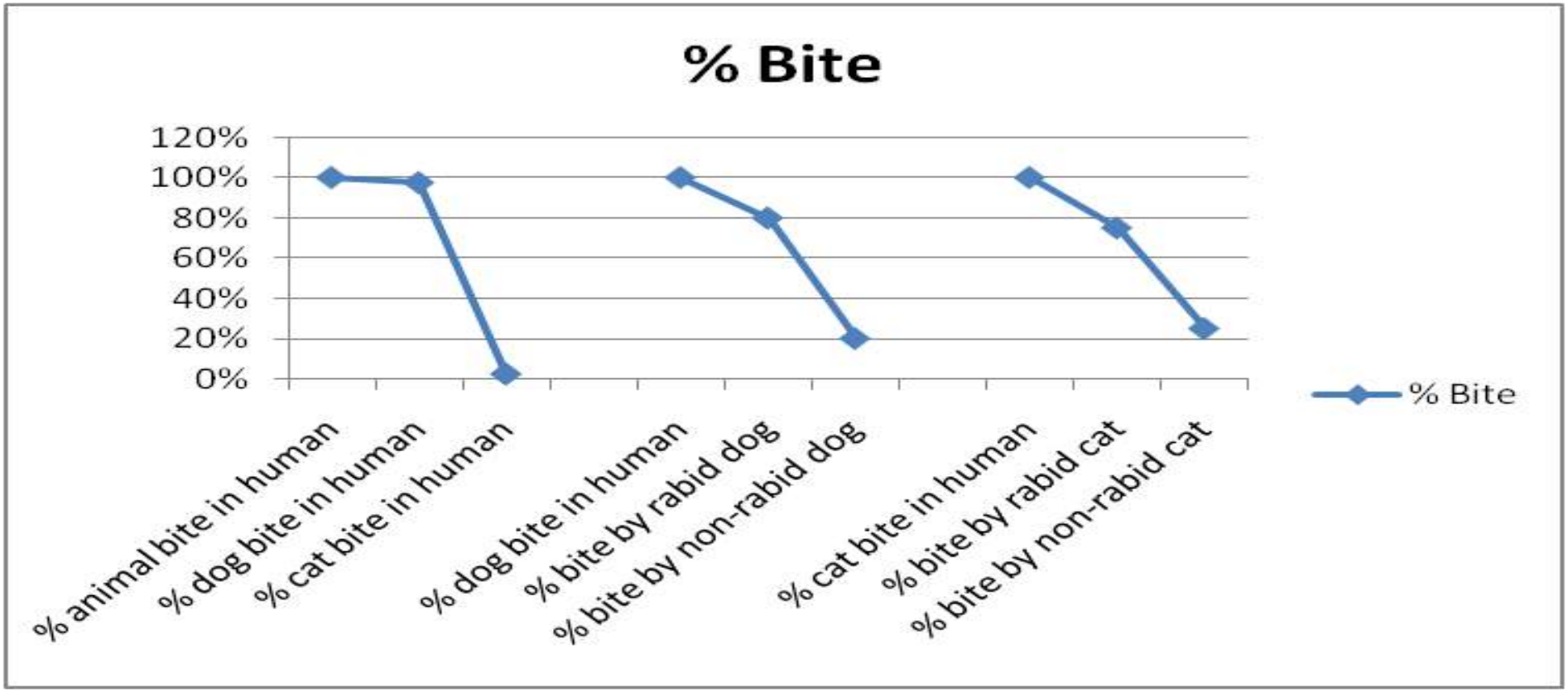



**Figure 3**: Breakdown of the 163 reported animal bite cases in percentages by the biting animal type.

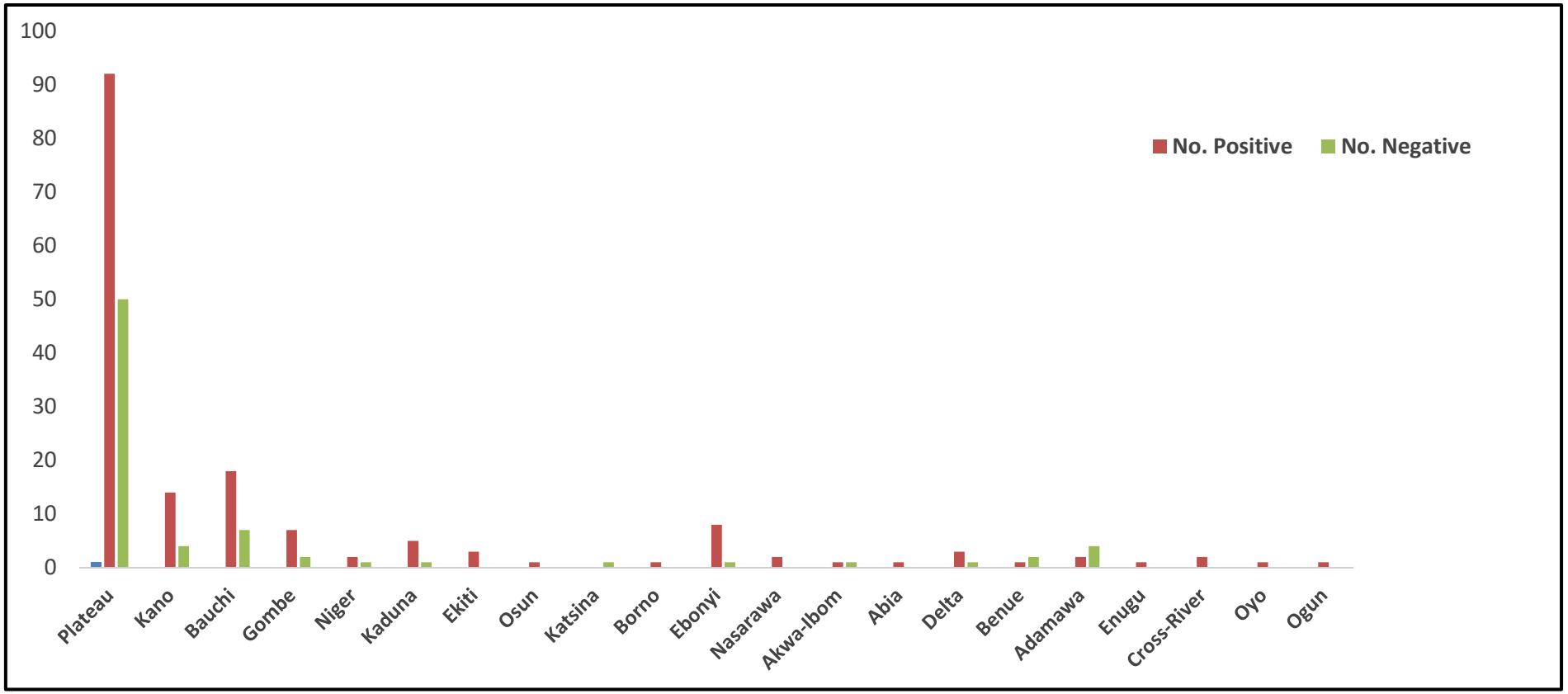



**Figure 4**: Distribution of routine cases (Positive or Negative) by States in the Federation.

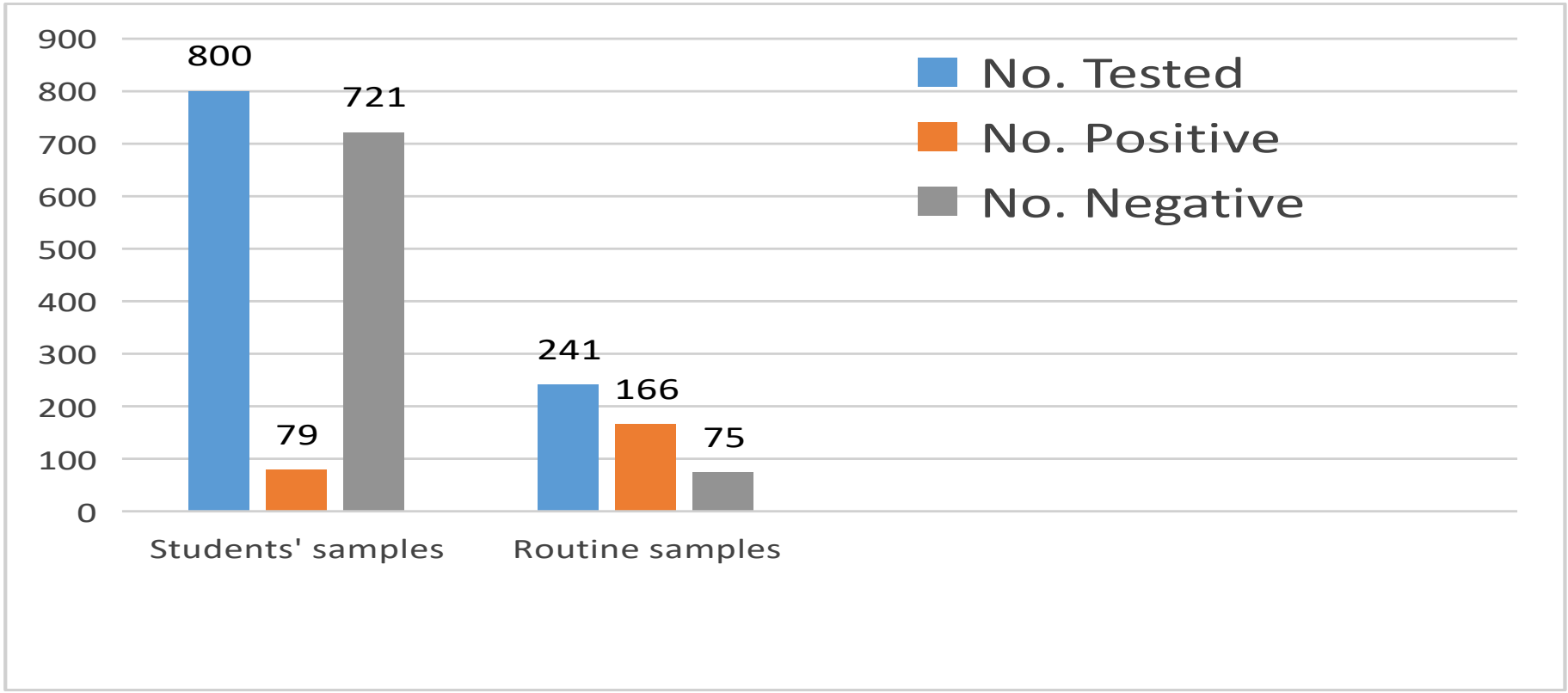



**Figure 5**: Distribution by category of research samples tested into number of positives and negatives.

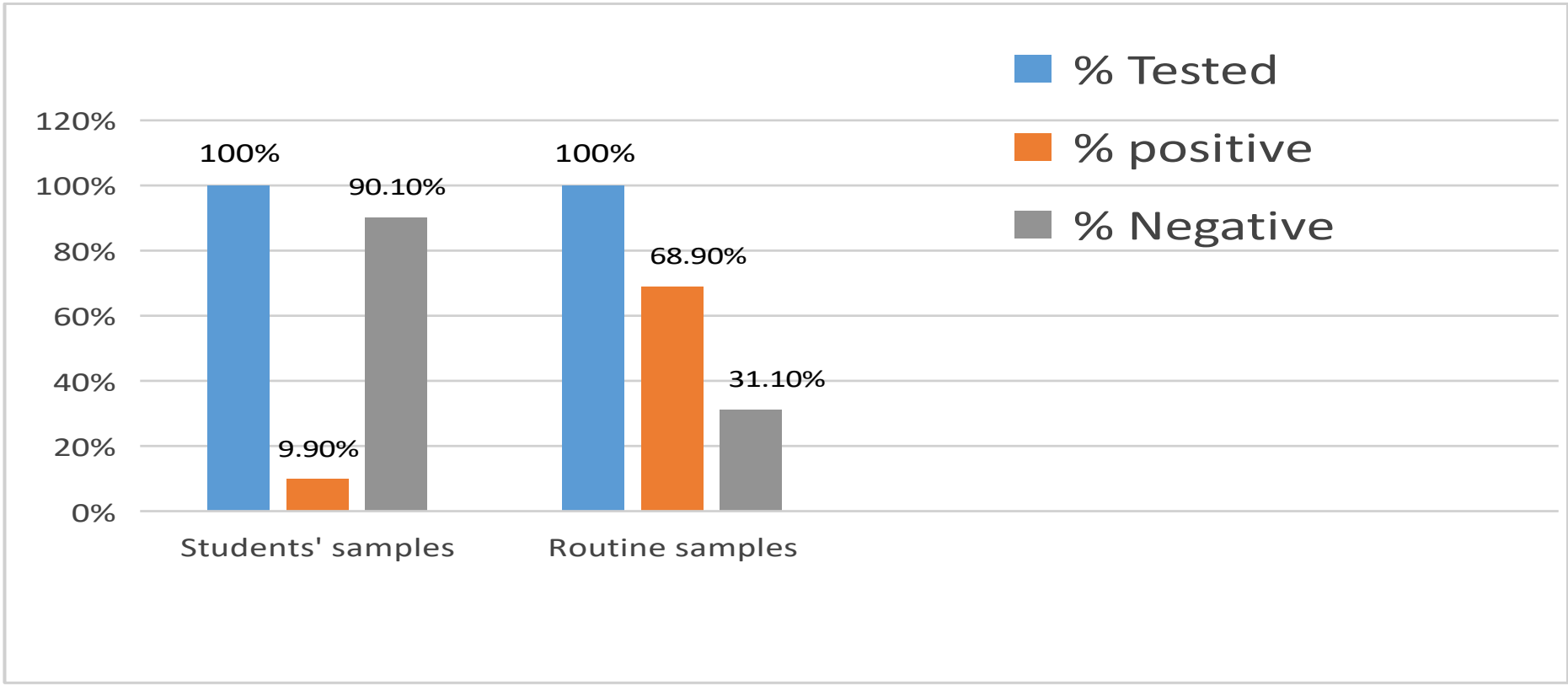



**Figure 6**: Percentage distribution by category of samples tested into % positives and % negative

**ii) Collaboration/Bench Work Activities in 2022**

The laboratory hosted one (1) each of Post Graduate students (Ph.D.) and HND students. The PhD student was from the Ahmadu Bello University (ABU) Zaria while the HND student was from the Federal College of Animal Health and Production Technology (FCAHPT), Vom. They carried out diagnoses of rabies virus antigen in 800 dog brain samples by fluorescent antibody test (DFAT), using rabies laboratory bench space.

## 3. Achievements

**I) Number of samples analysed**

The laboratory analysed a total of **1041 samples** from dog, Cat, Goat, Cow, sheep and wildlife (241 for routine diagnosis and 800 for students' research). The specimens came from only 21 States of Nigeria and a few from the Republic of Cameroon.

**II) Installation of laboratory benches and cabinets**

We appreciate the D/CE, for the laudable achievement of completing the installation of laboratory benches and special cabinets in the permanent building of the Division. However, due to lack of a few materials indicatedin the "major challenges" A to C below in this report, the laboratory is not ready for use. As soon as such materials are made available, the division will relocate to the permanent structure.

## 4. Major Challenges

**A.** Non-availability of furniture such as stools in the Laboratories, office Chairs and tables.
**B.** Non-availability of Ceramic sink, water pipes, waste pipes (in the mouse room).
**C.** The wash-up room requires to be tilled for easy cleaning.
**D.** Non-availability of washing and drying machines for laundering laboratory coats.
**E.** Non-availability of window blinds (required in 13 rooms).
**F.** Non-availability of six (6) energy saver electric lamps and holders (required in the passage in middle of the building).
**G. Non-availability of the following equipment**

i. Ultra-Low freezer (-80$^{o}$C)
ii. Refrigerated centrifuge (+4$^{o}$C)

**H. Short supply of the following equipment:**

i. Biosafety cabinet class II
ii. Carbon dioxide ($CO_2$)Incubator (+37$^{o}$C)
iii. Deep freezers (-20$^{o}$C)

**I.** Non-availability of panel of monoclonal antibody to Nigerian isolates of rabies virus.

Non-availability of Baby Hamster Kidney (BHK)or Murine neuroblastoma cell lines for virus propagation and isolation.

## 5. Research Highlights

The process of sero-survey for rabies virus neutralising antibody in dogs vaccinated against rabies, which commenced in 2021 is in progress. Currently, 1,566 sera samples have been collected from 989 dogs from parts of Jos south, Jos East and Riyom Local Government Areas (LGAs) in Plateau State. From the 989 dogs, 613 (62%) were vaccinated with exotic rabies vaccine, while 376 (38%) were vaccinated with the local (NVRI, Vom) vaccines respectively.

