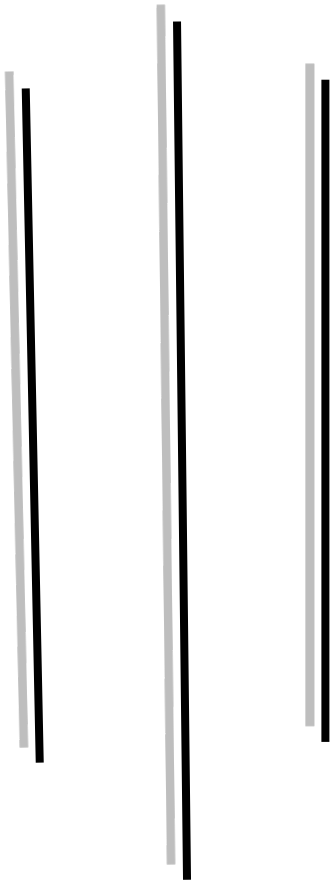
ANNUAL TECHNICAL REPORT
FISCAL YEAR 2080/081 (2023/24)

Government of Nepal
Ministry of Agriculture and Livestock Development
Department of Livestock Services
Central Veterinary Laboratory
Tripureshwor, Kathmandu
+977-1-5312143, 5361938
cvlgov01@gmail.com www.cvl.gov.np

Annual Technical Report

Fiscal year 2080/81 (2023/24)



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Phone: +977-1-5312143, 5361938
Email: cvlgov01@gmail.com, Website: www.cvl.gov.np

Foreword

It is my pleasure to present to you the Annual Bulletin of the Central Veterinary Laboratory (CVL) for the fiscal year 2080/81 (2023/24). This technical bulletin highlights our activities, accomplishments, and overall progress in disease diagnosis and providing information on status of different animal disease control program thus contributing for the improvement of animal health in the country.

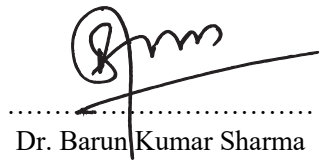
The Central Veterinary Laboratory (CVL) serves as referral veterinary diagnostic center in the country. It plays a vital role in diagnosing animal diseases, investigating outbreaks, and ensuring the safety of animals and animal products. CVL employs advanced diagnostic methods, including conventional and real time-based Polymerase Chain Reaction (PCR), Enzyme-Linked Immunosorbent Assay (ELISA), and Fluorescent Antibody Tests (FAT) to facilitate routine diagnosis of major economic and zoonotic diseases such as Avian Influenza (AI), Newcastle Disease (ND), Infectious Bursal Disease (IBD), African Swine Fever (ASF), Lumpy Skin Disease (LSD), and Peste des Petits Ruminants (PPR) etc.

The bacteriology unit at CVL conducts regular testing of clinical samples and also function as the national referral site for Antimicrobial Resistance (AMR) surveillance program, collaborating with other veterinary laboratories and the National Avian Disease Diagnosis Laboratory in Chitwan.

The public health section of CVL monitors meat market for the improvement of butchering and meat sale in coordination with local and provincial government institutes. The unit also conducts antibiotic residue test in meat and milk using ELISA to ensure food safety.

We are focused on upgrading the Central Veterinary Laboratory (CVL), veterinary laboratories and the National Avian Disease Diagnosis Laboratory (NADIL) to provide reliable, prompt and standardized diagnostic services nationwide. CVL maintains strong coordination and conducts regular training program with veterinary laboratories, provincial veterinary offices, and local units to ensure quality sample flow for advanced diagnosis, reinforcing CVL's role as the National Reference Laboratory for animal health.

I sincerely thank the Food and Agriculture Organization (FAO), the Australian Centre for Disease Preparedness (ACDP), and the International Atomic Energy Agency (IAEA) for collaboration and continuous support to upgrade and strengthen the quality of diagnostic services of the CVL. I am also grateful to FHI 360 (Fleming Fund) for their contribution on AMR surveillance capacity building. Finally, I appreciate the hard work of all the staffs working in laboratory system for their tireless efforts in performing the test and coming with results. Special thanks to veterinary officers at CVL for bringing the final report in this format. We anticipate feedback from the readers which will help us to improve our work.



Dr. Barun Kumar Sharma
Chief Veterinary Officer
Central Veterinary Laboratory

Abbreviations

AI	Avian Influenza
ALC	Avian Leucosis Complex
AMR	Anti-Microbial Resistance
ASF	African Swine Fever
AST	Antibiotic Sensitivity Test
BSE	Bovine Spongiform Encephalopathy
BVD	Bovine Viral Diarrhoea
CFT	Complement Fixation Test
CRVH	Central Referral Veterinary Hospital
CMT	California Mastitis Test
CS	Cloacal swab
CSF	Classical Swine Fever
CVL	Central Veterinary Laboratory
DLS	Department of Livestock Services
ELISA	Enzyme Linked Immunosorbent Assay
EPG	Egg per Gram
EQA	External Quality Assurance
ES	Environmental swab
ESBL	Extended Spectrum Beta Lactamase
FAO	Food and Agriculture Organization.
FAT	Fluorescent Antibody Test
FMD	Foot and Mouth Disease
GLP	Good Laboratory Practice
HA	Haemagglutination
HI	Haemagglutination Inhibition
HPAI	Highly Pathogenic Avian Influenza
IAEA	International Atomic Energy Agency
IB	Infectious Bronchitis
ILT	Infectious Laryngotracheitis
IBD	Infectious Bursal Disease
LFA	Lateral Flow Assay
LSD	Lumpy Skin Dsease
MoALD	Ministry of Agriculture and Livestock Development
NADIL	National Avian Disease Investigation Laboratory
NEQA	National External Quality Assurance

ND	New Castle Disease
NPHL	National Public Health Laboratory
NS	Nasal swab
PAT	Plate Agglutination Test
PPR	Peste des petits Ruminants
PM	Post Mortem
PT	Proficiency Testing
rRT PCR	Real Time Reverse Transcriptase Polymerase Chain Reaction
RBPT	Rose Bengal Plate Test
RDT	Rapid Diagnostic Test
SOP	Standard Operating Procedure
SPS	Sanitary and Phyto Sanitary Standard
TS	Tracheal swab
UTI	Urinary Tract Infection
VHLSEC	Veterinary Hospital and Livestock Service Expert Center
VLs	Veterinary Laboratories
WOAH	World Organization for Animal Health
WTO	World Trade Organization

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CHAPTER I: INTRODUCTION

1. Background

Central Veterinary Laboratory (CVL), referral laboratory in animal health sector in Nepal, focuses program with the objective of securing healthy national herd of livestock throughout the nation by mitigating the occurrence of diseases of livestock and poultry. CVL and the laboratory functioning under it works on epidemic investigation as well as surveillance and investigation on various diseases. The direct benefit of the performance of various laboratories has been experienced in the field of veterinary medical care based on valid laboratory test results. To achieve these multidimensional activities, CVL works with a series of laboratory test procedures through its various laboratory sections; Pathology, Parasitology, Microbiology, Serology, Laboratory management and teaching laboratory and Molecular Biology with a considerable progress in the later.

CVL has Standard Operating Procedures (SOPs), test protocols and quality guideline manual. CVL is gradually practicing the biosafety/ biosecurity measures so that Good Laboratory Practice is followed in all diagnostic laboratories. CVL is working to build knowledge and skills of biosafety and biosecurity to lab staff of all laboratories in animal health sector. CVL has already been participating in proficiency testing program with WOAH reference laboratories and has been adopting test verification system through international reference laboratories which will support to achieve different test for accreditation for international certification in future.