## 18. REGIONAL LABORATORY FOR ANIMAL INFLUENZA AND OTHER TRANSBOUNDARY ANIMAL DISEASES (TADs)

### 1. Mandate of the Laboratory

The Regional Laboratory is saddled with the following responsibilities: -

I. Diagnosis and research into animal diseases notably Newcastle disease virus, Avian influenza virus,Equine influenza virus, Swine influenza virus, Infectious bursal disease virus, Infectious bronchitis, Monkey pox, African horse sickness, coronaviruses and other transboundary animal diseases of viral origin.
II. Preparation of viral transport media, antisera and antigens.
III. Field assessment of NVRI avian viral vaccines through seromonitoring of vaccinated flocks.
IV. Participating in national surveillance of avian influenza.
V. Participating in national and international networks and surveillance for Emerging infectious/zoonotic/transboundary diseases.
VI. Rendering support to other West African Laboratories, as the Regional Reference Laboratory.
VII. Reference laboratory for West Africa Health Organization (WAHO).

### 2. Laboratory Activities from January to December2022

The laboratory was actively involved in the molecular testing/diagnoses during the COVID-19 pandemic with over 500 samples tested from Borno and Yobe States. The results were promptly dispatched within the stipulated turnaround time. The laboratory also carried out its mandate whichinvolved the routine diagnosis, passive surveillance of Avian influenza, Newcastle Disease Virus (NDV), Infectious Bursal Disease (IBDV),Fowl Pox (FP) and Rabbit Haemorrhagic Fever Virus (RHFV).

The table below shows the summary of samples received for diagnosis/laboratory confirmation in 2022

**Table 1**: Summary of tissue samples received for diagnosis in 2022

| **Total Number of Samples (tissues)** | | | | | **Total Number positive (tissues)** | | | |
|---|---|---|---|---|---|---|---|---|
| AIV* | NDV$^{\$}$ | IBD$^{\Phi}$ | | RHDV | AIV | NDV | IBDV | |
| 541 | 485 | 83 | | 3 | 224 | 10 | 2 | |

**Key**: AIV* - Avian Influenza Virus; NDV$^{\$}$ - Newcastle Disease Virus; IBD$^{\Phi}$-Infectious BursalDisease Virus; RHDV - Rabbit HaemorrhagicDisease Virus

In the drive to fulfill our mandate the Department conducted field assessment of NDV vaccines through seromonitoring of vaccinated flocks. A total of 905 sera samples were screened for seroconversion. In addition, 86 samples were screened for IBD and 19 sera samples screened for Equine Influenza Virus. The results were communicated to the farmers for necessary action either to administer a booster dose or treat for ongoing infection in the farm.

## 3. Student's Research and Surveillance

In the period under review, the Division supported M.Sc. and Ph.D. students in the analysis of their samples according to their research topics as follows:

I. Molecular detection of Crimean-Congo Hemorrhagic Fever Virus in ticks and cattle. A total of 120 samples were pooled into 41 and tested by RT-PCR.**(MSc. Research)**
II. Molecular characterization of Infectious Bronchitis Virus from LBM in Jos, Plateau State. A total of 100 pooled samples were screened for IBV by RT- PCR.**(MSc. Research)**
III. Epidemiological study of Equine Influenza amidst Donkeys and Horses sold in Ebonyi State. A total of 251 equine samples were screened by RT-PCR.**(PhD Research)**
IV. Molecular and classical epidemiology of Avian Influenza Virus from wild birds and LBM in selected States in Northern Nigeria. A total of 426 swab samples were analyzed by RT-PCR technique.**(PhD Research)**
V. Rabbit Haemorrhagic Disease surveillance activities was conducted from November to December, 2022 from 23 States of the Federation. A total of 3951 sera and 119 tissue samples were screened by ELISA and RT-PCR respectively.

## 4. Other Notable Activities

I. The Division commenced the second phase of the collaboration with CDC Atlanta/Nigeria and NCDC, FELTP on ecological surveillance of Monkeypox Disease in Animals.
II. COVID-19 diagnosis and testing of human samples was conducted.
III. The division was accredited as ISO17025 compliance in the detection Avian Influenza M-gene.
IV. Participation in national surveillance for Rabbit Haemorrhagic Disease by REDISSE.
V. Participation in LIDISKI project on Newcastle Disease Virus
VI. NACOH grant implementation on Coronaviruses and other infectious zoonotic diseases.

## 5. Achievements

I. Offering of diagnostic support for animal influenza and other avian diseases.
II. Molecular diagnosis of COVID-19 in Nigeria (over **500 samplesanalyzed**).
III. Staff of the laboratory published research articles in peer review journals and also made conference presentations within and outside the country.
IV. ISO17025 Accreditation.

## 6. Challenges

I. The batteries of the inverter can no longer hold charges for a long duration; hence this affects the PCR runs once there is power outage especially before the institutional generator comes on.
II. There are no Molecular Biology reagents as well as consumables (molecular grade ethanol, cotton wool, etc.) in the division.
III. There is need for additional Freezers for storage of tissue samples and sera
IV. Experimental birds for research are needed especially for the production of red blood cells.
V. There is need for the presence of security personnel in the FMD/AI complex. There are cases of theft (AC panel behind the laboratory were stolen).

## 7. Future Plan

I. Active surveillance for Highly Pathogenic Avian Influenza Virus in live bird markets will continue. This on-going collection, collation and analysis of data from live bird market will help in the prevention of future outbreaks as suspected cases will be properly handled.
II. RHDV surveillance.
III. Research and Development of vaccine for the control of Rabbit Haemorrhagic Disease.
IV. Strengthening national and international networks and collaborations.
V. Expansion of other R & D products and services including antivirals.

# 19.VETERINARY EXTENSION SERVICES DIVISION (VESD)

**Functions/mandate**

The Veterinary Extension Services (VES) Department advanced from the Veterinary Extension Research and Liaison Services Division. The Department is thorough for transfer of technologies from researchers to farmers, in order to address their livestock and poultry health constraints. Technologies generated from the Research Departments are collated by extension and packaged for dissemination to livestock farmers.

Specifically, the mandate includes:

Dissemination of proven veterinary health technologies to livestock and poultry farmers. This is to ensure improvement intheir production and productivity, to improve food security by making animal protein available and in the long run reduce poverty.

The primary goal of the Department is to reach out to as many livestock and poultry farmers as possible with veterinary health care extension messages. The Department also liaises withthe National and State Agricultural Development Project (ADPs) for effective dissemination and obtainingfeedback. The ADPs are the main extension outfits meant to address farmer's constraints.

**Specific (notable) activities in the year 2022**

- Carried out vaccinations (field trial of FMD vaccine) in the Institute's adopted villages.
- Participated in the selection and training of Community Animal Health Workers (CAHWs). A sponsored project by Bill and Melinda gates foundation.
- The Department represented the Institute at the just concluded 2022 edition of the Annual National Agricultural Extension Review and Planning Meeting (NAERPM) in November, 2022 held at the National Agricultural Extension and Research Liaison Services, Zaria.
- Production of Radio jingle in order to give the kiss of life to the extension radioprogramme of "Mulekarugage" which is an educational program on animal diseases and disease management .
- Carried out disease surveillance through the LIDISKI (Livestock DiseaseSurveillanceKnowledge Integration)Project (involved in advocacy, data

collection, extension services and capacity building for biostatistics, participatory approaches and socio-economic).

- Compilation of the Institute's info for production of bulletin/magazines(production awaiting publications).
- One day training held on poultry production and health management for SSS 2 students at Government Day Secondary School Tilden-Fulani, Toro in Bauchi State and GSS Du, Jos-South LGA of Plateau State.
- Advocacy visit to Ganawuri, Riyom local government area of Plateau State for rural poultry value addition.
- Impact assessment of the intervention carried out in the preceding year to ascertain as feedback, the effect of NDV I-2 and LSD vaccines on their local poultry and large animals in Tilden Fulani.
- Participated in the 45th regular meeting of the National Council on Agriculture and Rural Development (NCARD) and Exhibition with the theme: Strengthening Agricultural Value Chain Development Process for Food Security and Economic Development atLangfield Leisure Park, Rayfield Jos. 12th – 16th September, 2022.
- Participated in the 2022 National Agricultural Show held from 9th – 14th, 2022 organized by the National Agricultural Foundation of Nigeria (NAFN) @ The National Agricultural Show Ground Km 28 Abuja – Keffi Road, Tudun Wada, Karu LGA, Nasarawa State.
- Participated in the 2nd West and Central Africa Post-Harvest Congress and Exhibition (WCAPHCE). Theme: Upscaling and Promotion of African Indigenous Foods (AIF) 28th November – 2nd Dec., 2022. @theNicon Luxury Hotel & Suites, Abuja.

These Veterinary Extension activities were executed through:-
A. Participation in extension and outreach meetings including:
 Monthly Technology Review Meetings (MTRM)
 Zonal Steering committee and Zonal technical committee meetings
 National Annual Research Review Meeting
 Research extension farmer input linkage system (REFILS) workshop
B. Publication (Electronic and Print)
C. Representing the Institute at Agricultural shows and Trade fairs
D. Organizing Training workshops, Open days, and seminars
E. Stakeholder interactions
F. Outreach activities including Agricultural Research Outreach Centres (AROC)
G. Surveys (Thematic,Diagnostic and General)
H. OFAR (On-Farm-Adaptive-Research Trials)

**Achievements**

- Successful vaccination of local chicken against Newcastle disease virus in one (1) adopted village with Thermo-stable Newcastle disease vaccine ($ND^{1}/_{2}$).
- Vaccination of cattle against Foot and Mouth Disease in two (2) adopted villages with Foot and Mouth Disease vaccine.
- Successfully selected Community Animal Health Workers (CAHWs) for training on livestock and poultry diseases identification, treatment and vaccination from seven states – Adamawa, Plateau, Borno, Bauchi, Gombe, Jigawa and Kano.
- Five (5) episodes of"Mulekarugage" has been produced by the Department. Nevertheless, they are yet to be aired.
- Participated in National Council for Agriculture and Exhibition at Langfield Events Centre, Jos – Plateau State where we exhibited the Institute's technologies.
- Exhibited the Institutes' vaccines and the ethno-veterinary products each time the Department is privileged to participate in National and State Agricultural exhibitions.
- In one of the Exhibition, NVRI, Vom took third ($3^{rd}$) position among the Research Institutes that participated in the National Agricultural Show organized by the National Agricultural Foundation of Nigeria (NAFN).

**Challenges**

- Some activities were not carried out due to Paucity of funds. Extension activities are capital intensive that needs budgetary provision for smoothing running of her activities. The present financial outlays are extremely low.
- The Department is in need of cameras for still and motion pictures and public addressing system (PAS)
- There is no standard printer, photocopying machine and stationeries in the Department.
- Lack of laptop computer for editing both video and audio software
- No stand-by utility vehicle (Hilux) as it used to be for the Department for prompt and effective service delivery to clients.

# 20.VETERINARY PATHOLOGY DIVISION

1. **Functions/Mandate**

   i. Receive and document all cases / samples coming into NVRI Vom and give an identification /tracking number to each sample and dispatch of same to appropriate laboratory for action.
   ii. Conduct diagnosis and Surveillance of diseases (emerging and re-emerging) within the nation and sub region as the situation may demand.
   iii. Report all notifiable diseases diagnosed immediately to the Director and Chief Executive, Director Diagnostic Services, Epidemiology Division, NVRI and Chief Veterinary Officer of the nation.
   iv. Constitute a team for field outreach on any animal disease outbreak.
   v. The division is also saddled with ambulatory services to livestock and poultry farms and wild life parks.
   vi. Giving advice to livestock and poultry farmers based on cases /complaints received.
   vii. Training of manpower to cater for the division and other agencies.

2. **Specific notable activities**

   **i. Reception Unit:**

   This unit has received a total of 1348(One thousand three hundred and forty eight) cases between 1st January 2021 to December 2022. See **Table 1**.

   ii. **Necropsy Unit:** Conducted necropsy on cases referred above and sent tissue samples to the various laboratories for isolation, culture, characterization or PCR as the case may be. And the laboratory results are compiled and a final diagnostic report issued to the client and other stake holders as demanded by the reporting channel.See **Table 2**.

   iii. **Histopathology unit:** this unit runs daily activities in terms of reagent preparation, tissue sample reception, documentation, fixation, processing, sectioning, mounting and the release of histopathology slides for the diagnosis and research.See **Table 3**.

   iv. **Incineration unit**: Incinerated waste generated within the institute from different divisions and laboratories. The estimated total weight of the waste is**35,077.2kg**.See **Table 4**.

3. **Major Challenges**

i. The staff of this division sometimes work late into the night but have not received any reward or letters of commendation to encourage them despite the risk of kidnapping in the environment.
ii. With creation of new divisions, the work force of the division has greatly reduced. The division is in need of at least 10 veterinary pathologists and 15 Livestock attendants.

iii. Laboratory Consumables: None availability of consumables such as samples bottles, Universal bottles, hard gloves, nose mask, (protective kits) detergents, absolute alcohol, formalin, xylene, Hematoxylin and Eosin stains etc. affects good sample collection and sample processing.
iv. Frequent breaking down of the incinerator has caused a lot of health challenge to the staff in the division. As materials awaiting incineration especially vaccine eggs get piled up because the incineration machine has broken down and awaiting finance to get it fixed.
v. Non availability of a cold room (+2 - +5$^{o}$C) as part of the Post-Mortem facility for the preservation of carcasses and tissue samples.
vi. Breakdown of equipment in the lab: the Automatic Tissue Processor, Embedding Centre, Laboratory Microwave, and Hot Air oven are all faulty and remained nonfunctional throughout the year. There is no functional microscope, Flame supply, water bath and tissue stainer, in the laboratory.

**LIST OF TABLES.**

**Table 1**. Number of Cases Received From January To December 2022

| S/NO | ANIMAL SPP/SAMPLE TYPE | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEPT | OCT | NOV | DEC | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | Avian | 140 | 101 | 40 | 29 | 33 | 46 | 32 | 20 | 18 | 40 | 31 | 33 | 563 |
| 2 | Bovine | 24 | 5 | 5 | 6 | 12 | 9 | 8 | 14 | 13 | 13 | 8 | 7 | 124 |
| 3 | Canine | 20 | 23 | 17 | 25 | 29 | 19 | 24 | 21 | 36 | 25 | 22 | 18 | 279 |
| 4 | Caprine | 4 | 4 | 7 | 5 | 5 | 6 | 7 | 12 | 10 | 2 | 7 | 1 | 70 |
| 5 | Equine | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 1 | 1 | 4 | 4 | 3 | 16 |
| 6 | Feline | 1 | 2 | 1 | 0 | 0 | 2 | 1 | 0 | 1 | 1 | 5 | 0 | 14 |
| 7 | Humans | 2 | 1 | 0 | 1 | 3 | 1 | 2 | 3 | 14 | 8 | 9 | 2 | 46 |
| 8 | Leprine | 2 | 4 | 7 | 6 | 8 | 8 | 4 | 7 | 1 | 0 | 1 | 3 | 51 |
| 9 | Ovine | 2 | 3 | 12 | 7 | 5 | 5 | 3 | 6 | 10 | 0 | 7 | 0 | 60 |
| 10 | Porcine | 3 | 5 | 5 | 8 | 2 | 10 | 11 | 15 | 12 | 2 | 1 | 4 | 78 |
| 11 | Pisces (fish) | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 6 |
| 12 | Plates | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 |
| 13 | Water | 1 | 2 | 1 | 3 | 1 | 1 | 1 | 1 | 2 | 1 | 0 | 0 | 14 |
| 14 | Wildlife | 1 | 0 | 1 | 1 | 0 | 2 | 1 | 0 | 1 | 1 | 2 | 0 | 10 |
| 15 | Feeds | 1 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 1 | 1 | 0 | 7 |
| 16 | Drugs | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 17 | Liquid fertilizer | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 18 | Plant extract | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 19 | Pro-T | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 20 | Potatoes | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 |
| 21 | Eggs | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 22 | Total | | | | | | | | | | | | | **1348** |