To provide diagnostic facilities throughout the country, CVL works through its five Veterinary Laboratories (VLs) located in different provinces of the nation; Veterinary Laboratory Biratnagar, Veterinary Laboratory Janakpur, Veterinary Laboratory Pokhara, Veterinary Laboratory Surkhet and Veterinary Laboratory Dhangadhi. Diagnostic services are provided throughout the country in collaboration with provincial veterinary hospital, local veterinary unit. Specimens that cannot be processed in the aforementioned laboratories or needed to be further tested for confirmation are referred to the CVL. Provincial, veterinary hospital and veterinary units of local level also send samples to the CVL in coordination with Veterinary Diagnostic Laboratories for confirmatory diagnosis.

CVL has been actively involved in developing laboratory capacity of provincial laboratory capacity of provincial and local level veterinary units. In this CVL is supporting with laboratory placement of newly recruited staff and also bridging through on site mentoring to build capacity at local level. This has also contributed to build functional network among different tiers which has supported in sample collection and dispatch.

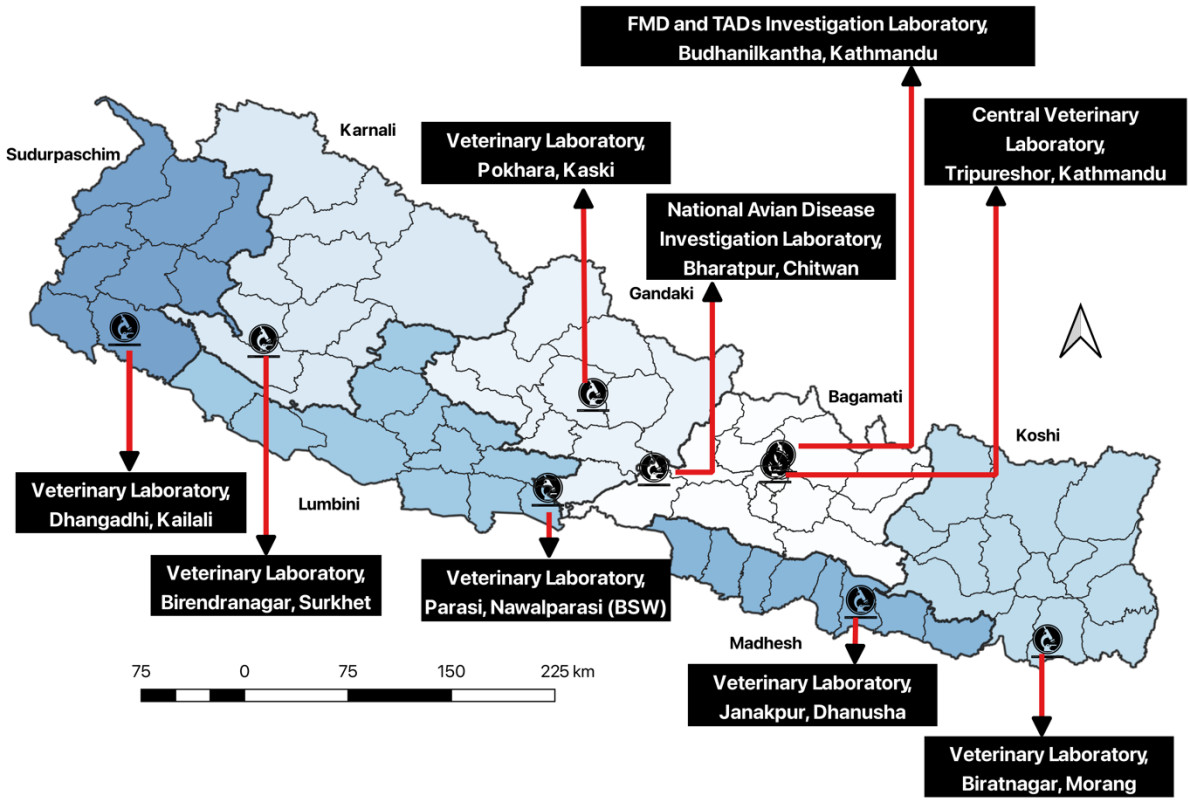


Figure 1: Map showing veterinary laboratories in Nepal.

2. Objectives

The role of the veterinary laboratory system has become dynamic with the advent of public health, food safety issues, economic liberalization and trade globalization. Nepal joined World Trade Organization (WTO) as a member in 2004. Therefore, Nepal follows the guidelines provided by the World Organization for Animal Health (WOAH) for the provision of Sanitary and Phytosanitary (SPS) agreement under WTO that seeks scientific procedures and evidence in the course of disease diagnosis as well as production chain. The roles of veterinary diagnostic laboratories are now therefore expanded and challenging in the new context. Moreover, CVL works with the following objectives in the country.

- Provide laboratory diagnostic services for animal health and veterinary public health.
- Conduct disease surveillance and monitoring programs.
- Ensure the quality and reliability of diagnostic tests and laboratory procedures by adhering to national and international standards and guidelines.
- Conduct epidemiological investigations to understand disease patterns, causes, and effects, and to control their spread and impact.
- Collaborate with national and international reference laboratories and institutions on laboratory diagnosis.
- Acquire, adopt, upgrade, and share diagnostic methods for livestock and poultry diseases to the laboratories working under CVL.
- Recommend animal health policies and disease control programs to the Department of Livestock Services (DLS) for effective disease control.
- Provide training in laboratory diagnostics for veterinarians and veterinary paraprofessionals.
- Provide technical support to strengthen veterinary laboratories at the three-tier government.
- To achieve the aforementioned objectives, there is a series of approved annual activities carried out by different laboratory sections of the CVL and five VLs.

3. Organization Structure:

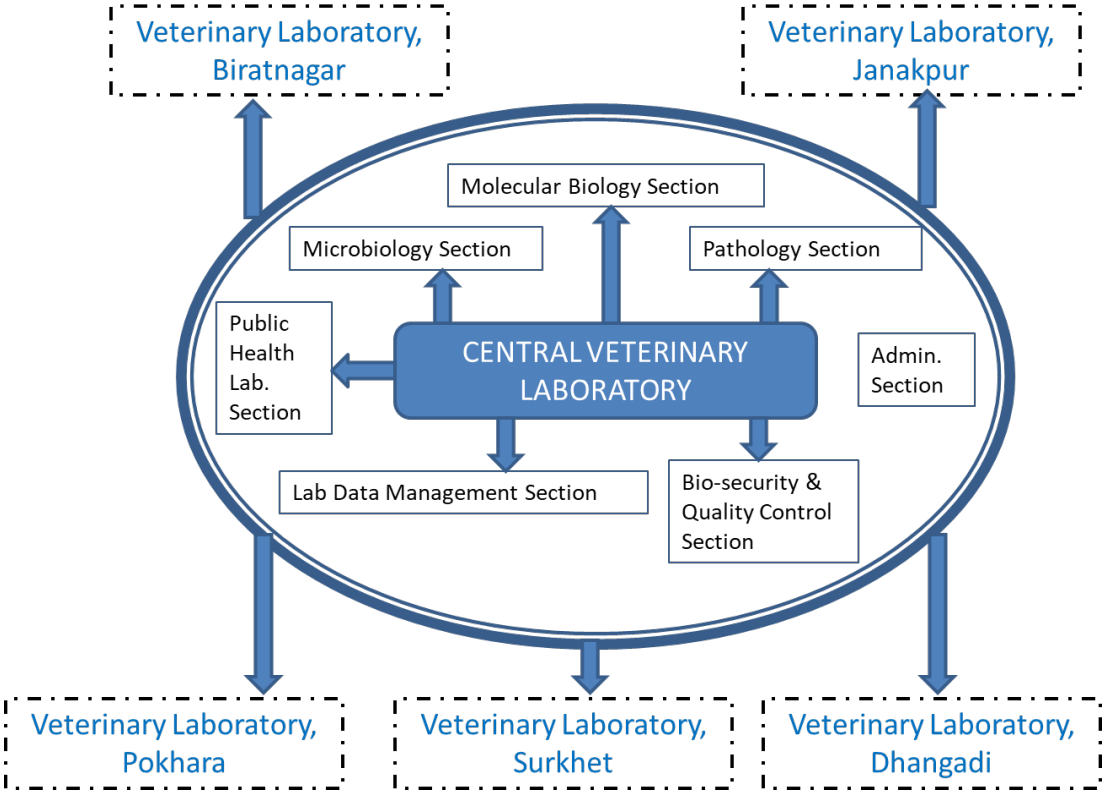


Figure 2: Organizational structure of CVL

4. Human resources

There are total of 39 permanent positions in CVL, which is led by the Chief Veterinary Officer. Under the Chief Veterinary Officer, there are four Senior Veterinary Officers, twelve Veterinary Officers, eight Animal Health Technicians and four Junior Animal Health Technicians. In the administration part, there is one accountant, one non-gazetted first class, two drivers and six office assistants. The details of staff at CVL are given in Table 1.

Table 1: List of Staffs working at CVL (F/Y 2080/81)

S.N.	Name	Position	Total Number	Fulfilled
1	Dr. Sharmila Chapagain Kafle Dr. Barun Kumar Sharma	Chief Veterinary Officer	1	1
2	Dr. Pragya Koirala	Senior Veterinary Officer	4	4
3	Dr. Sita Rijal			
4	Dr. Ram Chandra Sapkota			
5	Dr. Tulsi Ram Gompo			
6	Mr. Purna Bahadur Budha	Veterinary Officer	12	12
7	Mr. Prakash Devkota			
8	Mr. Bal Bahadur Kunwar			
9	Mr. Tek Bahadur Air			
10	Mr. Dhan Raj Rai			
11	Dr. Manju Maharjan			
12	Dr. Chanda Shrestha			

S.N.	Name	Position	Total Number	Fulfilled
13	Dr. Nabaraj Shrestha			
14	Dr. Luna Gongal			
15	Dr. Suraj Subedi			
17	Dr. Bikesh Kumar Raut			
19	Dr. Binita Tamang			
21	Dr. Rubina Shah			
22	Dr. L B Sahi			
23	Ms. Sushma Pokherel	Nayab Subba	1	1
24	Mr. Shiva Raj Khadka	Accountant	1	1
25	Mr. Hari Lal Kandel	Animal Health Technician	8	8
26	Ms. Rita Dahal			
27	Mr. Krishna Mani Kafle			
28	Mr. Sudip Kafle			
29	Ms. Sunita Adhikari			
30	Ms. Mina Kumari Tamang			
31	Ms. Bimala K.C			
33	Mr. Rikesh Yadav	Asst. Animal Health Technician	4	3
34	Mr. Deepak Ghimire			
26	Ms. Anita Shrestha			
27	Mr. Jeevan Rai	Computer Operator (Contract)	1	1
29	Mr. Kumar Nagarkoti	Driver	2	1
30	Mr. Dipesh Rana Magar			
31	Mr. Krishna Khadaka			
32	Ms. Devaki Rimal	Office Assistant	6	4
33	Ms. Yam Kumari Rai			
34	Ms. Bhima Acharya			
35	Mr. Chandra Bahadur Rana Magar			
36	Ms. Laxmi Adhikari			
37	Mr. Surendra Shrestha			
38	Mr. Kesav Pokharel			
Total			**39**	**35**

CHAPTER II: ANNUAL PROGRESS

5. Annual progress

The detail of the annual program and progress of CVL for FY 2080-81 is given in table below.

Table 1: Annual program and progress report of CVL in the Fiscal Year 2080-81

S.N.	Activities	Unit	Target	Progress
1	**Parasitology**			
1.1	EPG counts of parasites	Number	400	1386
1.2	Skin scrapping examination	Number	50	58
1.3	Larvae culture of parasite	Number	40	40
2	**Pathology**			
2.1	Clinical hematological examination	Number	1000	1501
2.2	Bio-Chemical examination	Number	600	1862
2.3	Post-Mortem Examination	Number	2400	3881
2.4	Histopathological examination	Number	40	77
2.5	Test Protocol for Histopathological examination	Times	1	1
2.6	Preparation of SOP for Post-Mortem of Small ruminants and Poultry	Times	1	1
3	**Microbiology**			
3.1	**Bacteriology**			
3.1.1	Isolation and Identification of Bacteria	Number	800	1648
3.1.2	Sample collection, Isolation and Identification of Fungus	Number	40	40
3.1.3	Participation in EQA, NEQA and dispatch of sample to Veterinary Laboratories and report compilation	Times	4	4
3.2	**Virology**			
3.2.1	Rabies test	Number	60	300
3.2.2	Investigation of PPR outbreak	Times	4	0
3.2.3	PPR Diagnosis by Pen-side Test	Number	80	210
4	**Serology**			
4.1	Sero-monitoring of PPR (National PPR Disease Control Program)	Number	6000	6607
4.2	Poultry sample collection and examination for salmonella and Mycoplasma	Times	8	8
4.3	Screening of cattle and buffalo disease in government and private farm. *M. bovis*, CCHF, CBPP, blood parasites	Number	400	1249
4.4	Screening of goat disease in government and private farm (CCPP, Brucellosis etc.)	Number	400	2539
4.5	Testing of Salmonella and Mycoplasma (ELISA)	Number	200	272
5	**Molecular unit**			

S.N.	Activities	Unit	Target	Progress
5.1	Molecular Diagnostic examination for Bird-Flu	Number	400	426
5.2	Molecular diagnosis (LSD, Anthrax etc.)	Number	100	432
5.3	Molecular diagnosis (Salmonella, PRRS, Erysepalas etc)	Number	100	199
5.4	Molecular diagnosis (PPR, CCPP, Pasturella etc)	Number	100	577
5.5	Diagnosis of Glanders in Horse and Mules	Number	40	127
5.6	Dispatch of sample to international reference laboratories	Times	2	2
6	**Disease surveillance and investigation**			
6.1	Emergency disease investigation team (EDIT) deploying	Times	12	12
6.2	Surveillance of poultry disease (AI, ILT etc.)	Number	400	437
6.3	Avian Influenza Surveillance	Number	800	823
6.4	AMR surveillance in Poultry	Number	80	80
7	**Zoonotic disease Investigation**			
7.1	Sample collection and examination for Brucella	Number	160	571
7.2	Surveillance of zoonotic diseases (Toxoplasmosis, Leptospirosis etc.)	Number	400	1231
8	**Staff development**			
8.1	Laboratory Technology Transfer	Times	6	6
9	**Public Health Program**			
9.1	Veterinary Drug Residue Testing	Number	800	801
9.2	Hormones detection in milk and meat	Number	150	150
10	**Laboratory Monitoring**			
10.1	Monitoring and inspection of veterinary laboratories at provincial and local level	Times	8	8
10.2	Monitoring managemental aspects of Veterinary Laboratories	Times	8	8
11	**Publications**			
11.1	Publication of annual technical bulletin	Times	1	1
11.2	Standard Operating Procedure preparation	Times	1	1
12	**Laboratory Management**			
12.1	Health examination of staffs	Person	39	37
12.2	LIMS Management	Times	12	12
12.3	Teaching lab management	Times	12	12
12.4	Management of Serum Bank	Times	12	12

CHAPTER III LABORATORY SERVICES

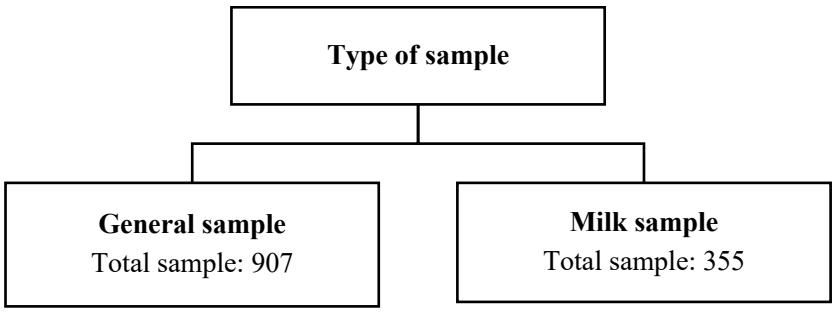
6. Microbiology section

The Microbiology section consists of two units, viz. Bacteriology and Mycology unit and Virology unit.