Table 2. Isolation/Diseases Diagnosedbased On Animal Species From January To December 2022

| S/NO | ANIMAL SPP/DISEASES | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEPT | OCT | NOV | DEC | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | **AVIAN** | | | | | | | | | | | | | |
| 1 | Avian anaplasma | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 2 | Coccidiosis | 59 | 31 | 15 | 17 | 19 | 25 | 8 | 9 | 15 | 26 | 27 | 13 | 264 |
| 3 | Colibacillosis | 48 | 30 | 17 | 12 | 14 | 18 | 10 | 11 | 9 | 20 | 14 | 10 | 213 |
| 4 | Salmonellosis | 3 | 3 | 3 | 2 | 1 | 4 | 1 | 0 | 1 | 3 | 1 | 0 | 22 |
| 5 | Proteus | 7 | 2 | 1 | 3 | 4 | 3 | 2 | 3 | 3 | 1 | 2 | 0 | 31 |
| 6 | Infectious Bursal Disease | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 3 |
| 7 | Klebsiellosis | 8 | 5 | 2 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 19 |
| 8 | Malnutrition | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 9 | Cooperia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 10 | Heterakis | 5 | 6 | 2 | 1 | 1 | 1 | 0 | 0 | 4 | 0 | 3 | 1 | 24 |
| 11 | Syngamus | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 12 | Strongylus | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 13 | Tetramers | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 14 | Subulura | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 4 |
| 15 | Strongyloides | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 4 |
| 16 | Davinea | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 17 | Micrococcus | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 18 | Avian influenza | 76 | 48 | 7 | 4 | 6 | 9 | 7 | 9 | 0 | 15 | 12 | 7 | 200 |
| 19 | Streptococosis | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 20 | Pectinatella | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 21 | Staphyllococosis | 0 | 4 | 3 | 3 | 4 | 4 | 2 | 3 | 4 | 3 | 3 | 2 | 34 |
| 22 | New castle disease | 1 | 11 | 2 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 17 |
| 23 | Trichuris | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 24 | Mareks | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 25 | Capillariosis | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| 26 | Prostognimus | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 27 | Aeromoniasis | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 28 | Bacillus infection | 4 | 4 | 2 | 3 | 1 | 1 | 0 | 4 | 2 | 3 | 3 | 4 | 31 |
| 29 | Ascaridosis | 5 | 12 | 1 | 4 | 5 | 4 | 1 | 1 | 4 | 3 | 1 | 0 | 41 |
| 30 | Pseudomoniosis | 2 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 7 |
| 31 | Hemonchus | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 32 | Citrobacter | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| 33 | Echinostomum | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 34 | Gardiosis | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 3 |
| 35 | Trichostrongylus | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 36 | Hlymenolopis | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 3 | 1 | 0 | 6 |
| 37 | Choantaenia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 38 | Cyclospora | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 5 | 4 | 6 | 18 |
| 39 | Rallietina | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| | | | | | | | | | | | | | | |
| B | **CAPRINE** | | | | | | | | | | | | | |
| 1 | Coccidiosis | 0 | 1 | 1 | 3 | 2 | 1 | 2 | 0 | 0 | 0 | 1 | 1 | 12 |
| 2 | Babesiosis | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 4 |
| 3 | Theileriosis | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 |
| 4 | Mycoplasmosis | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 5 | PPR | 0 | 1 | 1 | 5 | 2 | 2 | 1 | 1 | 4 | 1 | 0 | 0 | 18 |
| 6 | Colibacillosis | 1 | 0 | 2 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 7 |
| 7 | Ostertagia | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 4 |
| 8 | Trichostrongylus | 0 | | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 9 | Monezia | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 10 | Ehrlichia | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 11 | Buttiurlla | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 12 | Bacillus | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 3 |
| 13 | Trichuris | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 14 | Rabies | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 15 | Staphyllococosis | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| 16 | Strongyloides | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 17 | Filaria worms | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 18 | Listeria | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 19 | Leptospirosis | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| 20 | Giardia | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 21 | Tropozoites | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 22 | Hemonchus | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| 23 | Goat pox | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 24 | Fasciola | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 25 | Streptococcus | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 26 | Triconomisis | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 27 | Anaplasmosis | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 28 | Trypanosomiasis | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 29 | Brucellosis | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| | | | | | | | | | | | | | | |
| C | **OVINE** | | | | | | | | | | | | | |
| 1 | Bacillus | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 2 | Klebsiellosis | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 4 |
| 3 | Salmonella | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4 | Proteus | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 5 | Anaplasmosis | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| 6 | Babesiosis | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 | Theileria | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 8 | Mycoplasmosis | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 9 | PPR | 0 | 1 | 1 | 2 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 7 |
| 10 | Toxocara | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 11 | Ehrichia | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 12 | Ostertagia | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 13 | Haemonchus | 0 | 1 | 1 | 0 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 0 | 6 |
| 14 | Mycoplasma | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 15 | Coccidiosis | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 0 | 2 | 0 | 0 | 0 | 11 |
| 16 | Chabertia | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 17 | Providensia | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 18 | Staphylococcosis | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 3 |
| 19 | Colibacillosis | 0 | 0 | 5 | 2 | 1 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 11 |
| 20 | Oesophagustomum | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 2 |
| 21 | Fascioliasis | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 2 |
| 22 | Bunostonum | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| 23 | Trichostrongyllus | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 24 | Heterakis | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 25 | Nematodirus | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 26 | Sheep pox | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| | | | | | | | | | | | | | | |
| D | **PORCINE** | | | | | | | | | | | | | |
| 1 | ASF | 0 | 0 | 1 | 0 | 0 | 4 | 7 | 9 | 3 | 0 | 0 | 0 | 24 |
| 2 | Coccidiosis | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 4 |
| 3 | Colibacillosis | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 4 |
| 4 | Trichuris | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 5 | Pseudomonaiasis | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 6 | Bacillus | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 |
| 7 | Staphyllococosis | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 8 | Stephanorus | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 9 | Babesiosis | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 10 | Anaplasmosis | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 11 | Eperythrozoonosis | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 12 | Klebsiellosis | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | **BOVINE** | | | | | | | | | | | | | |
| 1 | Babesiosis | 3 | 2 | 0 | 2 | 6 | 1 | 2 | 2 | 0 | 3 | 0 | 1 | 22 |
| 2 | Coccidiosis | 3 | 1 | 0 | 1 | 3 | 3 | 2 | 1 | 1 | 3 | 2 | 1 | 21 |
| 3 | Bunostomum | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 2 | 0 | 1 | 0 | 1 | 8 |
| 4 | Anaplasmosis | 3 | 2 | 0 | 2 | 3 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 14 |
| 5 | Theileriosis | 3 | 2 | 0 | 1 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 9 |
| 6 | CBPP | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 1 | 0 | 2 | 0 | 0 | 5 |
| 7 | Citrobacter | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 8 | Bacillus | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 4 |
| 9 | Filaroides | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 10 | Trypanosomiasis | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 |
| 11 | Colibacillosis | 1 | 0 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 7 |
| 12 | Gastrathylax | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 13 | Staphyllococosis | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 |
| 14 | Food and mouth disease | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15 | Ascaridiosis | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 6 |
| 16 | Moneizia | 1 | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 7 |
| 17 | Buxtenalla | 1 | 2 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 9 |
| 18 | Oesophagostomum | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 2 | 0 | 0 | 5 |
| 19 | Streptococcosis | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 |
| 20 | Toxocarriosis | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 2 |
| 21 | Rabies | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 22 | Bovine popular stomatitis | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 23 | Haemonchus | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 4 |
| 24 | Strangles | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| 25 | Cooperia | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 3 |
| 26 | Amblyoma tick | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| 27 | Dicrocoelium | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 28 | Fascioliasis | 1 | 2 | 0 | 1 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 8 |
| 29 | Paraphistomum | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 30 | Trichophyton | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 31 | Penicillin | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 32 | Mucor | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 2 |
| 33 | Aspergillosis | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 34 | Mecistacirrus | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| 35 | Fischaderius | 1 | 0 | 0 | 0 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 6 |
| 36 | Klebsiella | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| 37 | Leptospirosis | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| 38 | Proteus | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 39 | Dermatophyllosis | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 40 | Lumpy skin disease | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 41 | Micoplasmosis | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 42 | Enterobacter | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 43 | Pseudomoniasis | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 44 | Aeromoniasis | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 45 | Cyanide poison | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | | | | | | | | | | | | | | |
| F | **CANINE** | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Rabies | 14 | 15 | 5 | 16 | 18 | 9 | 13 | 17 | 16 | 12 | 9 | 9 | 153 |
| 2 | Klebsiellosis | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 3 | Staphyllococosis | 0 | 0 | 2 | 0 | 0 | 1 | 2 | 0 | 0 | 2 | 1 | 1 | 9 |
| 4 | Mycoplasma | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 5 | Colibacillosis | 0 | 2 | 4 | 3 | 1 | 1 | 1 | 1 | 0 | 3 | 0 | 0 | 16 |
| 6 | Hepatozoon | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 4 |
| 7 | Babesiosis | 0 | 1 | 1 | 0 | 1 | 1 | 4 | 0 | 1 | 1 | 0 | 1 | 11 |
| 8 | Brucellosis | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 9 | Trichophyton | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 10 | Aeromoniasis | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 11 | Anaplasmosis | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 3 | 9 |
| 12 | Leptospirosis | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 4 |
| 13 | Bacillus infection | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 5 |
| 14 | Pseudomoniasis | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 15 | Coccidiosis | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 3 | 2 | 8 |
| 16 | Trychostrongyllus | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 17 | Micrococcus | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 18 | Enterobacter | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 19 | Salmonellosis | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| 20 | Toxocariosis | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 21 | Taeniasis | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 22 | Candida | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 23 | Rhipicephalus ticks | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | Cyclospora | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| | Necatar | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| | | | | | | | | | | | | | | |
| **G** | **PISCES** | | | | | | | | | | | | | |
| 1 | Coccidiosis | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 2 | Aeromonas | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 3 | Colibacillosis | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| 4 | Proeus | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| 5 | Bacillus | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| | | | | | | | | | | | | | | |
| **H** | **LAPRINE** | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Coccidiosis | 0 | 3 | 2 | 2 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 2 | 12 |
| 2 | Leptospirosis | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 3 |
| 3 | Colibacillosis | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 4 |
| 4 | Klebsiellosis | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 |
| 5 | Trichostrongyllus | 0 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 6 | Staphyllococosis | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 3 |
| 7 | Shigelliasis | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8 | Graphidium | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 9 | Pseudomonas | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 12 | Enterobacter | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 14 | Bacillus | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 15 | Monkey pox | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | | | | | | | | | | | | | | |
| **I** | **WATER** | | | | | | | | | | | | | |
| 1 | Bacillus | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 3 |
| 2 | Pseudomoniasis | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 3 | Colibacillosis | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 6 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | Klebsiellosis | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 5 | Proteus | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 2 |
| | | | | | | | | | | | | | | |
| **J** | **PLATES** | | | | | | | | | | | | | |
| 1 | Bacillus | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| | | | | | | | | | | | | | | |
| **K** | **EQUINE** | | | | | | | | | | | | | |
| 1 | Babesiosis | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 3 |
| 2 | Coccidicosis | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 |
| 3 | Pseudomonas | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 4 | Haemonchus | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 5 | Staphyllococosis | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 6 | Streptococcus | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 7 | Theileriasis | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 4 |
| 8 | Strongylus | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 9 | Diphyllidium | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 10 | Colibacillosis | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11 | Anaplasmosis | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 |
| 12 | Proteus | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 13 | Klebseilla | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 14 | Strongyloides | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 6 |
| 15 | African horse sickness | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 16 | Dictyocaulus | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 |
| 17 | Gatodines | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| | | | | | | | | | | | | | | |
| **L** | **FEEDS** | | | | | | | | | | | | | |
| 1 | Rhizopus | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 2 | Colibacillosis | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 3 | Baccilus | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| | | | | | | | | | | | | | | |
| **M** | **FELINE** | | | | | | | | | | | | | |
| 1 | Rabies | 0 | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 0 | 6 |
| 2 | Feline influenza | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **N** | **POTATOES** | | | | | | | | | | | | | |
| 1 | Bacillus | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| | Klebseilla | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| | Mucor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| | | | | | | | | | | | | | | |
| **O** | **HUMANS** | | | | | | | | | | | | | |
| 1 | Leptospirosis | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 4 | 4 | 5 | 1 | 19 |
| 2 | Brucellosis | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 3 | Plasmodium | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 4 |
| 4 | Pseudomonas | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 5 | Bacillus | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 |
| 6 | Staphylococcus | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| | | | | | | | | | | | | | | |
| **P** | **WILD LIFE** | | | | | | | | | | | | | |
| 1 | Colibacillosis | 1 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 2 | Coccidiosis | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 5 |
| 3 | Ehrlichia | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | Strongyllus | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 5 | Rabies | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 6 | Hymenolepis | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 7 | Proteus | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8 | Citrobacter | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 9 | Leptospirosis | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | | | | | | | | | | | | | | |
| | **Grant total** | | | | | | | | | | | | | |

**Table 3. Histology slides processed from January to December 2022.**

Activities based on Species of animals attended to

| S/No | Species | No of samples |
|---|---|---|
| 1 | Avian | 29 |
| 2 | Laprine | 164 |
| 3 | Bovine | 62 |
| 4 | Canine | 7 |
| 5 | Ovine | 6 |
| 6 | Caprine | 4 |
| | Total | **272** |

Activities based on Number of Organs Attended To

| S/No | Organ | No. of samples |
|---|---|---|
| 1 | Liver | 145 |
| 2 | Kidney | 98 |
| 3 | Brain | 12 |
| 4 | Intestine | 80 |
| 5 | Heart | 179 |
| 6 | Spleen | 83 |

| | | |
|---|---|---|
| 7 | Tumor (Benign) | 1 |
| 8 | Testis | 24 |
| 9 | Pancreas | 54 |
| 10 | Ovary | 20 |
| 11 | Fallopian tube | 20 |
| 12 | Mammary Gland | 6 |
| 13 | Lung | 81 |
| 14 | Proventriculus | 3 |
| 15 | Bursar of Fabricius | 3 |
| 16 | Oesophagus | 100 |
| 17 | Skeletal muscle | 3 |
| 18 | Total | 912 |

*The report is based on samples sent from the postmortem examination.

## Tables 4: INCINERATION WASTE REPORT FROM JANUARY – DECEMBER, 2022

| LABORATORY/UNIT | JAN | FEB | MAR | APR | MAY | JUNE | JULY | AUG | SEPT | OCT | NOV | DEC | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NECROPSY | 950.2 | 828.4 | 731.3 | 695.8 | 1,040.3 | 1,279.3 | 680.5 | 673.4 | 581.3 | 826.9 | 1,302.3 | 650.1 | 10,239.8 |
| RABIES LAB. | 68 | 59.7 | 75.8 | 108.3 | 111.4 | 72.7 | 71.9 | 108.1 | 81.2 | 108.6 | 143.6 | 202.7 | 1,212 |
| VIR. VAC. PROD. | 1,144 | 2,492 | 2,725 | 381 | 27.2 | 22.3 | 44.5 | 56.1 | 1,474 | 2,464 | 2,024 | 221.6 | 13,075.7 |
| BACT, RES. DIV. | 64.6 | 99.9 | 126.6 | 81.7 | 103.7 | 123.6 | 84.6 | 116.6 | 87.3 | 101.6 | 75.8 | 66.9 | 1,132.9 |
| BACT. LAB. | 113.7 | 97.6 | 85 | 151.4 | 139.3 | 179.6 | 184.5 | 143.6 | 141.3 | 98.9 | 117.1 | 76.3 | 1,528.3 |
| DRUG DEV. | 0 | 0 | 0 | 0 | 0 | 0 | 6.8 | 0 | 31 | 6.4 | 13 | 4.3 | 61.5 |
| REGIONAL LAB. | 42.2 | 97.1 | 41.6 | 103.2 | 61.4 | 69 | 92 | 101.2 | 60 | 82.2 | 43.5 | 50.8 | 844.2 |
| VIR. RES. DIV. | 12 | 10.6 | 12.6 | 36.8 | 19.4 | 16.6 | 14.4 | 21.5 | 22.2 | 45.7 | 25.4 | 14.9 | 252.1 |
| C/ PATH. LAB. | 2.1 | 2.4 | 5 | 3.8 | 3.9 | 3.8 | 2.3 | 5.7 | 4.9 | 3.9 | 4.8 | 4.1 | 46.7 |
| HISTOPATH. LAB. | 5.6 | 6.3 | 2.8 | 4.4 | 8.6 | 5.6 | 6.7 | 8.4 | 7.1 | 3 | 7.2 | 2.8 | 68.5 |
| PARA CDL | 15.1 | 20.6 | 5 | 7.6 | 9.8 | 8.5 | 12.8 | 11.3 | 13.8 | 13.5 | 14.9 | 12.3 | 145.2 |
| Q/C. LAB. | 0 | 0 | 18.3 | 10.9 | 21 | 8.6 | 6.3 | 8.6 | 18.6 | 13 | 18.6 | 8.3 | 132.2 |
| BIO-TECH. LAB. | 80.3 | 52.5 | 59 | 146.3 | 85.7 | 131 | 125 | 97 | 106.2 | 112.5 | 89.3 | 65.6 | 1,150.4 |
| UNKNOWN | 300.1 | 262.2 | 284.5 | 454.4 | 341.2 | 386.9 | 318 | 329.7 | 274.5 | 338 | 266.9 | 162.6 | 3,719 |
| CDL ENV. WASTE | 49.6 | 64.6 | 62 | 46 | 57.4 | 58.6 | 46 | 53 | 75 | 50.6 | 58 | 31.6 | 652.4 |
| BIO-CHEM. | 3 | 6.4 | 6.3 | 0 | 19 | 0 | 6 | 11.6 | 21.9 | 24.2 | 23.2 | 9.2 | 130.8 |
| DERMATOPHI. | 9.9 | 10.9 | 29 | 18.6 | 28.8 | 10.8 | 19.4 | 17 | 15.8 | 25.5 | 30.5 | 24 | 240.2 |
| LEPTOSPIROSIS | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 4.2 | 20 | 9.5 | 3.8 | 45.5 |
| FIELDWORK | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| VET CLINIC | 12 | 0 | 0 | 0 | 0 | 0 | 8 | 8 | 8 | 0 | 0 | 0 | 36 |
| SIDE LAB. | 0 | 29.6 | 28 | 20 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 83.6 |
| FCVMLT,VOM | 6.2 | 0 | 8 | 0 | 16 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 36.2 |
| MLT (BOOKS) | 38 | 100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 138 |
| DIR(SPECIAL DUTY) | 78 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 78 |
| c/o( Dr. Makama) | 0 | 0 | 0 | 0 | 0 | 0 | 28 | 0 | 0 | 0 | 0 | 0 | 28 |
| TOTAL | 2994.6 | 4240.8 | 4,313.8 | 2,270.2 | 2,094.1 | 2,376.9 | 1,769.7 | 1,770.8 | 3,028.3 | 4,338.5 | 4,267.6 | 1,611.9 | **35,077.2** |

**All figures in kilogram's (Kg)**

## 21. VETERINARY PUBLIC HEALTH AND PREVENTIVE MEDICINE DIVISION

**Functions/Mandates of your division**

Mandates of the division include:

1. Organizing and conducting disease surveys
2. Organizing and conducting disease surveillance
3. Organizing and conducting disease monitoring and instituting control where and when needed
4. Monthly disease data collection submitted to CDL
5. Disease data cleaning and presentation
6. Submission of monthly disease data collated/collected to appropriate authorities
7. Creation of a sustainable Animal Disease database of all animal diseases diagnosed in all the laboratories of the National Veterinary Research Institute, Vom
8. Disease modelling and forecasting
9. Designing disease control and prevention strategies
10. Outbreak investigations
11. Providing direction for future studies on animal diseases and
12. Provision of evidence-based information to policy makers on animal disease control.