6.1 Bacteriology and mycology unit

6.1.1 Type of samples

In the fiscal year 2080/81, bacteriology unit received 1262 samples from various sources such as farms, central veterinary referral hospitals, private clinics, veterinary laboratories, veterinary hospitals, and livestock service expert centers, and directly from the field-collected during the periodic sampling. The samples received were of two types:



The general samples include urine, blood, nasal swabs, ear swabs, skin scrapping of animals, tissues of animals collected during postmortem examination, water and animal feed and environment samples. And, milk samples include milk from cattle (subclinical/clinical mastitis) Similarly, milk samples are also brought by farmers for testing when they found animals sick mostly for dairy animals. Most of the environment samples included water from different farms and some swab samples from farm premises.

6.1.2 Types of isolates

Out of the total 907 general samples, 667 (73.53%) had bacterial growth. Out of 354 milk samples, 339 (95.49%) had bacterial growth on culture. Among the general samples, 15 different types of isolates were identified by cultural characteristics, Gram's staining, and biochemical tests. Also, a few of the bacteria were identified via MALDI TOF, VITEK and BD PHOENIX. Similarly, among milk samples, 15 different types of bacteria and moulds were identified. The description of various bacteria isolated in the general sample and the milk sample is shown in the tables below.

Table 1: Organisms isolated from general samples

S.N.	Organism	Nos.
1	*Escherichia coli*	517
2	*Staphylococcus*	23
3	*Citrobacter spp*	22
4	*Klebsiella spp*	22
5	*Salmonella spp*	20
6	*Pseudomonas*	12
7	*Enterobacter spp*	3
8	*Bacillus spp.*	6
9	*Pasturella spp.*	5
10	*Yersinia spp.*	4
11	*Streptococcus spp.*	4

Table 2: Organisms isolated from milk samples.

S.N.	Organism	Nos.
1	*Klebsiella spp.*	89
2	*Escherichia coli*	63
3	*Staphylococcus spp.*	61
4	*Enterococcus spp.*	33
5	*Pseudomonas spp*	24
6	*Streptococcus spp.*	18
7	*Citrobacter.*	15
8	*Enterobacter*	10
9	*Bacillus spp.*	10
10	*Proteus spp.*	8
11	*Candida spp.*	3

S.N.	Organism	Nos.
12	*Enterococcus spp.*	4
14	*Proteus spp.*	7
16	*Serratia spp.*	2
17	*Providencia spp.*	1
18	*Acinetobacter spp.*	1
19	*Morganella spp*	1
	Total	**667**
	No growth	240
	Total	**907**

S.N.	Organism	Nos.
12	*Pasturella spp.*	2
13	*Acinetobacter spp.*	1
14	*Yeast*	1
15	*Serratia spp*	1
	Total	**339**
	No growth	16
	Total	**355**

Table 3: Month-wise bacterial species isolated from general samples submitted to CVL.

Organism	Shrawan	Bhadra	Ashoj	Kartik	Mangsir	Poush	Magh	Falgun	Chaitra	Baishakh	Jesth	Ashar	Total
Escherchia coli	33		19	25	34	44	40	59	47	66	76	74	517
Staphylococcus	4		2	1		2	2					12	23
Citrobacter spp	2	1	3		3	3	2		2	3	2	1	22
Klebsiella spp	3	1			2	2	2			1	5	6	22
Salmonella spp		2	3	6	3	1	2			1		2	20
Pseudomonas		1	1			2	2		1		3	2	12
Enterobacter spp	1	1	1										3
Bacillus spp.	2	1		1								2	6
Pasturella spp.	1		1								1	2	5
Yersinia spp.		1		1			1					1	4
Streptococcus spp.				1	2						1		4
Enterococcus spp.		2		2									4
Proteus spp.	1		4				1				1		7
Serratia spp.				1							1		2
Providencia spp.				1									1
Shigella			1	3				1	1		2		8
Aeromonas spp											1		1
Morganella spp						1							1
Acinetobacter spp.											1		1
Penicillium spp.							4						4
Total													**667**

Table 4: Month wise bacterial species isolated from milk samples submitted to CVL.

Organism	No. of isolates												
	Shrawan	Bhadra	Ashoj	Kartik	Mangsir	Poush	Magh	Falgun	Chaitra	Baishakh	Jesth	Ashar	Total
Klebsiella spp.	20	12	16	2	2	4	3	2	4	5	3	16	89
Escherchia coli	12	6	7	3	2	7	2	3	4	4	4	9	63
Staphylococcus spp.	2	5	11	5	2	3	6	6	5	5	4	7	61
Enterococcus spp.	4	3		3	1	6	7	3	1	2	1	2	33

Organism	No. of isolates												
	Shrawan	Bhadra	Ashoj	Kartik	Mangsir	Poush	Magh	Falgun	Chaitra	Baishakh	Jesth	Ashar	Total
Pseudomonas spp	3	4	2		1			5	1	1	7		24
Streptococcus spp.	1	1		5		3	1	2	2		1	3	18
Citrobacter.		5				2		1	1		1	5	15
Enterobacter	1	1	1		1	2	2				1	1	10
Bacillus spp.	1	2	1	1	2	2				1			10
Proteus spp.	2	1				1			1	2		1	8
Candida spp.		2									1		3
Pasturella spp.	1		1										2
Acinetobacter spp.												1	1
Yeast	1												1
Serratia spp						1							1
Total	**48**	**42**	**39**	**19**	**11**	**31**	**21**	**22**	**19**	**20**	**23**	**45**	**339**

6.1.3 Antimicrobial Susceptibility Testing

All the bacterial isolates from the culture were routinely tested for their antimicrobial susceptibility by disc diffusion methods. The antibiotics against each isolate were matched according to Clinical and Laboratory Standards Institute (CLSI) guidelines, 2024.

6.1.3.1 General sample

All the isolated bacteria were tested for antimicrobial sensitivity. Commercially available antimicrobials such as Gentamycin, Ciprofloxacin, Tetracycline, Amikacin, Amoxycillin, Ceftriaxone, Cefoxitin, Chloramphenicol, Sulphonamide and Trimethoprim, Penicillin G, Imipenem, etc. Details of the five major bacteria, *E. coli, Salmonella, Enterococcus, Moraxella* and *Klebsiella* are presented in the table and figure below.

Table 5: AST result on *Escherichia coli.*

Drugs	I	R	S
GM	4.5%	59%	36.5%
CIP	4.9%	92.3%	2.8%
T	0%	97.12%	2.88%
C	0.41%	65.18%	34.41%
AMX	0%	50%	50%
CRO	0%	5.88%	94.12%
FFC	0.8%	55.8%	43.4%
TS	0%	50%	50%
AP	2.4%	75.1%	22.4%

Table 6: AST result on *Salmonella spp.*

Drugs	I	R	S
GM	0%	33.3%	66.7%
CIP	16.7%	66.7%	16.7%
T	0%	11.11%	88.89%
C	0%	11.11%	88.89%
CRO	0%	0%	100%
FFC	0%	75%	25%
AP	0%	15.4%	84.6%

Table 7: AST result on *Klebsiella spp.*

Drugs	I	R	S
GM	9.1%	45.45%	45.45%
CIP	7.1%	92.9%	0%
T	0%	80%	20%

Drugs	I	R	S
AK	0%	33.33%	66.66%
FFC	0%	20%	80%
C	0%	33.33%	66.66%

Note: I=Intermediate, R=Resistant, S=Sensitive, GM=Gentamycin, CIP=Ciprofloxacin, T=Tetracycline, AK=Amikacin, AMX=Amoxycillin, CRO= Ceftriaxone, FOX= Cefoxitin, C= Chloramphenicol, TS= Sulphanomaide and Trimethroprim, PG=Penicillin G, IMI=Imipenem, FFC= Florphenicol, NA = Not applicable.

6.1.3.2 Milk sample

366 milk samples had bacterial growth, which were subsequently subjected to an antibiotic sensitivity test with different antibiotic panels. The detailed description of five major bacteria, *E. coli, Staphylococcus, Streptococcus, Moraxella* and *Klebsiella* is shown in the table below.

Table 8: AST result on *Escherchia coli*.

Drugs	I	R	S
GM	6.8%	25%	68.2%
CIP	11.7%	48.3%	40%
T	0%	29.4%	70.6%
AP	13.6%	47%	39.4%
C	16.4%	18.2%	65.5%
CRO	21.6%	24.3%	54.1%
FOX	0%	45.5%	54.5%

Table 9: AST result on *staphylococcus spp.*

Drugs	I	R	S
GM	0%	17.8%	82.2%
CIP	20.4%	29.6%	50%
T	0%	21.4%	78.6%
AP	11.8%	17.6%	70.6%
FOX	8.2%	32.7%	59.2%
C	12%	20%	68%

Table 10: AST result on *Streptococcus spp.*

Drugs	I	R	S
GM	0%	37.5%	62.5%
CIP	11.76%	52.94%	35.3%
T	0%	40%	60%
AP	5.5%	18.18%	76.32%
CRO	0%	50%	50%
FOX	0%	53.33%	46.67%
C	13.33%	13.33%	73.34%

Table 11: AST result on *Klebsiella spp.*

Drugs	I	R	S
GM	6.9%	31%	62.1%
CIP	29.9%	37.9%	32.2%
T	6.3%	37.5%	56.3%
AK	20.68%	27.58%	51.74%
CRO	5.9%	21.6%	72.5%
C	1.3%	15.2%	83.5%
FOX	10%	33.39%	56.61%

Note: I=Intermediate, R=Resistant, S=Sensitive, GM=Gentamycin, CIP=Ciprofloxacin, T=Tetracycline, AK=Amikacin, AMX=Amoxycillin, CRO= Ceftriaxone, FOX= Cefoxitin, C= Chloramphenicol, TS=Sulphanomaide and Trimethroprim, PG=Penicillin G, IMI=Imipenem, FFC= Florphenicol, NA = Not applicable.

6.1.4 Antimicrobial Resistance Surveillance

Antimicrobial resistance (AMR) has emerged as one of the major global challenges in both animal and public health. CVL is the national reference laboratory for the AMR surveillance from Animal Health sector. Being a national referral laboratory CVL works in close collaboration with National Public Health Laboratory (NPHL) which is the national referral center for AMR surveillance in Nepal. For the quality assurance of the works conducted in microbiology unit, CVL participates in National External Quality Assessment (NEQA), and quarterly receives unknown bacterial strains from NPHL for isolation, identification, and antimicrobial susceptibility test reporting. Along with this, CVL also participates in EQA with Mahidol University, Thailand and Chulalongkorn University, Thailand, in collaboration with Denmark Technical University (DTU) quarterly. CVL also conducts NEQA in animal health sector. Samples are sent to the Department of Food Technology and Quality Control laboratory, NADIL and peripheral veterinary laboratories within the country.

In recent years, the Fleming Fund Country Grant in Nepal (FFCGN) and FAO has supported CVL in capacity building through human resources training, infrastructure development. These agencies have also supported

in the document preparation including surveillance plans and guidelines. As a part of Flemming fund support, CVL has initiated a program for active AMR surveillance program in poultry fecal and cecal samples since 2020. The main targeted bacteria for the surveillance are *E. coli, Salmonella, Enterococcus,* and *Campylobacter* spp. CVL is leading the active surveillance activity, and three veterinary laboratories of Biratnagar, Pokhara, and the NADIL, Chitwan, are participating in this program.

In addition, the microbiology unit of CVL had participated in the WHO tricycle project on Extended Spectrum *E. coli* (ESBL)-Animal health component in collaboration with NPHL, focusing on the resistance patterns of ESBL *E. coli* in healthy chicken through the One Health approach.

6.2 Virology unit

This unit is responsible for the diagnosis of viral diseases. Most of the samples for virological testing are submitted from the postmortem unit of CVL, followed by Veterinary Laboratories in different provinces, NADIL, Central Veterinary Referral Hospital and Veterinary Hospital and Livestock Services Expert Centre (VHLSEC). Samples are also submitted by quarantine check posts, private clinicians, farmers, and staffs of CVL during disease outbreak investigations. The unit has a facility for competitive ELISA, Fluorescent Antibody Test, Plate Agglutination Test and Lateral Flow Assay. Mainly, Lateral Flow Assay is used for the initial screening of Avian Influenza, Newcastle Disease, Infectious Bursal Disease, Infectious Bronchitis, PPR, ASF and Rabies. For the confirmatory diagnosis of Avian Influenza, Newcastle Disease, PPR and ASF samples are sent to the Molecular Section. Likewise, the confirmatory diagnosis of rabies is done through the Fluorescent Antibody Test (FAT) and PCR.

6.2.1 Lateral Flow Assay

In the fiscal year 2080/81, a total of 611 samples were tested by rapid test kit method where 318 samples were positive for different diseases.

Table 12: Rapid diagnostic test record of different viral diseases.

Month	Samples	AIV	IBDV	IBV	PPR	ASF	Rabies	NDV	Total
Shrawan	Total	7	0	0	3	0	22	0	32
	Positive	0	0	0	1	0	19	0	20
Bhadra	Total	4	0	2	0	0	7	5	18
	Positive	0	0	1	0	0	5	3	9
Ashoj	Total	15	7	1	2	0	5	1	31
	Positive	0	4	0	0	0	3	0	7
Kartik	Total	10	9	0	0	0	10	1	30
	Positive	0	3	0	0	0	7	1	11
Mangsir	Total	19	3	1	2	0	22	0	47
	Positive	3	2	0	0	0	13	0	18
Poush	Total	14	9	3	0	0	31	0	57
	Positive	2	4	0	0	0	24	0	30
Magh	Total	19	9	3	0	0	31	1	65
	Positive	2	7	2	0	0	25	0	34
Falgun	Total	12	6	0	0	0	43	1	62
	Positive	0	4	0	0	0	40	1	45
Chaitra	Total	30	4	0	1	0	29	2	66
	Positive	8	2	0	1	0	23	1	35
Baisakh	Total	44	9	1	0	0	20	1	75
	Positive	18	5	0	0	0	14	0	37
Jestha	Total	18	5	0	0	0	29	3	55
	Positive	2	4	0	0	0	24	2	32
Ashar	Total	44	26	8	0	0	23	2	103
	Positive	1	17	3	0	0	18	1	40
	Total	**196**	**87**	**19**	**8**	**0**	**272**	**17**	**611**

Month	Samples	AIV	IBDV	IBV	PPR	ASF	Rabies	NDV	Total
Grand Total	Positive	36	48	6	2	0	215	9	318

6.2.2 Rabies diagnosis

In the fiscal year 2080/81, rabies-positive cases were found in samples from 39 districts.