**Specific notable activities**

In the outgoing year, the division was able to carry out the following activities:

1. Participated in survey of Newcastle Disease in birds in Plateau State
2. Participated in survey of Peste des Petits Ruminants (PPR) in small ruminants in Plateau State
3. Participated in immunosurveillance for seroconversion in small ruminants vaccinated with NVRI's PPR vaccines in some part of Adamawa State
4. Participated in immunosurveillance for seroconversion in large ruminants vaccinated with NVRI's CBPP vaccines in some part of Adamawa State
5. Collated and cleaned disease information submitted to CDL
6. Submitted on monthly basis disease reports to appropriate authorities
7. Creation of animal disease database for all animal species starting from 2001-2020
8. Trace back of records of disease diagnoses at the central diagnostic laboratory

9. Investigations on the distribution and spread of diseases of different animal species
10. Strategies for further disease investigations by states in the coming year.

**ACHIEVEMENTS**

In the outgoing year, the division was able to achieve the following:

1. Prompt submission of diseases reports monthly.
2. Creation of structures that make yearly data entry and access easier
3. Investigation-based evidence for research focus next year.

**CHALLENGES**

1. Lack of dedicated vehicles for the survey activities.
2. Lack of dedicated data collecting equipment and materials such as GPS readers, tablets/iPads, laptops, specialized epidemiological software etc
3. Lack of sufficient dedicated laptops.
4. Late release of laboratory reports on disease investigation and analysis
5. Shortage of staff as five staff are currently undergoing their postgraduate studies.

**Research highlights**

1. Collecting relevant specimens in the field, effectively transporting same to the relevant laboratories, analysing samples and publishing findings.
1. Collation and presentation of disease investigation and analysis in formats for easy interpretation and publication.

In the coming year, the division hopes to embark on the following research activities:

i) Further investigations on specific diseases common to each state down to the LGA level
ii) Further investigations on the risk factors associated with disease findings
iii) Disease mapping, modelling, and forecasting
iv) Disease mitigation strategies.

**Table I. Animal Diseases Diagnosis Report Summary 2015 – 2022**

| Species/ Disease | 2015 | | 2016 | | 2017 | | 2018 | | 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Bovine** | **No. Samples** | **No Positive** | **No. Samples** | **No Positive** | **No. Samples** | **No Positive** | **No. Samples** | **No Positive** | **No. Samples** | **No Positive** |
| Brucellosis (sera) | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 6 | 3 |
| CBPP ( sera) | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 6 | 3 |
| (tissues) | 3 | 1 | 3 | 3 | 25 | 5 | 13 | 4 | 15 | 7 |
| Bovine Tuberculosis | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 5 | 2 |
| FMD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ASF | 0 | 0 | 0 | 0 | 3 | 0 | 9 | 5 | 14 | 7 |
| Lumpy Skin Disease | 0 | 0 | 2 | 0 | 6 | 3 | 0 | 0 | 3 | 1 |
| Trypanasomosis | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 4 | 16 | 7 |
| Helminthosis | | | 0 | 0 | 9 | 2 | 0 | 0 | 3 | 3 |
| Ectoparasitism | 6 | 2 | 4 | 3 | 0 | 0 | 7 | 4 | 10 | 8 |
| CBPP | 3 | 1 | 0 | 0 | 1 | 1 | 17 | 10 | 7 | 4 |
| Babesiosis | 3 | 1 | 0 | 0 | 8 | 2 | 3 | 1 | 10 | 5 |
| **Bovine,Sheep,Goats** | | | | | | | | | | |
| Dermatophilosis | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 |
| **Horses** | | | | | | | | | | |
| African HorsesSickness | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Caprine** | | | | | | | | | | |
| PPR | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 |
| Trypanasomosis | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Helminthosis | 16 | 7 | 17 | 11 | 0 | 0 | 0 | 0 | 13 | 8 |
| Ectoparasitism | 5 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 11 |
| Coccidiosis | 4 | 2 | 11 | 7 | 9 | 9 | 9 | 9 | 10 | 9 |
| **Ovine** | | | | | | | | | | |
| PPR | 3 | 1 | 0 | 0 | 2 | 0 | 5 | 0 | 13 | 12 |
| Trypanasomosis | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 3 |
| Helminthosis | 12 | 7 | 24 | 11 | 13 | 5 | 19 | 7 | 4 | 4 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Ectoparasitism | 7 | 3 | 0 | 0 | 6 | 2 | 0 | 0 | 24 | 11 |
| Coccidiosis | 8 | 5 | | | 3 | 3 | 13 | 9 | 19 | 12 |
| **Avian** | | | | | | | | | | |
| Newcastle (tissues) | 12 | 7 | 17 | 11 | 19 | 12 | 21 | 10 | 24 | 14 |
| Avian Influenza(tissues) | 19 | 8 | 124 | 99 | 5 | 0 | 9 | 1 | 14 | 4 |
| Coccidiosis | 98 | 79 | 307 | 86 | 268 | 113 | 401 | 158 | 406 | 160 |
| Helminthosis | 7 | 4 | 42 | 17 | 26 | 13 | 19 | 11 | 28 | 19 |
| Ectoparasitism | 3 | 3 | 0 | 0 | 0 | 0 | 8 | 7 | 11 | 10 |
| Colibacillosis | 16 | 14 | 38 | 26 | 29 | 19 | 97 | 71 | 101 | 74 |
| IBD | 4 | 2 | 0 | 0 | 15 | 9 | 27 | 13 | 45 | 25 |
| Fowl Typhoid | 21 | 13 | 30 | 11 | 9 | 3 | 16 | 8 | 23 | 11 |
| Fowl Cholera | 7 | 4 | 18 | 4 | 8 | 6 | 6 | 6 | 18 | 10 |
| **Porcine** | | | | | | | | | | |
| ASF | 0 | 0 | 0 | 0 | 3 | 0 | 5 | 1 | 10 | 3 |
| **Total** | **264** | **170** | **637** | **289** | **467** | **207** | **723** | **343** | **893** | **456** |

| Species/ Disease | 2020 | | 2021 | | 2022 | |
|---|---|---|---|---|---|---|
| **Bovine** | **No. Samples** | **No Positive** | **No. Samples** | **No Positive** | **No. Samples** | **No Positive** |
| Brucellosis (sera) | 3 | 2 | 8 | 5 | 14 | 9 |
| CBPP ( sera) | 4 | 2 | 8 | 5 | 16 | 11 |
| (tissues) | 28 | 11 | 18 | 14 | 14 | 8 |
| Bovine Tuberculosis | 4 | 2 | 7 | 5 | 11 | 9 |
| FMD | 6 | 2 | 5 | 3 | 0 | 0 |
| ASF | 6 | 4 | 14 | 9 | 21 | 16 |
| Lumpy Skin Disease | 9 | 4 | 0 | 0 | 9 | 7 |
| Trypanasomosis | 0 | 0 | 16 | 11 | 22 | 19 |
| Helminthosis | 12 | 8 | 9 | 4 | 9 | 6 |
| Ectoparasitism | 0 | 0 | 12 | 6 | 16 | 14 |
| CBPP | 4 | 3 | 22 | 9 | 13 | 11 |
| Babesiosis | 11 | 7 | 8 | 6 | 16 | 13 |
| **Bovine,Sheep,Goats** | | | | | | |
| Dermatophilosis | 0 | 0 | 0 | 0 | 10 | 7 |
| **Horses** | | | | | | |
| African HorsesSickness | 2 | 0 | 0 | 0 | 0 | 0 |
| **Caprine** | | | | | | |
| PPR | 4 | 2 | 5 | 2 | 8 | 5 |
| Trypanasomosis | 0 | 0 | 0 | 0 | 0 | 0 |
| Helminthosis | 3 | 2 | 9 | 6 | 19 | 12 |
| Ectoparasitism | 4 | 3 | 6 | 4 | 25 | 19 |
| Coccidiosis | 12 | 9 | 14 | 10 | 16 | 11 |
| **Ovine** | | | | | | |
| PPR | 4 | 2 | 9 | 0 | 11 | 7 |
| Trypanasomosis | 0 | 0 | 0 | 0 | 0 | 0 |
| Helminthosis | 16 | 11 | 24 | 18 | 10 | 8 |
| Ectoparasitism | 9 | 7 | 5 | 2 | 30 | 23 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Coccidiosis | 6 | 5 | 18 | 12 | 25 | 17 |
| **Avian** | | | | | | |
| Newcastle (tissues) | 24 | 12 | 26 | 18 | 33 | 22 |
| Avian Influenza(tissues) | 9 | 6 | 14 | 9 | 22 | 18 |
| Coccidiosis | 301 | 247 | 417 | 368 | 433 | 353 |
| Helminthosis | 31 | 23 | 24 | 17 | 34 | 26 |
| Ectoparasitism | 4 | 0 | 13 | 9 | 17 | 13 |
| Colibacillosis | 34 | 27 | 102 | 81 | 119 | 99 |
| IBD | 19 | 12 | 32 | 24 | 56 | 33 |
| Fowl Typhoid | 13 | 9 | 21 | 17 | 34 | 18 |
| Fowl Cholera | 10 | 8 | 11 | 8 | 24 | 17 |
| **Porcine** | | | | | | |
| ASF | 8 | 5 | 11 | 7 | 18 | 12 |
| **Total** | **600** | **435** | **888** | **689** | **1,105** | **843** |

**Summary of CDL cases, samples received and processed from 2015 – 2022.**

| Year | Total cases | Total Samples received | Total Sample Processed |
|---|---|---|---|
| **2015** | 170 | 264 | 408 |
| **2016** | 289 | 637 | 804 |
| **2017** | 207 | 467 | 650 |
| **2018** | 343 | 723 | 864 |
| **2019** | 456 | 893 | 1,167 |
| **2020** | 435 | 600 | 897 |
| **2021** | 689 | 888 | 1,349 |
| **2022** | 843 | 1,105 | 1,813 |
| **TOTAL** | **3,432** | **5,577** | **7,952** |

# 22. VIROLOGY (RESEARCH) DIVISION

**MANDATES:**

1. Research and Surveillance of morbilliviruses (Peste des petits ruminants (PPR) and canine distemper) and related viruses (Canine Parvoviruses) in all states of the federation especially in outbreak locations for control measures toward the PPR eradication programme in 2030.

2. Routine diagnosis of viruses using Serological methods (competitive ELISA and Immunocapture ELISA and Polymerase Chain Reaction (RT-PCR) techniques for PCR proficiency.

3. Development of live Lumpy skin disease (LSD)

4. Development of a single-live Capripox vaccine for sheep and goats

5. Diagnosis of LSD, Goatpox (GTP), Sheep pox (SPP), Contagious ecthyma (Orf) and Bovine Papilloma (BP), Cowpox, Carmel pox, pseudocowpox

**SPECIFIC ACTIVITIES**

1. Carried out field surveillance and research into morbillivirus (and related mucosa viral) diseases of livestock and canids.

2. Evaluation of existing vaccine and development of template for further vaccine development.

3. Molecular diagnostic services for received samples.

4. Trained students from tertiary institutions on industrial attachment.

5. Aided undergraduate and postgraduate students on project research work with skill acquisition and sample analysis.

6. Applied for grants to facilitate numerous research proposals

7. Improved the laboratory towards attaining regional laboratory status.

8. Annual proficiency test for PPR samples (Sera and Nucleic acid) from CIRAD, France, under LIDISKI project by European Union and FOA/IAEA). Proficiency test was passed with certification from assessing bodies.

**On-going research/collaboration:**

1. LIDISKI project on PPR by European Union and FOA/IAEA).

2. Screening for Antiviral activities of some indigenous plant extracts using embryonated eggs and Newcastle Diseases Virus-NDV. Collaboration with University of Sokoto.
3. Shaping livestock disease control policies in Nigeria by promoting stakeholder awareness of the socio-economic burden of sheep pox and goat pox and the feasibility of vaccination. A collaboration between National Veterinary Research Institute Vom and The Pirbright Institute, United Kingdom

**Achievements:**

**A. Routine diagnostic results**

Total number of samples diagnosed using ELISA = 2,578
Total number positive = 1,078
Total number negative = 1,468
Total number Doubtful = 32

**B. Proficiency test result**: Proficiency test was passed with certification from assessing bodies.

**C.** Samples were received from suspected outbreaks of LSD, GTP, Orf and Bovine papilloma from Gombe, Bauchi, Nasarawa, Plateau, Kaduna, Kano

| Disease | No of samples received | No of samples tested by PCR | No of positive samples |
|---|---|---|---|
| **Lumpy skin Disease (LSD)** | 12 | 12 | 1 |
| **Goat pox** | 28 | 28 | 3 |
| **Sheep pox** | 53 | 53 | 3 |
| **Orf** | 0 | 0 | 0 |
| **Bovine papular stomatitis** | 49 | 49 | 15 |
| **Marek's disease** | 32 | 32 | 4 |
| **Total** | 174 | 174 | 26 |

**Research Highlights**

1. Studying the role of livestock markets in transboundary disease transmission
   **Research output**
   a. Mapping the movement of livestock through live animal markets
   b. Detection of transboundary disease from samples collected at livestock markets

2. Seeking stakeholder input on vaccination programmes for SGP in Northern Nigeria. Training NVRI researchers and field workers on modeling and estimation of financial losses due to sheep and goat pox diseases

**Work done so far:**

1. Administration of questionnaires at six livestock markets in Plateau and Bauchi States
2. Samples collected from animals observed with clinical signs of major Transboundary diseases at six livestock markets in Plateau and Bauchi States

3. Forty-two people were trained on the usage of a mobile **App** that was previously developed for estimating financial losses due to outbreaks of transboundary diseases of sheep and goats.
4. The **Mobile App** was deployed for validation in five States in Nigeria namely Bauchi, Kaduna, Nassarawa, Plateau, and Yobe States

**CHALLENGES**

1. No administrative staff.
2. Broken down Computer and accessories.
3. No communication systems (Intercom, network, etc).
4. Inadequate biosafety and biosecurity system.
5. Inadequate reagents for serology and PCR work.
6. Old, non-calibrated and faulty equipment.
7. Inadequate automatic pipettes.
8. Electrical issues from faulty wiring system.
9. Poor ventilation for proper equipment functioning especially cooling systems.

# 23. VIRAL VACCINES PRODUCTION DIVISION

**Introduction**

The Viral Vaccine Production Division (VVPD) is saddled with the primary responsibility of producing virus-based vaccines for the prevention of livestock and poultry viral diseases of economic and/or public health importance in Nigeria and other West African countries.

In addition, the Division produces distilled water as well as propagate cell lines and media for use by other Divisions within the institute. Furthermore, in view of the domiciliation of the Freeze Drying and Labelling Machines within the Division, it also renders services such as lyophilization and labelling of vaccines to Bacterial Vaccine Production Divisions.

The Viral Vaccine Production Division which consists of Five (5) Technical Sections and Five Support Sections produces the following veterinary viral vaccines:

Infectious Bursal Disease Vaccine or IBDV (Gumboro)
Fowl Pox vaccine (FPV)
Newcastle disease vaccine (La Sota)
Newcastle disease vaccine (Hitchner B1-Intra-ocular)
Newcastle disease vaccine (Komarov)
Thermo-tolerant Newcastle disease vaccine (NDV I-2)
Peste des Petits Ruminants (PPR) vaccine
Low-Egg-Passage (LEP) Rabies vaccine for dogs (ARVD)
High-Egg-Passage (HEP) Rabies Vaccine for Cats (ARVC)
Lumpy Skin disease (LSD) vaccine
Sheep/Goat Pox Vaccine (GPV)
Sterile diluents for vaccines

**Production**

The Division produced **43,355,332** doses of the various veterinary viral vaccines between January and December, 2022. The details and the summary of vaccine production in doses for the period by the Division are presented in Tables 1 and Table 2.