Districtwise Distribution of Rabies Cases in the Fiscal Year 2080/81

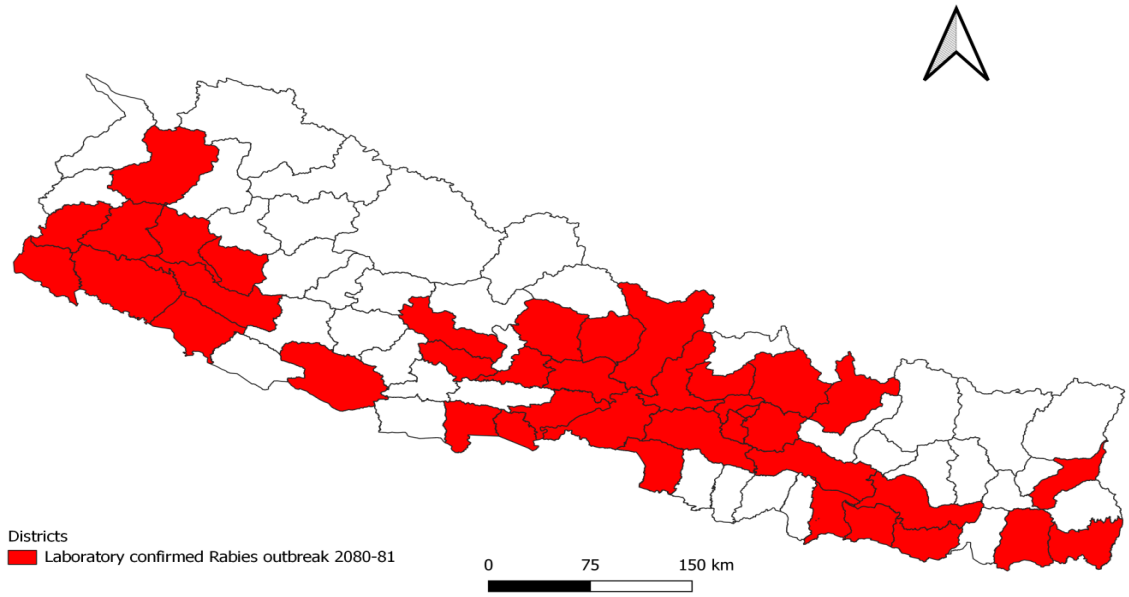


Figure 1: Districtwise Distribution of Rabies Cases in the Fiscal Year 2080/81

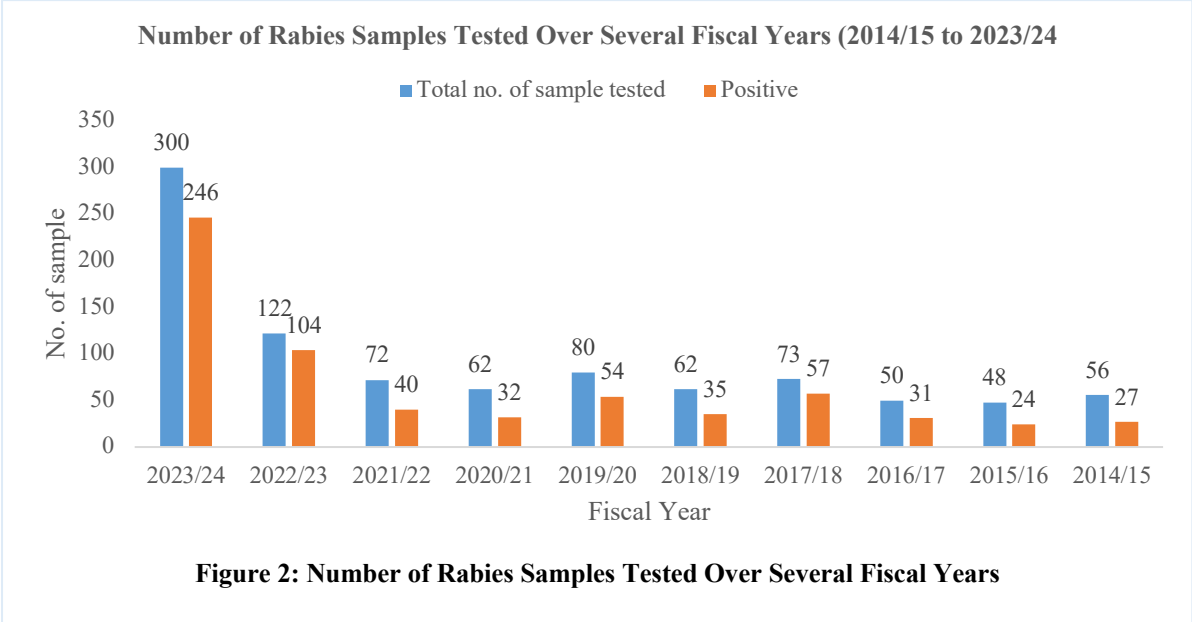


Figure 2: Number of Rabies Samples Tested Over Several Fiscal Years

In the fiscal year 2080/81, 300 rabies suspected samples were tested out of which 246 (82%) were found to be positive. The number of samples test and the positive cases has significantly increased from fiscal year 2022/23.

Table 13: Species wise distribution of rabies cases

S.N.	Species	Positive	Negative
1	Buffalo	32	6
2	Cat	1	7
3	Cattle	41	5
4	Dog	152	26
5	Goat	13	7
6	Jackel	2	0
7	Malsaproo	0	1
8	Mouse	0	1
9	Pig	4	0
10	Red Panda	0	1
11	Wild animals	1	0
Total		**246**	**54**

A total of 246 positive rabies cases were identified across various animal species. Dogs constituted the majority of these cases, with 152 dogs testing positive, demonstrating a high positivity rate of 85.4%.

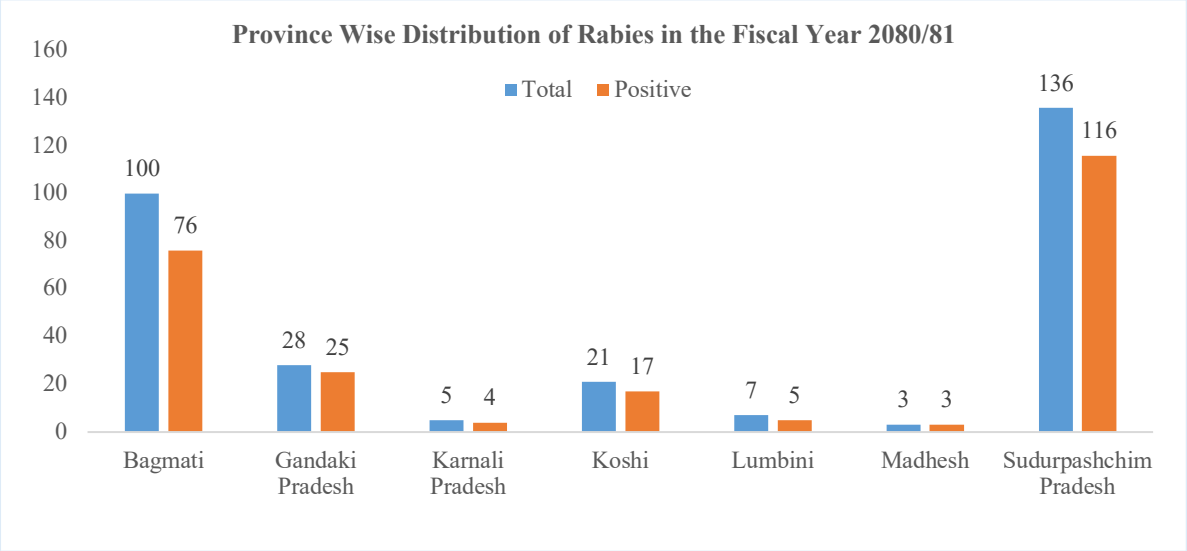


Figure 3: Province wise distribution of cases

Sudurpaschim Province reported the highest number of rabies cases, with 136 samples tested out of which 116 samples were positive, followed by Bagmati Province with 76 positives out of 100 samples. Gandaki (25/28), Koshi (17/21), Karnali (4/5), Lumbini (5/7), and Madhesh (3/3) also showed high positivity rates despite fewer samples submitted.

Table 14: District wise distribution of rabies cases

District	Total No. of sample tested	Positive
Achham	6	6
Baglung	1	1
Bajhang	3	2
Bardiya	1	1
Bhaktapur	6	4
Chitwan	6	6
Dadeldhura	3	1
Dailekh	1	0
Dang	1	0

District	Total No. of sample tested	Positive
Dhading	5	3
Dhanusa	1	1
Dolakha	1	1
Doti	5	5
Gorkha	4	4
Gulmi	1	1
Jhapa	1	1
Kailali	65	56
Kanchanpur	54	46
Kaski	4	3
Kathmandu	61	44
Kavrepalanchok	4	3
Lalitpur	9	9
Lamjung	2	2
Makwanpur	3	3
Morang	4	3
Nawalparasi (East)	3	2
Nawalparasi (West)	2	2
Nuwakot	2	2
Panchthar	15	13
Rupandehi	2	1
Saptari	1	1
Sindhuli	2	1
Sindhupalchok	1	0
Siraha	1	1
Surkhet	4	4
Syangja	3	3
Tanahun	11	10
Udayapur	1	0
Total	**300**	**246**

Among the 300 samples tested at CVL, the highest number of rabies-positive cases were reported from Kailali (56/65), Kanchanpur (46/54) and Kathmandu (44/61), indicating a significant burden in these districts.

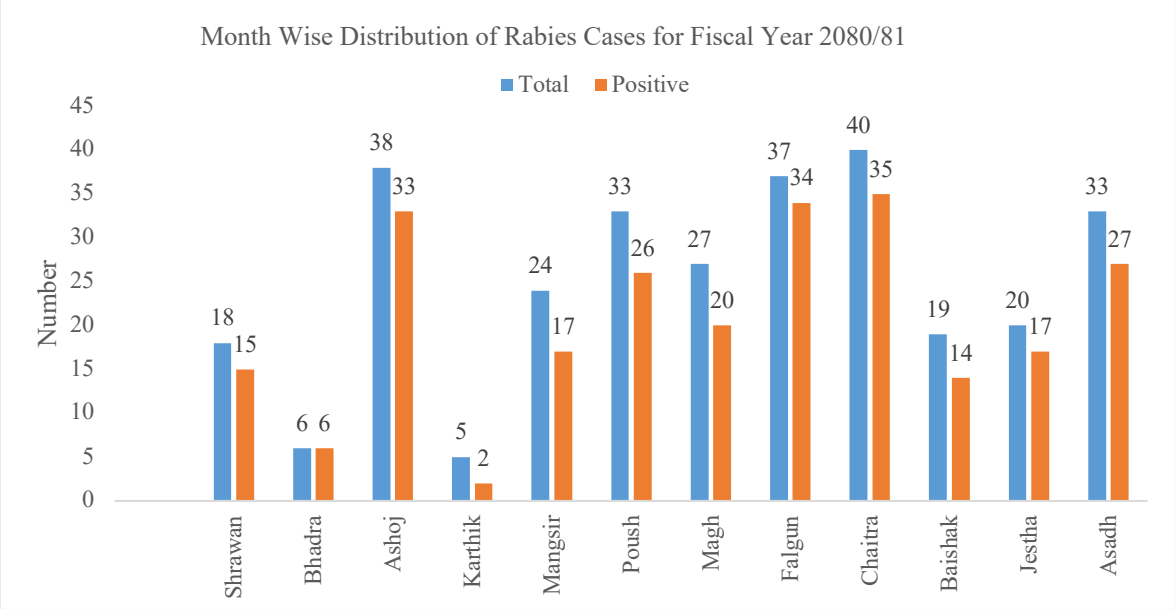


Figure 4: Month-wise distribution of Rabies Cases for fiscal year 2080/81

The chart shows monthly rabies cases for fiscal year 2080/81. Chaitra had the highest cases (40 total, 35 positive), followed by Ashoj and Falgun. The lowest were in Karthik and Bhadra. Most months had a high proportion of positive cases relative to total tested.

7. Pathology section

Pathology section consists of postmortem unit, histopathology, parasitology and clinical hematology and biochemistry unit. Samples for these units are submitted either by VLs, NADIL, CRVH, VHLSEC and Local level or they are brought directly by the veterinary practitioners, livestock, and poultry farmers.

7.1 Postmortem unit

Post-mortem examination is the first step in disease diagnosis for morbid animals. Along with history, clinical findings, and epidemiological surveillance, it aids in making an accurate diagnosis, which is confirmed through various tests at CVL. In the fiscal year 2080/81, a total of 1333 cases were registered for Post-mortem (3881 PM performed). The most common species brought for PM were poultry with 1,282 cases, followed by dogs (29 cases), goats (19 cases), pigs (1 case), wild animals (1 case), and cats (1 case).

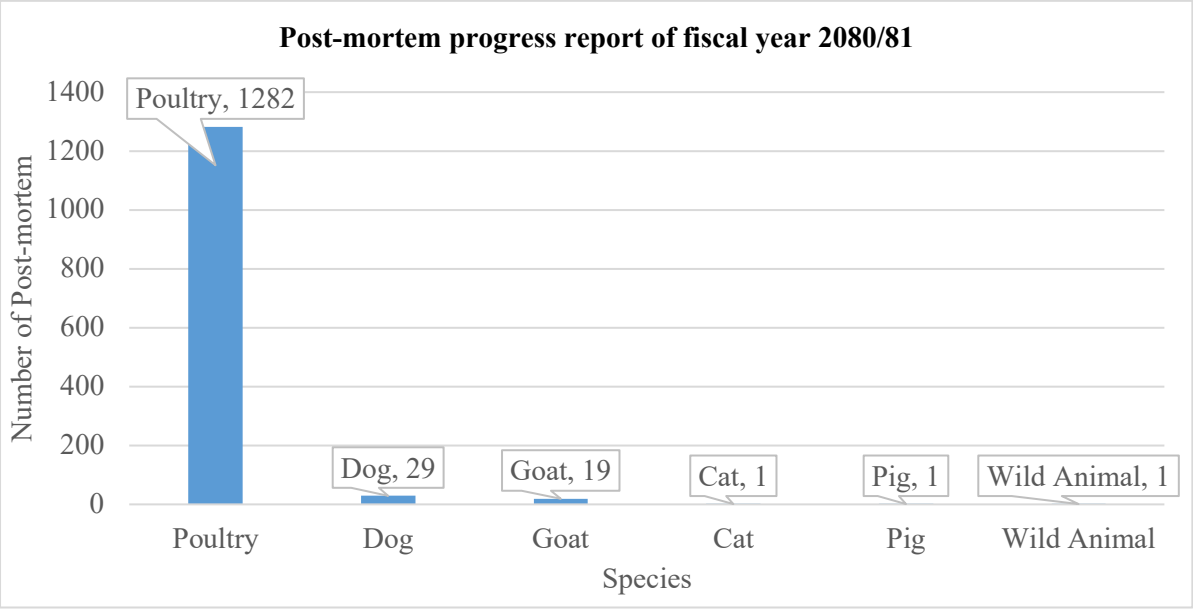


Figure 5: Post-mortem progress report of fiscal year 2080/81

The postmortem data from CVL for fiscal year 2080/81 highlights the significant disease burden in poultry, which accounted for 1,282 cases (96.17% of the total). These cases encompass a range of infectious and non-infectious conditions, including Colibacillosis, Mycotoxicosis, Chronic Respiratory Disease, and Infectious Bursal Disease reflecting the growing intensive poultry farming in Nepal and the associated challenges of disease management. 29 cases of dogs were brought where Rabies was the predominant condition (25 cases), underscoring its zoonotic significance and the need for enhanced control measures. 19 cases of goats were brought for PM where parasitic infections like Haemonchus Infestation and Fascioliasis/Liver Fluke (4 cases each) were the most common finding, alongside PPR, Enterotoxaemia, and other conditions, indicating diverse health challenges in small ruminants

The following report summarizes the postmortem examinations conducted by the CVL during the fiscal year 2080/81 (2023/24). The data details the animal species, associated diseases or pathological conditions, and the number of reported cases.