The Division produced about **5000**litres of distilled and MilliQwater for its use and that of other Divisions in the Institute. Various cell culture media (GMEM, DMEM, HMEM.EMEM, RPMI, F-12, HBSS) and cell cultures in monolayer and suspension including Vero R133, CEF and BHK-21 were also produced for research as well as quality control of viral vaccines and for use in various divisions of the Institute and the two colleges. A culture bank of these same cells are being maintained in liquidnitrogen in the Division.

The Freeze Drying Section also lyophilized vaccines of the Bacterial Vaccine Production Division (BVPD) which include Contagious Bovine Pleuropneumonia (CBPP) vaccine, Fowl Typhoid Vaccine (FTV), and *Brucella* S vaccines for sale to livestock farmers.

**Table 1: Viral Vaccines Production Figure (doses) January – December, 2022**

| MONTH | ARV | IBDV | FPV | NDV-K | NDV-L | NDV-$L_{500}$ | NDV I/O | NDV-$I2_{50}$ | PPRV | LSD | GPV | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **January** | 68,410 | - | - | - | 1,914,400 | - | - | - | - | - | - | **1,982,810** |
| **February** | 43,545 | - | - | - | - | - | - | 499,100 | 560,450 | - | - | **1,103,095** |
| **March** | 26,245 | 2,202,200 | - | | 4,785,800 | - | - | 1,640,600 | | - | - | **8,654,845** |
| **April** | 36,857 | 2,110,000 | - | - | 1,800,400 | - | - | 1,041,750 | 992,150 | - | - | **5,981,157** |
| **May** | 7,684 | - | - | | 1,829,000 | | - | - | 542,850 | - | | **2,379,534** |
| **June** | 25,760 | 2,039,600 | - | 1,784,600 | 869,000 | 1,764,000 | - | 452,900 | 509,900 | - | - | **7,445,760** |
| **July** | 29,637 | - | - | - | 1,845,600 | - | - | 890,650 | - | 41,050 | - | **2,806,937** |
| **August** | 8,920 | 2,378,600 | - | - | 1,798,800 | - | - | 510,400 | 968,800 | - | - | **5,665,520** |
| **September** | 11,578 | - | - | - | 2,221,800 | - | - | 593,100 | - | - | - | **2,826,478** |
| **October** | 23,039 | - | 749,800 | - | - | - | - | 567,900 | - | - | - | **1,340,736** |
| **November** | 82,881 | - | - | 876,200 | - | - | - | - | 310,050 | - | - | **1,269,131** |
| **December** | 39,929 | 1,125,800 | 733,600 | - | - | | - | - | - | - | - | **1,899,329** |
| **TOTAL** | **404,485** | **9,856,200** | **1,483,400** | **2,660,800** | **17,064,800** | **1,764,000** | **-** | **6,196,400** | **3,884,200** | **41,050** | | **43,355,332** |

**Table 2:** Summary of Vaccine Production for 2022 (DOSES)

| S/No | VACCINES | QUANTITY |
|---|---|---|
| **1.** | **ARV** | **404,485** |
| **2.** | **IBDV** | **9,856,200** |
| **3.** | **FPV** | **1,483,400** |
| **4.** | **NDV-K** | **2,660,800** |
| **5.** | **NDV-L** | **18,828,800** |
| **6.** | **NDV-I/O** | **0,00** |
| **7.** | **NDV-12** | **6,196,400** |
| **9.** | **PPRV** | **3,884,200** |
| **10** | **Sheep/Goat Pox** | **0.00** |
| **11.** | **LSDV** | **41,050** |
| **TOTAL** | | **43,355,332** |
| **Diluents (Sterile Diluent: 100ml & 200ml)** | | **10,870 Bottles** |

## NOTABLE ACTIVITIES

- SCADA upgrade and the put to use of the 12,000 capacity Lyofast7.0 Freeze Dryer
- Procurement of potent vaccine Master seeds and new cell-lines for vaccine production
- Repair of JM 6 refrigerated Centrifuges
- Repairs of GT-40 freeze dryers
- Repair of ultra-low freezers
- Commencement/supply of production of Anti-rabies under the RIDESSE project

## CHALLENGES/CONSTRAINTS

1. Constant breakdown of the Lyovac GT 40 Freeze Dryers
2. Lack of potent vaccine Master seed for some of the vaccines
3. Poor quality of embryonated chicken eggs
4. Outdated and obsolete production equipment
5. Unavailability and delayed supply of vaccine consumables
6. Shortage of autoclaveable storage and centrifuge Nalgene bottles
7. Lack of sufficient autoclave machine for the sterilization of vaccine receptacles
8.

**Future Plan**

- Increase dose/vial of critical vaccines in order to drive down cost of vaccines and compete favorably in the market with foreign vaccines
- Procurement of Boifermenters/Bioreactors for the increased production of cell culture-based vaccines
- Development of cell culture based anti-Rabies and Fowlpox vaccine
- Procurement/Sourcing of vaccine master seed for all the vaccines

## OUTSTATION REPORTS

### 1. ABUJA OUTSTATION LABORATORY

**Functions/Mandates**

i. Disease surveillance/monitoring
ii. Vaccine sales/reconstitution/storage
iii. Farm visitation
iv. Post-mortem examinations, sample collection, sample storage and transportation
v. Vaccination and supportive therapy

**Notable Activities in 2022**

i. Monthly zoom meetings with DDS and VIOs.
ii. Filing and submission of composite monthly reports capturing and reporting major diseases treated and activities in the outstation.
iii. Working in collaboration with Federal Capital Territory Veterinary Clinic, Ministry of Agriculture and Rural development- Research Department and the University of Abuja to investigate the causes of disease outbreaks in different species of animals and proffering effective mitigative measures. .
iv. Frequently sending samples to Vom from disease outbreaks of unknown causes for further and development of relevant vaccines and biologicals.
v. Carried out annual Contagious Bovine Pleuropneumonia (CBPP) and Rabies vaccination campaign in collaboration with the FCT Veterinary Clinic. Engaged in treatment and classical surgeries with the FCT Veterinary Clinic.
vi. Attendance of the monthly and weekly clinical conferences by staff of the outstation.
vii. Collaborated with Dr Asala and his team from the Headquarters on the research carried out on abattoir rats.
viii. Vaccine sales and utilization of some of the proceeds for the maintenance of the office.

**I. Farm Visitations**

a. The farm of the former Chief of Air staff, the late Alex Badeh's was visited in Nasarawa State. one hundred and twenty (120) crossed Friesians cattle were treated for the following;

i. Contagious Bovine Pleuropneumonia (treated and vaccinated).
ii. Tick infestation (treated and controlled).
iii. Trypanosomiasis (treated)

b. Alhaji Umar Tela's farm was visited and the following intervention were carried out:

i. Contagious Bovine Pleuropneumonia vaccination for 110 crossed Friesian cattle at Lenguwa Kada, Lugbe Abuja.
ii. Administered Peste des Petits Ruminants (PPR) vaccination to 80 Balami sheep.
iii. Conducted generalfarm inspection.

c. Damsy Farms Deidei: The farm has the capacity for six thousand (6,000) layers and broilers and also accommodates a herd of sheep. The poultry were treated for Newcastle Disease and coccidiosis respectively. The sheep were routinely dewormed and antibiotics administered.

d. The home of Alhaji Afolabi Solade Dutse inthe Bwari Area Council of the FCT were three adult Rottweilers were routinely dewormed and given tick baths.

**II. Sample collection**

i. Blood and urine samples were collected from a herd of cattle belonging to Alhaji Bamanga Umar of Ruga village Gwarimpa. We were also able to diagnose Fascioliasis, Leptospirosis and Trypanosomiasis.

ii. Skin scrappings were also collected from the above farm and sent to the Dermaphilosis laboratory in NVRI, Vom.

**Achievements**

i. Sales of Vaccines and Biologicals.

ii. Renovation of the office space provided by the FCT Veterinary Clinic and successful connection to AEDC (Electricity supply).

iii. Correspondence with Aso Villa, National Assembly and other FederalGovernment establishments.

iv. Broker partnership with the FCT Veterinary Clinic in all services such as routine disease surveillance activities and clinical services.

v. The Outstation was able to procure some chairs and stationaries as well as hire a cleaner to improve the work environment. .

**Challenges**

i. Urgent need for a standard independent laboratory building.

ii. The NVRI laboratory signboard is yet to be placed due to the unwillingness of the host establishment, (the FCT Vet clinic) to permit its installation.

iii. Lack of basic laboratory equipment, office furnitures and reagents.

iv. Lack of a vehicle for routine laboratory surveillance and ambulatory services to meet up with pressures.

v. Frequent power outage and a non-functional generator.

vi. Lack of internet facilities

## 2. AKURE LABORATORY

### 1. Functions /Mandate

i. Akure zonal laboratory functions include rendering administrative and professional services.

ii. The zonal laboratory oversees other outstation laboratories as the need arises.

iii. Professional duties include diseases surveillance and monitoring in conjunction with both the State Department of Veterinary Services and Private Veterinary Service Providers.
iv. Vaccine sales.
v. Rendering of Consultancy and Diagnostic services.
vi. Empowerment of the youths and the general public on Apiculture.

## 2. Notable activities carried out in 2022

i. Clinical services and field surveillance.
ii. Collaboration with the State Veterinary Services onAmbulatory/ Disease survey and sampling.
iii. Sale of vaccines.

## 3. Achievements in 2022

i. Bee honey workshops/seminars presented to NVMA Ondo State Chapter.
ii. Seminar presentation on honey residues/contaminants for EU Export organized by Federal Ministry of Agriculture.
iii. Seminar presented on pharmaceutical importance of Bee Venom as vaccine trial and therapeutics organized by Raw Materials Research and Development Council and the Federal Ministry of Science and Technology Abuja.
iv. Visit to the semi-automated abattoir in Akure for possible samples collection.
v. Intervention on African Swine Fever outbreak in the Ondopiggery.
vi. Carried out clinicaldiagnosis and intervention on Marek's Disease in a commercial poultry farm.

## 4. Major challenges

i. Dearth of laboratory facilities and constant threats by the new occupant(Father Land Park)to vacate the office.
ii. Notice received from the Ondo State Government to vacate the residential quarters.
iii. Insufficient supply of vaccines to meet the farmers demands.
iv. Inability to pay back customers their monies nor supply them with vaccines which they have earlier booked.
v. The sale of our vaccines is under threat from the patronage of exotic vaccines from other private outlets and the claim that exotic vaccines are cheaper than the ones produced in NVRI, Vom.
vi. Accusation that NVRI vaccine have short shelf life as compared with exotic vaccines.
vii. The call by other veterinarians for NVRI to start the production of other canine vaccines such as Distemper, Parvo and Hepatitis vaccines in order to maintain relevance and influence in the industry and sustain our competitive advantage.
viii. Inability of the Akure laboratory to analyze bee products for contaminants. There is a high demand for this services.

ix. There is a high demand for the Akure office to establish cattle ranches, which we have not been able to provide.

### 5. Conclusion

The current State of the zonal laboratory requires urgent intervention. As the zonal hub of Veterinary activities, there is the need for a purpose-build laboratory, equipped with basic laboratory infrast;ucture to enable staff discharge their duties and boost the impact of the laboratory in the community.

## 3. BAUCHI OUTSTATION LABORATORY

### 1. Functions/Mandate

i. Animal disease surveillance.
ii. Vaccine sales.
iii. Laboratory Diagnostic Services (Parasitology, Bacteriology and Haematology)

### 2. Notable activities

i. Clinical examination and management of sick animals and apparently healthy animals (Disease management, surgeries, vaccination etc).
ii. Laboratory diagnosis of samples presented for disease investigation (Bacteriology, Parasitology and basic Haematology)
iii. Postmortem examination of carcasses presented for disease investigation.
iv. Sale of vaccines.
v. Animal disease surveillance on important reportable diseases through samples collection, storage, packaging for referral of samples to Diagnostic Division NVRI Vom.
vi. Ambulatory services in poultry, nomadic and institutional farms.
vii. Training of students from higher Institutions on industrial attachment (SIWES).
viii. Collaboration with EKORE, REDISSE, WAC-EID, LIDISKI projects, and Bauchi and Gombe State Governments on Research projects,
ix. Training of CAHWs on vaccines procurement and sales to rural farmers and animal disease surveillance.

### 3. Achievements

i. Maintenance of solar panel installations by LIDISKI project.
ii. Procurement of laboratory equipment and reagents for Parasitology and Bacteriology.
iii. Procurement of a 150-litre Deep Freezer.
iv. Maintenance of generator and other office and laboratory equipment.
v. Regular payment of water and light bills.
vi. Temporarily secured collapsed portions of office complex perimeter fence with zinc.

### 4. Major challenges

**i.** Collapsed portions of office complex perimeter fence
**ii.** Lack of autoclave.

**iii.** Lack of laboratory reagents.
**iv.** One staff quarter and 2 boys' quarters not in good condition, still having asbestos roof with leakages.
**v.** Lack of water storage facility.

**5. Research Highlights**

i. Wildlife conservation research activities including population survey, disease surveillance and health management.
ii. Collaboration with researchers from Abubakar Tafawa Balewa University Teaching Hospital, Bauchi on One Health approach to research activities on Lassa Fever.
iii. Collaboration with WAC-EID on Disease surveillance activities in camels and rodents.
iv. Active participation in LIDISKI Research Project in Bauchi State.

# 4. BENIN OUTSTATION

**1. Functions/Mandate**

**i.** Disease surveillance/investigation.
**ii.** Routine laboratory analysis and diagnosis of diseases.
**iii.** Vaccine sales and routine vaccination activities.

**2. Notable activities**

**i.** Monthly zoom meetings with the DDS and VIOs.
**ii.** Furnishing the DDS and Dr. Mohammed Bolajoko with monthly reports through email.
**iii.** Routine farm visits and sample collection/transportation to designated laboratories at the institute for diagnosis.
**iv.** Joint participation and continuation of Antirabies campaign across Edo State.

**3. Achievements**

**i.** We have further secured the temporary office space with a new door and metallic burglary proof window.
**ii.** Promotion of a staff.
**iii.** Collaboration with the Edo State Department of Veterinary Services in routine disease surveillance activities.
**iv.** Commencement of PhD by a staff

**4. Major challenges**

**i.** Lack of standard laboratory building.

**ii.** The poor power situation in the building hosting the temporary office space has made it near impossible to power the deep freezer, thus affecting vaccine sales.
**iii.** Lack of basic laboratory equipment and reagents.
iv. Lack of a vehicle for routine laboratory surveillance activities.

### 5. Suggestions

**i.** Building of a standard laboratory building.
ii. Provision of a vehicle for routine disease surveillance activities.
iii. As a long-term measure, there is the need to build a permanent office accommodation for the outstation.
iv. Request for routine inclusion of staff in training programs and grants domiciledin the institute.

### 6. Research Highlights

**i.** Molecular Characterization and risk factors associated with *Cryptosporidium* infection in HIV patients in Benue State.A PhD proposal by Due Emmanuel Awai of the Dept of Veterinary Public Health and Preventive Medicine, University of Nigeria, Nsukka.

### 7. List of publications

All research work in the year under review have been sent to journals for review and the committee would be briefed in writing as soon as the manuscripts are accepted and published.

## 5. BIRNIN-KEBBI OUTSTATION

### 1. Functions/Mandate

i. To conduct research into all aspects of animal diseases, their treatment and control.
ii. To collect and transport animal samples to the Central Diagnostic Laboratory for confirmatory diagnosis.
iii. To enlighten the farmers, livestock owners and other stakeholders and the public on the vaccines and other biologicals product by the NVRI.
iv. Disease diagnosis and treatment.
v. Extension services to poultry and livestock owners.
vi. Sales, distribution, and administration of vaccines produced by NVRI to farmers, livestock and poultry owners.

### 2. Notable Activities

i. Awareness campaign on rabies pre/post exposure vaccination, first aid treatment to exposed animals and individuals,
ii. Mass vaccination of animals against Rabies, CBPP, PPR and others.

## 3. Achievements

The outstation collected the following number of vaccines for sales, distribution and administration during the period under-review.

**Table 1**: The quantities of the different vaccines supplied and sold by the Birnin-Kebbi Outstation in 2022

| Vaccines | Quantity |
|---|---|
| CBPP | 2,100 |
| NDV($I_2$) | 1,300 |
| HSV | 50 |
| ASV | 400 |
| FPV | 50 |
| KUMOROV | 700 |
| 1BDV | 800 |
| LASOTA | 1,000 |
| FTV | 20 |
| BQV | 20 |

i. The outstation sent 8 samples to the Central Diagnostic Laboratory for confirmatory diagnosis.
ii. Sixteen (16) student were sent to the laboratory for industrial training/experience.
iii. Despite the condition of the laboratory basic clinical and laboratory services were rendered to the public i.e. ambulatory and extension services to livestock owners and poultry farmers on biosecurity, in collaboration with the State sister Ministry.

**Table 2**: Cases of the various animal species handled in 2022.

| Month | Ovine | Caprine | Bovine | Equine | Avian | Canine | Feline |
|---|---|---|---|---|---|---|---|
| January | 17 | 12 | 4 | - | 13 | 3 | - |
| February | 13 | 6 | 2 | - | 14 | 2 | - |
| March | 6 | 13 | 7 | - | 20 | 4 | - |
| April | 8 | 12 | 13 | - | 4 | 6 | - |
| May | 3 | 11 | 3 | 1 | - | 4 | - |
| June | 4 | 8 | 2 | 1 | 13 | - | 1 |
| July | 10 | 12 | 1 | - | - | - | - |
| August | 14 | 4 | 6 | 3 | 16 | 1 | - |
| September | 19 | - | - | 1 | 13 | 2 | - |
| October | 20 | - | 2 | - | 12 | 3 | 1 |
| November | 6 | 2 | 1 | 2 | - | 3 | - |
| December | 13 | 1 | 1 | 1 | - | 3 | - |
| **Total** | **133** | **80** | **42** | **12** | **105** | **31** | **2** |

### 4. Major Challenges

i. The laboratory has two leaking deep freezers and a fridge, with bad compressors.
ii. The only microscope in the laboratory needs repair or replacement
iii. The laboratory lacks basic chemicals/reagents for smooth operations.
iv. The roof of the office building needs urgent repairs after it was damaged during the raining season in 2022.
v. Shortage of staff in the outstation. Presently, there are only two of staff

### 5. Research Highlights

i. Ongoing research activity on Pasteurellosis, Avian Influenza Virus and Monkeypox Virus in collaboration with the State Ministry of Animal Health.

## 6. CALABAR ZONAL LABORATORY

### 1. Functions/Mandate of the laboratory

- Surveillance activities
- Diagnostic work
- Disease outbreak investigation and reporting
- Sample collection and transportation
- Vaccine storage and sales
- Laboratory tests
- Research project implementation.
- Implementation of laboratory quality assurance standards.
- Implementation of biorisk management.

### 2. Specific (Notable) Activities

- Repair of blown off roof of the lab which resulted in leakages into the lab and offices was carried out.
- A comprehensive assessment and replacement of all burnt and spoiled electrical wiring and fittings was carried out to enable restoration of light.
- All the four old wooden doors were removed and replaced by four new doors (2 iron and 2 aluminium panel doors).
- All broken window glasses and handles were replaced with new ones.
- The generator in the Laboratory was repaired and serviced for use.

- 2 air conditioners were installed
- About 105 farm visits were made during the year.
- 15 necropsies were carried out.
- Vaccine sales was started during the year.
- The lab started carrying out Simple serological test such as brucella RBPT.
- The office was involved in World Rabies Daycelebration jointly organized by NVMA and Dept of Vet. Services, CRS Ministry of Agriculture and Rural Development.
- The Head of the Zonal laboratory participated in the public enlightenment discussion at Hit FM radio station in Calabar on livestock and poultry diseases of economic and public health importance.
- Participated in the flag-off ceremony for the2022 free mass vaccination against rabies and other transboundary animal diseases organized by the Department of Veterinary Services, CRS Ministry of Agriculture and Rural Development where a goodwill message was given on behalf of NVRI.
- Participated in a sensitization workshop organized by Federal Character Commission for all heads of Federal Institutions in south south geopolitical zone.

**C. Achievements**

1. We successfully stopped leakages of rain from the roof into our lab and offices.
2. Farm visits and surveillance activities helped build our client base.
3. Post mortem Diagnostic work has been restored in the laboratory.
4. We were able to replace the very old doors with new and stronger ones.
5. We fixed handle to all windows that had no handle locks to beefup security of our laboratory and offices.
6. Replacement and repairs of all electrical cables, sockets and switches in the lab and offices which enabled restoration of light with the use of generator.
7. The office was able to carry out farm visits and Post mortem Diagnostic work.
8. The laboratory now has 2 security men employed by the Institute to provide both day and night security services at our Laboratory.
9. Conducive atmosphere has been enhanced with the installation of the air conditioner.
10. We have started blood/serum sample collection and testing for brucella antibodies by RBPT and for storage.

11. More awareness created on the availability of various NVRI vaccines at our office led to increased sales of our vaccines.

12. We established collaboration with public and private veterinarians and poultry farmers.

13. Diagnosis of some common poultry and livestock diseases were achieved. E.g. Coccidiosis, Helminthosis, Newcastle disease, egg peritonitis, typhoid and mycotic infection.

**D. Challenges**

1. Lack of logistics and mobility for farm visits and surveillance.
2. Lack of electricity
3. Lack of water
4. No incubator
5. No biosafety cabinet
6. No gas cylinder,
7. No Bunsen burner,
8. No basic media
9. No reagents and wire loops for basic microbiological and parasitological works.

**E. Research Highlights**

Research work in the laboratory is yet to kick off.

## 7. IBADAN LABORATORY:

**MANDATE:**

- Vaccine sales/distribution,
- Diagnostic Services
- Extension services.
- Diseases surveillance/Sample collection
- Consultancy
- Veterinary Research

**Vaccines Sold in 2022:**

| S/No | Type Of Vaccines Sold | Quantity (Vial /Bottle) |
|---|---|---|
| 1 | Newcastle Disease Vaccine Lasota (200) | 421 |
| 2 | Newcastle Disease Vaccine Lasota (500) | 475 |
| 3 | Newcastle Disease Vaccine Komorov(200) | 756 |
| 4 | Infectious Bursa Disease Vaccine Gumboro (200) | 200 |
| 5 | Fowl Pox Vaccine | 21 |
| 6 | Peste des Petit Ruminant (PPRV) (50) | 156 |
| 7 | Contagious Bovine Pleuropneumonia (CBPP) (100) | 36 |
| 8 | Foot and Mouth Disease Vaccine (FMDV) (50) | 18 |
| 9 | Lumpy Skin Disease (LSDV) | 1 |
| 10 | Lamstreptocide (1L) | 4 |
| 11 | Antrabies Vaccine | 6 |

**DIAGNOSTIC SERVICES:**

**Necropsy/Extension services:**Our Laboratory performed clinical and diagnostic services (especially Necropsy) for poultry farmers in the course of the year 2022. Farm visits were also made based on farmerrequest.

**Disease surveillance/Sample collection:** Disease surveillance and sample collectionwere carried outin collaboration with the Oyo State Epidemiology Unit. Samples collected were sent to Headquarters for confirmation. Samples brought directly by farmers were also sent to Headquarters for confirmatory diagnosis.

**Consultancy:** A few consultancy services were carried out in the course of the year.

**C. ACHIEVEMENTS:**

1. Collaborative work between NVRI and Oyo State epidemiology unit in the surveillance and control of African swine fever and Avian Influenza.
2. There were several collaborative workshops/training of farmers by the NVRI and Oyo state Ministry of Agric and Rural Developments on ASF
3. Step down training for Veterinarian and Para Vet of Oyo State Ministry of Agric and Rural Developments by NVRI and Oyo State Ministry of Agric and Rural Developments on Monkey Pox
4. Collaborative training of staff of Oyo state National park by Society for Animal right and Protection (SERAP) and NVRI on Monkey Pox Infection, Prevention and Control.

**D. CONSTRAINTS:**

There are a few facilities on ground however the available facilities are not fully utilized due to inconsistency in power supply. Also, lack of requisite reagents and laboratorytechnical staff have deterred laboratory services and research.

**E. NEEDS:**

In other to achieve and fulfill the core mandate of the institute in this part of the country, the laboratory will appreciate the provision of reagents/chemicals,laboratorytechnical staff(a Laboratory Scientist/Technologist) and an electrical generating set. These will help in provision of better service to our clients/farmers.

## 8. IKIRE LABORATORY OUTSTATION

**MANDATE:**

- Vaccine sales/distribution,
- Diagnostic Services
- Extension services.
- Diseases surveillance/Sample collection
- Consultancy
- Veterinary Research

**Achievements**

Ambulatory Services: Visit to Livestock and poultry farms within and outside Ikire.

**Challenges**

**Vaccines depot:** There were no sales of vaccines in Ikire Laboratory because the electric poles that supplies electricity to the Laboratory and the staff quarters buildings were affected by the rain storm.The generator which was the secondary source of electricity to the Laboratory has been damaged. There is no refrigerator to store vaccines.

**Quail Production:**Quail production couldn't be expanded because of the constraints of housing. The quails have stopped producing eggs. Therefore, they have been sold and needed to be replaced. There is constraints because the Laboratory was been used for the quail production and lack of adequate fund required for the replacement and feeding of the quails.

**Laboratory building:** There was damage to the walls, roof and ceiling components of the laboratory by a tree that fell on the building.

**Staff Quarters:** The two senior staff quarters and the two boys quarters need to be repaired because of the damage caused by rain storm.

**Perimeter fence:** The perimeter fence to the Laboratory has broken down. It needs to be reconstructed to tighten the security for the Laboratory.

**Security Gate:** There should be security gate to the Laboratory, so as to provide adequate security to the compound.

**Staff:** The Laboratory is in need of the following categories of staff:

i. Two(2) Security men

ii. Two(2) Livestock Assistants

## 9. ILORIN OUTSTATION

### MANDATE

Diagnosis of livestock diseases

Investigation of livestock disease

Vaccine collection and distribution

Extension services to farmers

### ACTIVITIES

SPECIFICDIAGNOSIS: The laboratory diagnosed the following diseases by Necropsy and farm visits:

Avian: Newcastle

Coccidiosis

Septicemia

Colibacillosis

Respiratory disease

Helmimthosis - Teniasis

Cachexia

Nutritional deficiency

Rodents infestation

### VACCINE SALES

The following vaccines were sold:

POULTRY

| | |
|---|---|
| NDVK | 450 Vials |
| NDVL | 300 |
| FTV | 1350 |

| | |
|---|---|
| I/2 50 | 250 |
| BOVINE | |
| CBPP | 300 |
| ASV | 100 |

**Achievements**

Vaccine supply greatly improved

Diagnosis and investigation of livestock diseases was carried out

**Research Highlights**

Hemoparasitological profile of cattle in Kwara state was carried out in collaboration with Parasitology Department, NVRI, Vom.

**Challenges**

Diagnostic capacity of the laboratory needs improvement.

Dilapidated laboratory infrastructure

Laboratory scientist staff is needed.

Water supply

Land encroachment

# 10. KADUNA OUTSTATION

1. **Function / Mandates**

i. Disease surveillance, investigation and diagnosis,
ii. Conduct research on animal diseases,
iii. Provide extension services to farmers within our areas of jurisdiction and
iv. Distribution and sales of NVRI vaccines and other products to local farmers and clients.

2. **Specific notable activities**

i. In collaboration with the Department of Parasitology at the Headquarters, in the month of March, 2022 the Kaduna outstation embarked on blood sampling from cattle slaughtered at Kawo and Tudunwadaabattoirs in Kaduna with the view to

conductingresearch on the prevalence of hemoparasitism in cattle slaughtered at various abattoirs.

ii. Conducted active and passive Avian Influenza surveillance in major hatcheries in Kaduna.Through the afore mentioned activitiesover 200 samples were processed for diagnosis, they consist of 56bovine blood samples, over 100 avian tissues, over 30 avian trachea swaps, over 30 avian cloaca swabs, **3** blood samples from dogs, **3** sera samples from dogs, 1 fecal samples from dogs, ticks sample from dogs.

iii. Carried out routine necropsy investigation on many avian carcasses.

iv. Other activities that were notably carried out at the period under review was vaccines sales and distribution.

## 3. Achievements

i. Avian influenza active surveillance in major hatcheries in Kaduna
ii. Participated in sample collection from cattle slaughter in Kaduna abattoirs for hemoparasitic prevalence study.
iii. Twenty two animal diseases were diagnosed through our lab with some interesting cases undergoing the process of publications.
iv. Sales of NVRI vaccines worth **N7,483,500**
v. Routine farms visitations and extension services was carried out in the period under review.

**Table 1**: Cases diagnosed in 2022 at the Kaduna Lab.

| S/No. | Animal specie | Disease diagnosed | Number of cases diagnosed and or reported |
|---|---|---|---|
| 1 | Bovine | Theileriosis | 1 |
| 2 | Bovine | Haemoplasmosis | 1 |
| 3 | Canine | Anaplasmosis | 1 |
| 4 | Canine | Babesiosis | 3 |
| 5 | Canine | Helminthosis | 5 |
| 6 | Canine | Hepatozonosis | 1 |
| 7 | Canine | Mycoplasmosis | 1 |
| 8 | Avian | Aspergillosis | 2 |
| 9 | Avian | Infectious bursal disease | 6 |
| 10 | Avian | Pulmonaryhypertension syndrome | 1 |
| **Total** | **3** | **10** | **22** |

**Table 2:** Vaccine sales in 2022 at the Kaduna Lab

| S/No. | Recipient specie | Type of vaccine | No. of vials/bottles | No. of doses |
|---|---|---|---|---|
| 1 | Bovine | HSV | 690 | 27,600 |
| 2 | Bovine | BQV | 164 | 82,000 |
| 3 | Bovine | ASV | 620 | 248,000 |
| 4 | Bovine | HTV | 50 | 2,000 |
| 5 | Caprine/Ovine | LSD | 5 | 250 |
| 6 | Caprine/Ovine | PPRV | 600 | 30,000 |
| 7 | Avian | NDVi/2 (50 doses) | 804 | 40,200 |
| 8 | Avian | NDVL | 2,550 | 510,000 |

| | | | | |
|---|---|---|---|---|
| 9 | Avian | IBDV | 2,050 | 410,000 |
| 10 | Avian | FPV | 400 | 80,000 |
| 11 | Avian | FTV | 2,805 | 286,500 |
| 12 | Avian | FCV | 6 | 1,200 |
| **Total** | **3** | **12** | **10,744** | **1,711,750** |

### 4. Major Challenges

i. Lack of water supply to the office: Water supply to the entire neighborhood where our office is located have been cut off by the Kaduna State Water Board,
ii. Well dug by laboratory not sustainable, as it dries up during dry season.
iii. Lack of utility vehicle is a challenge to field work; smaller personal vehicles are employed for any field work which is not convenient and the staff bear the cost.
iv. The security challenges especially banditry and kidnappings in the State are on an alarming rate, this have affected our routine disease investigation, farm visitation and other field work activities.
v. Lack of office furniture

.

### 5. Research highlights:

i. Specific research work is ongoing by various staff through their various postgraduate trainings. One of such is trying to look at the effects of some trace elements in the modulation of certain diseases in poultry.
ii. Collaborative research works with some researchers in the Headquaters in Bovine and Avian species, majorly on prevalence studies.

## 11. KANO OUTSTATION

**Mandate**

The mandate of the laboratory are disease surveillance, diagnosis, treatment and control as well as providing extension services to livestock and poultry farmers. The outstation is also responsible for collection and distribution of vaccines and other biologicals.

## Summary of the activities for 2022

We conducted disease surveillance through visitations to abattoir, veterinary clinics, livestock farms and poultry farms. We collected and submitted about 52 samples to the institute (Avian influenza, Brucella, FMD, CBPP, NCD, and Rabies Laboratories). Also we conducted 116 Post-mortem examinations (109 poultry carcasses, 6 small ruminant and 1 cattle). We also processed 24 samples (Parasitology/Microbiology) at Kano Outstation Laboratory within the year.

We participated in several trainings within the year under review: FAO LMT, Sandia

Laboratory BRM, LifeStockInt'I Trans-boundary Animal Disease Training, LIDISKI SE and PE.

We handled 4 project students from College of Agricultural Produce Technology, Kano and 1 from Bayero University Kano. All of them conducted their bench work in the laboratory.

Within the year under review, we continued to be part of Kano State Avian Influenza

Containment Committee' and participated actively in the activities for the containment of the disease. Also participated in other disease investigation in Kano and Jigaswa States.

Through the approval of the Director/Chief Executive, we drilled borehole, installed overhead tanks and connected it to the office and residential houses in the lab using the kano lab. vaccine handling charges.

## 2022 VACCINES SALES RECORD

| Month | Customer Name | Lasota (NDVL) | IBDV | NDV-i2 | FTV | FPV | CBPP | PPRV | ASV | HSV | BQV | FMD | LSDV |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| January | Dr. Abdulkadir Rimi | | 7 | 4 | | | 30 | | | | | | |
| | NafiuAzareAgrovet | 50 | 50 | | | | | | | | | | |
| | Tropical Poultry Jgw | | | 200 | 36 | | | | | | | | |
| | Karvet Kano | 100 | 150 | | | | 50 | | | | | | |
| | Sovet Kano | 271 | 300 | 100 | | | | | | | | | |
| | Hafizu Yakasai Agro | | | | | | 100 | | | | | | |
| | Isa M. Inuwa | 65 | | 400 | 150 | | | | | | | | |
| | Bashir Funtua | | | | | | | | | | | | |
| | DanhassanAgrov KT | | | | 200 | | | | | | | | |
| | Vet Clinic Sokoto | | | | | | 250 | | | | | | |
| | | | | | | | | | | | | | |
| February | Isa Yahaya | | 102 | | | | 500 | | | | | | |
| | Sani Umar | | 6 | | | | | | | | | | |
| | Sovet Agrovet Kano | | | 400 | | | | | | | | | |
| | Humane Agrovet KN | 100 | 100 | | | | | | | | | | |
| | MansirGwale | 2 | 6 | 10 | | | 50 | | | | | | |
| | Musa Bunkure | | | 7 | | | | | | | | | |
| | | | | | | | | | | | | | |
| March | NafiuAzareAgrovet | 100 | 100 | | | | | | | | | | |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | AminuBunkure | | 102 | | | | | | | | | | |
| | Albarka Agrovet KN | | | 300 | | | | | | | | | |
| | Hafizu Agrovet KN | | | 200 | | | | | | | | | |
| | DanhassanAgrovet | | | | 78 | | 50 | | | | | | |
| | Al-Amin Agrovet KN | 200 | 100 | | | | | | | | | | |
| | Iliyasu Roni Jigawa | | | | | | 100 | | | | | | |
| | AminuBunkure | | | 50 | | | | | | | | | |
| | | | | | | | | | | | | | |
| April | Isa M. Inuwa | | | 1000 | | | | | | | | | |
| | Dr. Awalu Kano | | | 1000 | | | | | | | | | |
| | Nafi'uAzare Agrovet | 50 | 50 | | | | | | | | | | |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dr Rimi Katsina | 20 | 50 | 50 | | | | | | | | | |
| | SovetAgrovet | | | 2000 | | | | | | | | | |
| | Tropical Poultry Services Jigawa | | | 100 | | | | 100 | | | | | |
| | Iliyu Roni | | | 50 | | | | | | | | | |
| | Al-Amin Agorvet | | | 100 | | | | | | | | | |
| | Alfurqan Farm Kano | 300 | | | | | | | | | | | |
| | AminuBunkure | 10 | | | | | | | | | | | |
| | DanhassanAgrovet | | | | | | 50 | 50 | | | | | |
| | Mansur Gwale | | | 10 | | | | | | | | | |
| | Albarka Agrovet Abuja | 100 | 55 | | | | | | | | | | |
| | HafizuAgrovet | | | | | | 50 | 100 | | | | | |
| | Musa Bunkure | | | 20 | | | | | | | | | |
| | | | | | | | | | | | | | |
| May | Drabdulrazakagrovet Zaria | | 50 | 20 | | | | | | | | | |
| | MrsAko | | 1 | 1 | | | | | | | | | |
| | Auwalu Bawa | 7 | 6 | 2 | | | | 1 | | | | | |
| | HafizuAgrovet | 200 | 350 | 300 | | | | 10 | | | | | |
| | KarvetAgrovet | | 20 | | | | | | | | | | |
| | Bashir Tofa | 11 | 1 | 1 | | | | | | | | | |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Isa M. Inuwa | | | 2,000 | | | | 150 | | | | | |
| | DrAtuma NVRI Bauchi | | | | | | | 50 | | | | | |
| | Sovet Agrovet | | 2,000 | | | | | | | | | | |
| | IliyasuBebeji | | | 172 | | | | | | | | | |
| | | | | | | | | | | | | | |
| June | Ibrahim Wudil | 23 | 23 | | | | | | | | | | |
| | Dr Idris | | | | | | | | | | 6 | | |
| | Salisu Isa | | 6 | | | 1 | | | | | | | |
| | Garba Uba | 3 | | | | 1 | | | | | | | |
| | Umar Ya'u | 10 | | 3 | | | | | | | | | |
| | KarvetAgrovet | 10 | | | | | | | | | | | |
| | Danhassan Agrovet Katsina | | 35 | 50 | | | | | | | | | |
| | DrMaikudiKatsina | | | 100 | | | | | | | | | |
| | NafiuAzareAgrovet | 30 | 30 | | | | | | | | | | |
| | Prof Hassan Wudil | | | | | | | 150 | | | | | |
| | Nura Fagge | 22 | | | 120 | | | | | | | | |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dr Abdurazak Zaria | | 20 | 50 | | | | | | | | | |
| | Alfurqan Farm | 30 | 14 | | | | | | | | | | |
| | Barka Abuja Agrovet | 80 | 100 | 190 | 100 | | | | | | | | |
| | SovetAgrovet | | 250 | | | 2 | | | | | | | |
| | SalisuFalgore | | | | | | | | | | 2 | | |
| | HafizuAgrovet | 100 | 28 | 300 | | | | | | | | | |
| | | | | | | | | | | | | | |
| July | HafizuAgrovet | | 287 | 100 | 10 | | 50 | | | | | | |
| | Kamalu | | | | 149 | | | | | | | | |
| | Mansur Funtua | | | | 20 | | | | | | | | |
| | Tropical Poultry Services Jigawa | | | 200 | | | 20 | 10 | | | | | |
| | Bashir Tofa | 24 | 24 | | | | | | | | | | |
| | Nafi'uAzare Agrovet | 15 | 15 | 50 | | | | | | | | | |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Yarima Tofa | 15 | | | | | | | | | | | |
| | Iliyasu Roni | 5 | 7 | 7 | 20 | | | | | | | | |
| | Dr Abubakar Inuwa | | | | | | 3 | | | | | | |
| | Nasiru Gumel | 5 | 2 | 2 | | | 1 | | | | | | |
| | | | | | | | | | | | | | |
| August | Alfurqan Farm | 50 | | | | | | | | | | | |
| | Danhassan Agrovet Katsina | | 40 | 100 | | | | | | | | | |
| | Garba Musa Wudil | 20 | 8 | 20 | | | | | | | | | |
| | Kabo | | 5 | 10 | | | | | | | | | |
| | Yarima Tofa | 20 | | 3 | | | | | | | | | |
| | MrsAko | 1 | 2 | 2 | | | | | | | | | |
| | Barka Agrovet Abuja | | 5 | 10 | | | | | | | | | |
| | Sovet Agrovet | 300 | 93 | 1000 | | | | | | | | | |
| | MaansurGwale | 8 | 5 | 15 | | | | | | | | | |
| | Kamalu | 8 | | 10 | | | | | | | | | |
| | Kangal agro Enterprises Mina | | | | | | 50 | | | | | | |
| | Ismail Ibrahim | | | | | | 400 | | | | | | |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Bashir Tofa | | | | 15 | | | | | | | | |
| | | | | | | | | | | | | | |
| September | Mansur Gwale | 5 | | 3 | 3 | | | | | | | | |
| | Sovet Agrovet | | 200 | 500 | | | | | | | | | |
| | Dr Muktar | | | | | | | | | | | | 2 |
| | DrabubakarInuwa | | | | | | | | | | | | 5 |
| | Zubairu Gaya | | | | | | 10 | | | | 1 | | |
| | Rabiu Danhassan | | | | | | | | | | 3 | | |
| | NafiuAzare | 30 | 30 | 100 | | | | | | | | | |
| | Yarima Tofa | 35 | 1 | | | | | | | | | | |
| | KarvetAgrovet | 2 | 13 | | | | | | | | | | |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tijjani Fagge | 15 | | | 20 | | | | | | | | |
| | DrDiggiKebbi | | | | | | 135 | | | | | | |
| | Dr Idris Kyauta | | | 13 | | | | | | | | | |
| | Baba Ali | | | 8 | | | | | | | | | |
| | Nura Fagge | 80 | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| October | Yarima Tofa | 20 | | | | | 6 | | | | | | |
| | Iliyasu Roni | 3 | 3 | 7 | | | 15 | | | | | | |
| | AminuBunkure | 16 | 1 | | | | 4 | | | | | | |
| | Dr Abdurrazak Zamfara | | | | | | | | | | | | |
| | Dr Idris Kyauta | | | 7 | | | | | | | | | |
| | Isa M. Inuwa | | | | | | | | 300 | | | | |
| | Nura Fagge | | | | 100 | | | | | | | | |
| | Dr. Barka | | 100 | 200 | | | | | | | | | |
| | HafizuAgrovet | 100 | 100 | 100 | | | 400 | | | | | | |
| | DrDiggiKebbi | | | | | | 40 | | | | | | |
| | DrMaikudiKatsina | | | 50 | | | 2 | | | | | | |
| | Garba Zubairu | 25 | 3 | 11 | | | | | | | | | |
| | Dr Abubakar Inuwa | | | | | | | | | | | | |
| | SovetAgrovet | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| November | DrDiggisKebbi | | | 20 | | | 83 | | | | | | |
| | Abbas Dangora | 4 | 2 | 1 | | | | | | | | | |
| | Dr Abdussalam | 13 | 4 | 5 | | | | | | | | | |
| | Mande karfi | | | | | | 19 | | | | | | |
| | DrSa'aduSokoto | | | | | | 178 | | | | | | |
| | Dr Abubakar Inuwa | | | | | | 13 | | | | | | |
| | Yarima Tofa | 20vials | | | | | | | | | | | |
| | Alh Nasiru Fagge | 10vials | | | | | | | | | | | |
| | Ismail Ibrahim | | 5 | 600 | | | 4 | | | | | | |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NafiuAzareAgrovet | | 31 | 16 | | | | | | | | | |
| | HafizuAgrovet | 93s | 87 | 100 | | | 10 | | | | | | |
| | Nura Fagge | 200 | | | | | | | | | | | |
| | Isa M. Inuwa | 200 | | | | | 200 | | 200 | 200 | | | |
| | Yakubu Lere | | | 20 | | | 40 | | | | | | |
| | Rabiu Danhassan | 23 | 20 | | | | | | | | | | |
| | KarvetAgrovet | 50 | 50 | 100 | | | | | | | | | |
| | | | | | | | | | | | | | |
| December | DrDiggisKebbi | | | | | | 186vials | | | | | | |
| | Sunusi Hatchery | | | 60 vials | | | | | | | | | |
| | HafizuAgrovet | | 189 vials | 400vials | | | | | | | | | |
| | Sovetagrovet | 300 | | 3,000 | | | | | | | | | |
| | Isa M. Inuwa | | | | | | 500 | | | | | | |
| | Yarima Tofa | | | 60 | | | | | | | | | |
| | Abbas Gwale | | | | | | 20 | | | | | | |
| | Baffa U/Uku | | | 6 | | | | | | | | | |
| | Musa Wudil | 8 | | 8 | | | 20 | | | | | | |
| | Iliyasu Roni | | | | | | | | | | | | |
| | Iliyasu Roni | | | 20 | | | | | | | | | |
| | Rabiu Danhassan | 2 | | | | | | | | | | | |
| | Broken Vaccines | 95 | | | | | 50 | | | | | | |
| | Nura Fagge | | 11 | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

# Challenges

The major challenge is water flooding in the laboratory (see pictures attached


ERPEST
BUT NOT FORGOTTEN
eradicated in 2011.

## KATSINA OUTSTATION

**Mandate/Activities**

- Collection/submission of animal samples to Central Diagnostic Laboratories for confirmatory diagnosis.
- Enlightens the farmers, pet owners, Veterinarians and general public on the use of NVRI vaccines and other products produced by the institute.
- To research into all animal diseases
- Disease diagnosis and Treatment through clinical sign and post-mortem Lesion
- Offer Veterinary Services to poultry and livestock farmers
- Handling and training of IT students
- Sales of vaccines produced by NVRI to the farmers and Vet. Medicine Stores

**Achievements**
**Vaccine sales**

**I. Vaccines Quantity sold**

| | | |
|---|---|---|
| CBPP | - | 2,900 |
| FMD | - | 2 |

| | | |
|---|---|---|
| $NDVI_2$ | - | (50) 3,000 |
| HSV | - | 800 |
| ASV | - | 200 |
| Fowl pox | - | 200 |
| NDV k | - | 500 |
| BQV | - | 200 |
| IBDV | - | 1,200 |
| Lasota | - | 1250 |

II. Received 22 students from various institution for industrial Training

III. Submitted 17 animal samples to Central Diagnostic Laboratories for confirmatory diagnosis

.

IV. Carried out 145 post-mortem in poultry, and 10 post-mortem in animals despite the challenges we encountered with the state veterinary clinics

V. Provided extension services to 15 farms and trained some of them on how to reconstitute our vaccines for their animals

**3) Challenges**

i. Lack laboratory
ii. Lack almost all the laboratory equipment
iii. Lack vehicle for mobility.
iv. Shortage of manpower (only two staff in katsina outstation currently)
v. Difficulty in transporting vaccine from institute to Jos motor park

**4) Research Highlights**

Research on contagious ecthyma, Foot and mouth and avian influenza

virus in poultry is currently ongoing in Katsina , also research on monkey pox virus in some reptile is still ongoing.

## LAGOS LABORATORY

### Mandate

- The NVRI Outstation Laboratory Lagos serves as the first contact outbreak response unit for the NVRI Vom during outbreak of diseases within Lagos and Ogun states.
- We collaborate with the Director of Veterinary Services in the states for effective, active and passive disease surveillance and control activities such as mass vaccination of vaccinable diseases.
- The NVRI Lagos office also serves as one of the channels for NVRI vaccine distribution and supply for the State.

### ACTIVITIES

The following specific activities were carried out during the period under report.

1. Diagnosis, treatment, and control of animal diseases in households and on farms in Lagos and environs.

   The following diseases (as cases) were attended to at the clinic section of the laboratory for the year 2022.

| S/No | Case | Subtotal |
|---|---|---|
| **1** | Anti-Rabies vaccination | 258 |
| **2** | DHLPP vaccination | 30 |
| **3** | Helminthosis/Deworming | 47 |
| **4** | Parvo Viral Enteritis | 13 |
| **5** | Myasis in dog | 87 |
| **6** | Tick fever in dog | 54 |
| **7** | Poisoning | 5 |
| **8** | Leptospirosis | 2 |
| **9** | Skin infection | 42 |
| **10** | Gastritis | 11 |
| **11** | Contagious ecthyma | 1 |
| **12** | Fracture | 1 |
| **13** | Mange | 13 |
| **14** | Helminthosis in Small Ruminants & Cattle | 8 |
| **15** | Others | 15 |
| | **Total** | **587** |

2. Samples from suspected cases were collected from animals in some affected farms in Lagos and Ogun states for onward transportation to Central Diagnostic Laboratory at headquarters (NVRI, Vom for confirmatory diagnosis.

   Below is the summary of samples that were collected and sent to NVRI, Vom.

| MONTH | DISEASE SUSPECTED | SPECIE | TYPE OF SAMPLE | LOCATION LAGOS STATE | LOCATION OGUN STATE | TOTAL |
|---|---|---|---|---|---|---|
| JAN | FMD | BOVINE | BLOOD | 111 | - | 111 |
| FEB | COVID 19 SURVEILLANCE | PANGOLIN | BLOOD, ORAL SWAB, RECTAL SWAB | 19 | | 19 |
| MAR | COVID 19 SURVEILLANCE | CANINE | BLOOD, NASAL SWAB, SERA | 48 | | 48 |
| APR | AI | AVIAN | CLOACAL SWAB, TRACHEAL SWAB, LUNGS | 65 | | 65 |
| MAY | COVID 19 SURVEILLANCE | CANINE | BLOOD | 72 | - | 72 |
| JUN | - | - | - | - | - | - |
| JUL | - | - | - | - | - | - |
| AUG | | AVIAN (64), BOVINE (1), PORCINE (19), CANINE | SERUM, CLOACAL SWAB, TRACHEAL SWAB, TISSUE | 85 | - | 85 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | (1) | | | | |
| SEP | - | CANINE | BLOOD | 2 | - | 2 |
| OCT | AHF | AVIAN (2), EQUINE (22), | CARCASS, CLOACAL SWAB, TRACHEAL SWAB, LIVER, BROCHIAL SWAB, LUNGS, HEART, LARGE INTESTINE, SMALL INTESTINE | 24 | | 24 |
| NOV | AHF | EQUINE | BLOOD, SERA | 2 | | 2 |
| DEC | AHF | EQUINE | LIVER, SPLEEN, HEART, TRACEA | 52 | | 52 |

**KEY: Others- Septicaemia, Canine Cough Mechanical injuries, Inflammations etc**

3.We made some sales of NVRI vaccines and products. The table below summarizes the different types of vaccines and other NVRI products that were sold:

**Vaccines**

| S/No | Vaccine/Product | Spp | Quantity | No. Sold |
|---|---|---|---|---|
| **1** | Newcastle disease virus (LaSota strain) | Avian | 800 VIALS | 800 VIALS |
| **2** | Lumpy Skin Disease (LSD) | Bovine | 8 VIALS | 8 VIALS |
| **3** | Contagious Bovine Pleuropneumonia (CBPP) | Bovine | 2 VIALS | 2 VIALS |
| **4** | Peste des Petits Ruminants (PPR) | Caprine/Ovine | 100 VIALS | 100 VIALS |
| **5** | Foot and Mouth Disease Vaccine (FMD) | Cattle | 1 Bottle | 1 Bottle |

**Other products**

| S/No | Products | Quantity received | Quantity Sold |
|---|---|---|---|
| **1** | Dog shampoo | 42 pcs (Produced) | 42 pcs |
| **2** | Damasol CREAM | 60 pcs | 60 pcs |
| **3** | Lamstreptcide 2L | 2 | 2 |
| **4** | NVRI soap | 120 pcs | 120 pcs |

4. We liaised with the department of Veterinary Services through the director of Veterinary Services (DVS Lagos) on Active and Passive surveillance of animal diseases in Lagos and environs.
5. We collaborated with Lagos State Veterinary Department in conjunction with FMARD/OIE/REDISSE in organizing free statewide Anti-Rabies vaccination exercise in all the five divisions of the state from the 13th to 16th of July, 2022.

**Achievements**

We got approval from the Director/Chief Executive to start small scale production of Dog shampoo at the NVRI Lagos Laboratory in August 2022. This is as a result of a follow-up

request and feedback from the Anti-rabies vaccination program carried out in the premise. So far, over 100 bottles have been produced.

We have also been able to revive the hither to non-activity within the vaccine sales section of the office. More awareness of the presence of NVRI in Lagos has been established because of our numerous channels of interaction with the general public and via the office of the Director of veterinary services, Lagos State. NVRI Lagos is now an integral part of the Lagos State Department of Veterinary Services Epidemiology Unit.

**Challenges**

Ambulatory services – most (about 90%) of our epidemiological responses take place in the outskirt areas of the state. These areas are located far from the office (Oke-Aro for example spans about 48km), with bad road networks. The availability of a rugged ambulatory vehicle will ameliorate this.

Also, for us to function maximally, we need to put the newly supplied equipment to optimal use. Some major equipment are still needed to make them functional such as Gas cylinder and burner, Deep freezers, Fridge and stabilizers.

# MAKURDI OUTSTATION

**1. Functions/mandates of the Division**

- Disease surveillance/monitoring
- Vaccine sales/reconstitution/storage
- Farm visits
- Post mortem, sample collection, sample storage and transportation of samples
- Vaccination and supportive therapy

**2. Specific activities in 2022**

- Training with FAO on Laboratory Mapping tool.
- Submitting monthly reports.
- Monthly zoom meetings with the DDS and VIOs
- Working in collaboration with NCDC, WHO, Benue state Ministry of Health and the University Teaching Hospital to unravel the cause of an unknown disease outbreak in Makurdi associated with Guillain-Barre syndrome.
- Member of a Research group on a Grant from WAC-EID in collaboration with NVRI. So far, we have collected 600 blood samples and nasal swabseach from sheep, goats and pigs in Benue state. We have also set traps to capture 130 domestic and wild rats

and organs such as heart, lungs, liver, spleen, intestines, head, oral and rectal swaps have been taken for analysis.

- Member of a research grant group. PPR IN PIGS. Where about 150 serum samples were taken from pigs as well as sheep and goats staying together to establish the presence of PPR in pigs.

**2. Achievements**

- Collaborated with Benue state government, private veterinary clinics and veterinary practitioners in the state to promptly collect samples from sick animals, most especially pigs to assist in diagnosis and supportive therapy to minimize losses to farmers.
- Sold several vaccines to farmers inneighbouringNasarawa State.

**3. Challenges**

- Power disconnected byJEDC and the stand-by power-generating set is old.
- No functional laboratory and all equipments are obsolete and reagents expired.
- No water source and no functional toilet

**4. Research highlights**

- Developed a Ph.D. proposal titled Molecular Characterization and Risk Factors Associated with ASFV Infection of Pigs In Benue State. For study at J.S Tarka University, Makurdi, Benue State, Nigeria.

## OJI RIVER LABORATORY

**1. Functions /Mandate**

i. To provide surveillance and diagnosis of animal diseases.
ii. To conduct research into all aspects of animal diseases, their treatment and control.
iii. To train intermediate manpower in Veterinary Laboratory Technology and Animal Health and Production Technology.
iv. To provide extension services to poultry and livestock farmers.

**2. Notable activities in 2022**

i. The laboratory provided post mortem and extension services to farmers.
ii. The laboratory supplied farmers and our professional colleagues the under listed vaccines, see Table 1.

**Table 1**: Vaccines supplied to clients by the Laboratory in 2022

| S/No. | Type of vaccine | No. of vials requested | No. of vials supplied |
|---|---|---|---|

| | | | |
|---|---|---|---|
| 1. | Newcastle Disease Vaccine (Lasota) | 5800 | 3400 |
| 2. | Infections Bursal Disease Vaccine (Gumboro) | 3300 | 2600 |
| 3. | Fowl Typhoid Vaccine (FTV) | 240 | 200 |
| 4. | Fowl Pox Vaccine (FPV) | 1440 | 400 |
| 5. | Pestesdes Petit Ruminants (PPR) | 10 | 10 |
| 6. | Newcastle Disease Vaccine (Komarov) | 550 | 180 |
| 7. | Antirabies Vaccine (ARV) | 230 | 150 |
| | Total | 11570 | 6940 |

**3. Notable achievements**

We could not achieve much in other respect as a result of the accident I had in my home, as I was hospitalized for months.

**4. Major challenges**

i. Inability to meet up with the enormous vaccine demand by our clients. In the year under-review eleven thousand five hundred and seventy (11570) vials of different vaccines were requested and only six thousand, nine hundred and forty (6940) vials were supplied (see Table 1 above).

ii. Economic inflation and the ever increasing cost of Day old chicks, feed and equipment has forced many of our poultry clients out of production. Thus, affecting our services in the year 2022.

## PORT HARCOURT LABORATORY

FUNCTIONS/MANDATES OF DIAGNOSTICS SUB-DIVISION:

Our Laboratory is involved in Necropsy, Epidemiology, Bacteriology, clinical pathology, histopathology, Rabies diagnosis, among others. We contribute significantly to the Institute's role as a national and regional laboratory for Avian influenza and other transboundary animal diseases for West and Central Africa by conducting ambulatory services to farmers, diagnosis of emerging and re-emerging diseases and surveillance activities.

SPECIFIC (NOTABLE) ACTIVITIES IN THE YEAR 2022:

- Attended Workshop on Laboratory equipment and Instruments use.

- In collaboration with the Veterinary department of the Rivers State Ministry of Agriculture, a training of Veterinary doctors and other animal handlers on sample collection and processing was facilitated.

**Achievements**

1. Improved surveillance on transboundary diseases such as Avian influenza and African Swine fever (ASF).
2. More Veterinary doctors and animal handlers are aware of strict adherence to routine sample collection and processing.
3. Through public education, more pet owners now would want to vaccinate their pets against Rabies. Also, more farmers are open to discontinue the use of proliferated and unsafe avian influenza vaccines in the market.

**Challenges**

- Our outstation laboratory lacks the most basic laboratory equipment for a BSL1 laboratory such as functional microscope, reagents and other diagnostic tools.
- Security challenges within the premises of Rivers State Agricultural Development Programme (ADP), Rumuodomaya, where our office is located. There's continual theft of office fittings such as window louvre and plumbing pipes even after replacements.

**Research Highlights**

- Our contribution towards the research in African Swine fever vaccine development through some of the positive ASF samples we collected and submitted.
- We have also contributed towards One health approaches by working with Rivers State Ministry of Health in developing strategies towards Avian influenza prevention and control.

## SOKOTO LABORATORY

**Functions/Mandate of Sokoto Zonal Laboratory:**

1) The Laboratory supports veterinary disease diagnosis and surveillance.
2) It supplies all livestock and poultry vaccines from the headquarters to Sokoto State.
3) It serves as or offers extension services to livestock owners in the State.
4) It supports teaching and IT conduit to students from various Universities and institutions around Sokoto State.

5) To support NVRI Kebbi outstation Laboratory in disease diagnosis where and when necessary.

**Activities**

1) Staff attended various training ECTAD workshops in the Headquarters
2) Staff attended NVMA National Congress in Benin City, Edo State, 2022
3) 18 poultry postmortem diagnoses were made including Newcastle, Gumboro, Fowl pox, Fowl typhoid and Coccidial diseases**.**
4) Legal battle/litigation about intruding our lab, but at last the lab remains our property.

**Achievements**

Our Zonal Laboratory has been and still under major renovations including the Staff quarters'

NVRI Zonal Laboratory left view under renovations

NVRI Zonal Laboratory right view under renovations

NVRI Zonal Lab Sokoto Staff Quarters reconstructed.

NVRI Zonal Lab gate interior (with gateman room and toilet) newly constructed

Part of the achievement, we realized over N150,000 revenue in the year, 2022

**Challenges:**

Our two major challenges are lack of furniture and laboratory equipment in the lab. Also, there are only 2 veterinarians in the lab and recently laboratory technologist posted in March, 2022. We need more technical staff especially that the second veterinarian is on study leave.

**Research Highlight:**

Two research work have been conducted awaiting publications

1. A questionnaire survey for the assessment of the awareness of livestock owners on veterinary clinical practices and livestock production in Sokoto, Nigeria …Garba et al, 2023

2. Assessment of common diseases of sheep and goats in Sokoto (2016 – 2018), Nigeria….Garba et al, 2023

**Future Plan:** Our lab has a vast land, part of the future plans are that after having furniture and laboratory equipment. We propose to have a partnership with a private firm to have a Veterinary Clinic attached to our laboratory which will certainly boost our presence and services to the state residents. We further propose to have demonstration poultry house to be built in the laboratory space where broilers and quails can be raised regularly and sold to generate revenue for the lab.

# UMUDIKE LABORATORY

## Activities

1. Distributed and sold vaccines produced by NVRI
2. Diagnosed and treated animal diseases in our laboratory and used our technical know-how respectively.
3. Offered veterinary services to poultry and livestock farmers.
4. Enlightenment of farmers, veterinarians, pet owners and the general public on the efficacy and use of NVRI vaccines and products.
5. Offered professional advice on animal disease control.
6. We obtained feedbacks from farmers on our biological and services.

## Achievements

1. Surveillance on poultry diseases in Abia state was carried out anddiscovered an outbreak of Avain influenza in Aba. Relevant samples were collected from a farm, sent to the headquarters for confirmation. It was confirmed to be H5N1.
2. Monkeypox training and sensitization was successfully carried out in Abia state.
3. In conjunction with the ministry of agriculture and REDISSE we carried out mass anti-rabies vaccination in Abia state.
4. Offered extension services to several farms.
5. Sensitized, sold and vaccinated NVRI vaccines as a result, these vaccines were on high demand after the vaccination exercise in Abia state.
6. Diagnosed and treated many animal diseases.
7. Distributed and sold vaccines produced by NVRI
8. Diagnosed and treated animal diseases in our laboratory and used our technical know-how respectively.
9. Offered veterinary services to poultry and livestock farmers.
10. Enlightenment of farmers, veterinarians, pet owners and the general public on the efficacy and use of NVRI vaccines and products.
11. Offered professional advice on animal disease control.
12. We obtained feedbacks from farmers on our biological and services.
13. Surveillance on poultry diseases in Abia state was carried out and discovered an outbreak of Avain influenza in Aba. Relevant samples were collected from a farm, sent to the headquarters for confirmation. It was confirmed to be H5N1.
14. Monkeypox training and sensitization was successfully carried out in Abia state.
15. In conjunction with the ministry of agriculture and REDISSE we carried out mass anti-rabies vaccination in Abia state.
16. Offered extension services to several farms.
17. Sensitized, sold and vaccinated NVRI vaccines as a result, these vaccines were on high demand after the vaccination exercise in Abia state.
18. Diagnosed and treated many animal diseases.

19. Surveillance on poultry diseases in Abia state was carried out and discovered an outbreak of Avian influenza in Aba. Relevant samples were collected from a farm, sent to the headquarters for confirmation. It was confirmed to be H5N1.
20. Monkey pox training and sensitization was successfully carried out in Abia state.
21. In conjunction with the ministry of agriculture and REDISSE we carried out mass anti-rabies vaccination in Abia state.
22. Offered extension services to several farms.
23. Sensitized, sold and vaccinated NVRI vaccines as a result, these vaccines were on high demand after the vaccination exercise in Abia state.
24. Diagnosed and treated many animal diseases.

**Challenges**

1. Lack of stable electricity supply
2. In need of casual staff
3. An upgrade of our Laboratory with a Real-time Polymerase Chain Reaction (qPCR) machine and reagents
4. Renovation of our laboratory building.
5. Lack of stable electricity supply
6. In need of casual staff
7. An upgrade of our Laboratory with a Real-time Polymerase Chain Reaction (qPCR) machine and reagents
8. Renovation of our laboratory building.

**Future plan**

i. To have a Real-time Polymerase Chain Reaction (qPCR) machine and the reagents in the Laboratory for more sensitive and specific diagnosis of veterinary diseases within the shortest possible time.
ii. Offer more vaccines to farmers and to sensitized extension workers.
iii. A need for a technical staff
iv. To have a Real-time Polymerase Chain Reaction (qPCR) machine and the reagents in the Laboratory for more sensitive and specific diagnosis of veterinary diseases within the shortest possible time.
v. Offer more vaccines to farmersand to sensitized extension workers.
vi. A need for a technical staff.

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**Conference papers and posters:**

1. Adedeji, A.J., Dogonyaro B.B., Nanven M.A., Tunde, Waziri I. Ganih J., Luka H., Pewan S. and Luka P. (2022). First report of molecular detection of Bovine Papular Stomatitis virus in an organized cattle ranch in Nigeria. Book of abstract 57th Nigeria Veterinary Medical Association Congress, Oyo 20202.

2. Adedeji A., M. Rawlins, S. Ijoma, R. Atai, B. Dogonyaro, J. Adole, M. Nanven, O. Osemeke, I. Waziri, Y. Atuman, N. Lyons, P. Beard, K. Stevens, P. Alarcon, G. Limon. Factors and impact associated with sheeppox and goatpox seroprevalence, identification of high-risk areas and economic viability of vaccination in northern Nigeria (2022). The International Symposium of Veterinary Epidemiology and Economics, August 7 - 12, 2022 at the Halifax, NS, Canada.

3. Idahor K.O., Sati N.M., Emennaa P.E., Fatai R.B., Yakubu A. and Abari M.A 2022. Comparison of one-hen and two-hen brooding strategies among Nigerian indigenous hens in natural incubation. Proc. 11th ASAN-NIAS Joint Annual Meeting & 27th ASAN Ann. Conf. Bauchi 2022, Pp 96 – 101.

4. Idahor, K.O., Emennaa P.E. and Sati N.M. 2022. Effects of boiling, refrigeration, drying and storage on nutritional compositions, bacterial and fungal loads of fowl eggs (PEM-002). National Conference on Native Chicken: relevance of climate smart traditional farming systems in the era of Omics, Madras Veterinary College Chennai, Tamil Nadu, India, Pp 247 – 248.

5. Ismaila Shittu, Bitrus Inuwa, Jolly A. Amoche, Paul Abdu, Adeyinka J. Adedeji. First report of avian gyrovirus – 2 from a diseased chicken. Nigeria. First Africa meeting of World Veterinary Poultry Association held in Marrakech, Morocco, from June 23th to 25th, 2022.

6. Obishakin Emmanuel T., Meseko Clement A., Shittu Ismail., Audu Benshak J., Olaolu Olushola, Mark Samson, ThankGod Daniel G., Dogari Darius, Shuaibu Hafsat J., Israel Barde. Direct PCR detection of Mycobacterium bovis and other Mycobacterium tuberculosis complex DNA in suspected bovine lung tissue samples from four states in Nigeria. NVMA Oyo 2022

7. Shuaibu Hafsat J, Mark Samson, Peter Garba J., Bwala Falmata, Yakubu Rebecca A., Olaolu Olushola, Audu Benshak J., ThankGod Daniel G., Adebiyi Odunola, Dogari Darius D, Chima Nneka, Okoye Onyedikachi M, Nyango Patrick G, Nanfa Dindam, Owolodun Olajide, Luka Pam, Obishakin Emmanuel T. Molecular detection of Anaplasma and Ehrlichia species in Dogs from Jos south slaughter slab, Plateau state, Nigeria. NVMA Oyo 2022

8. Tekki I.S., Maurice N.V., Ladan, S., Kabatiyok D., Kwada A. C., Aliyu M., Oyetunde S., Abali I., Davou J.A., Hambolu S.E., Konzing L., Vandi B., Bature Y.,Adedeji J.A., Obishakin E., Saleh M. Meseko C. and Muhammad M.Rabies Virus Antigen in Free-Roaming Cats in a North Eastern State, Nigeria: Implications on Urban Rabies Control and One Health Concept.An Oral presentation at the 48th annual conference of the Nigeria Veterinary Medical Association held from October 24-28, 2022 at the International Conference Centre, University of Ibadan.