Table 15: Reported Cases of Diseases by Animal Species at CVL

Animal Species	Disease/Pathological Condition	Reported Cases
Poultry	Various Diseases (Detailed in the table below)	1,282
Dog	Rabies	25
	Non-specific Disease	2
	Pneumonia	2
Goat	Mycotoxicosis	1
	Non-specific Disease	2
	Peste des Petits Ruminants	2
	PPR/Pneumonia	1
	Enterotoxaemia	2
	Haemonchus Infestation	4
	Fascioliasis/Liver Fluke	4
	Monieziasis	1
	Cestodiasis	1
Pig	Pneumonia	1
Cat	Peritonitis	1
Wild Animal (Jackel)	Canine Distemper	1
Total		**1,333**

The table below provides a monthly breakdown of poultry disease diagnoses at CVL for the fiscal year 2080/81. In total, 1282 cases were diagnosed with 25 different diseases. The most frequent diagnosis was Colibacillosis (352 cases) followed by Mycotoxicosis (221 cases), and CRD (145 cases). The data below shows details for each disease in a temporal pattern.

Table 16: Month-wise distribution of poultry disease diagnosed at CVL

Disease	Baisakh	Jestha	Ashad	Shrawan	Bhadra	Asoj	Kartik	Mangsir	Poush	Magh	Falgun	Chaitra	Total
Fowl Cholera	0	0	0	0	0	0	0	0	0	0	1	0	1
Fowl Typhoid	1	0	0	5	0	1	1	0	3	0	0	0	11
CRD	7	4	16	29	9	7	13	12	10	13	14	11	145
Colibacillosis	47	20	40	35	30	15	22	30	15	21	24	53	352
Infectious Coryza	0	0	0	0	0	0	0	0	0	1	0	0	1
Necrotic Enteritis	1	0	0	3	0	1	3	5	1	2	1	0	17
Omphalitis	0	0	0	0	0	0	0	0	0	0	4	0	4
CCRD	0	0	0	0	0	0	0	5	0	9	6	0	20
AI (M gene)	16	2	1	0	0	0	1	0	0	2	0	8	30
Ranikhet/ND	0	1	1	4	0	1	1	0	0	0	2	1	11
IBD	5	3	14	9	5	9	1	3	4	7	4	2	66
IB	0	0	0	0	0	0	0	2	0	1	1	0	4
ALC	0	0	0	0	0	0	0	1	0	1	0	0	2
IBH	0	0	0	0	0	0	0	2	0	0	0	0	2
Mycotoxicosis	19	14	58	31	12	23	13	8	5	2	12	24	221
Coccidiosis	0	0	0	0	0	0	0	2	0	1	0	0	3
Asciariasis	0	0	0	0	0	0	0	1	0	0	0	0	1
Fatty Liver Syndrome	0	0	0	0	0	0	0	1	0	3	0	0	4
Ascites	8	2	1	4	4	2	6	8	0	6	12	11	64
Gout	0	0	0	0	0	0	0	1	0	1	1	0	3
Non-specific Disease	0	0	0	0	0	0	0	0	0	1	0	0	1

Disease	Baisakh	Jestha	Ashad	Shrawan	Bhadra	Asoj	Kartik	Mangsir	Poush	Magh	Falgun	Chaitra	Total
Immune Supression	3	0	1	2	0	0	10	11	6	1	13	2	49
Urolithiasis	0	0	0	0	0	0	0	0	0	1	1	0	2
Nephritis	0	0	0	0	0	0	0	7	0	2	3	0	12
Pneumonia	0	0	0	0	0	0	0	0	0	2	1	0	3
Stress	5	8	15	3	3	3	1	4	2	5	4	0	53
Grand Total	**109**	**54**	**146**	**120**	**63**	**58**	**72**	**103**	**60**	**82**	**104**	**111**	**1282**

Table 17: Distribution of poultry disease in different bird types based on Post-mortem

Disease	Broiler	Kuroiler	Layers	Pheasant	Quail	Broiler parent	Kroiler Parent	Layer Parent	Duck	Local Poultry	Giriraj Parent	Giriraj	Kalij	Others	Total
Fowl Typhoid	2	0	7	0	0	0	0	0	0	2	0	0	0		**11**
CRD	111	10	5	1	0	0	0	0	0	16	0	2	0		**145**
Colibacillosis	295	16	11	0	0	5	0	0	1	19	0	3	1	1	**352**
Necrotic Enteritis	6	1	3	0	0	0	0	0	0	5	0	2	0		**17**
Omphalitis	9	0	0	0	0	0	0	0	0	3	0	0	1		**13**
CCRD	58	1	2	0	0	0	0	0	0	1	0	0	0		**62**
AI	16	3	6	0	0	0	1	0	0	4	0	0	0		**30**
Newcastle Disease	3	0	5	0	0	0	0	0	0	2	0	0	0	1	**11**
IBD	53	4	2	0	0	0	1	0	0	5	0	1	0		**66**
IB	4	1	1	0	0	0	0	0	0	1	0	0	0		**7**
Marek's Disease	0	1	0	0	0	0	0	0	0	2	0	1	0		**4**
ALC	0	0	0	0	0	1	0	0	0	5	1	0	0		**7**
IBH	20	0	0	0	0	0	0	0	1	0	1	0	0		**22**
Mycotoxicosis	94	19	36	2	4	10	0	2	3	42	0	4	3	2	**221**
Coccidiosis	11	2	4	0	0	0	0	1	0	9	0	3	1		**31**
Asciariasis	0	0	3	0	0	0	0	0	0	1	0	0	0		**4**
Fatty Liver Syndrome	12	1	6	0	1	0	0	0	1	1	0	0	0		**22**
Ascites	61	1	1	0	0	0	0	0	0	1	0	0	0		**64**
Gout	5	4	1	1	0	3	0	0	0	1	0	0	0		**15**
Non-specific Disease	11	5	1	0	0	0	0	0	0	1	2	1	1		**22**
Immune Supression	41	3	0	0	1	0	0	0	0	3	0	0	1		**49**
Urolithiasis	3	1	0	0	0	0	0	1	0	0	0	0	2		**7**
Nephritis	23	5	3	0	1	0	0	0	0	2	0	0	0		**34**
Stress	48	0	0	0	0	0	0	0	0	1	0	0	3	1	**53**
Pneumonia	8	0	0	0	0	0	0	0	0	0	0	0	0		**8**
Others	7	2	2	0	0	0	0	0	0	1	0	3	0		**15**
Total	**901**	**80**	**99**	**4**	**7**	**19**	**2**	**4**	**6**	**128**	**4**	**20**	**13**	**5**	**1282**

*Other diseases include fatty liver disease, urolithiasis, nephritis, enteritis, stress, immunesupression, injury, sudden death, starvation etc.

Note: CRD-Chronic Respiratory Disease, CCRD-Complex Chronic Respiratory Disease, IBD-Infectious Bursal Disease, ND-Newcastle Disease, AI-Avian Influenza, IB-Infectious Bronchitis, MD-Mareks Disease, ALC-Avian Leukosis Complex

The table shows the distribution of various diseases among different types of poultry brought to CVL for post-mortem examinations. Broilers are the most affected, especially with Colibacillosis, CRD, Mycotoxicosis, Ascites, CCRD and IBD. Layers and local poultry have significant numbers of cases of Mycotoxicosis. Ducks and other less common poultry types have fewer cases overall.

Number of diseases diagnosed in poultry in FY 2080/81 were shown in below bar.

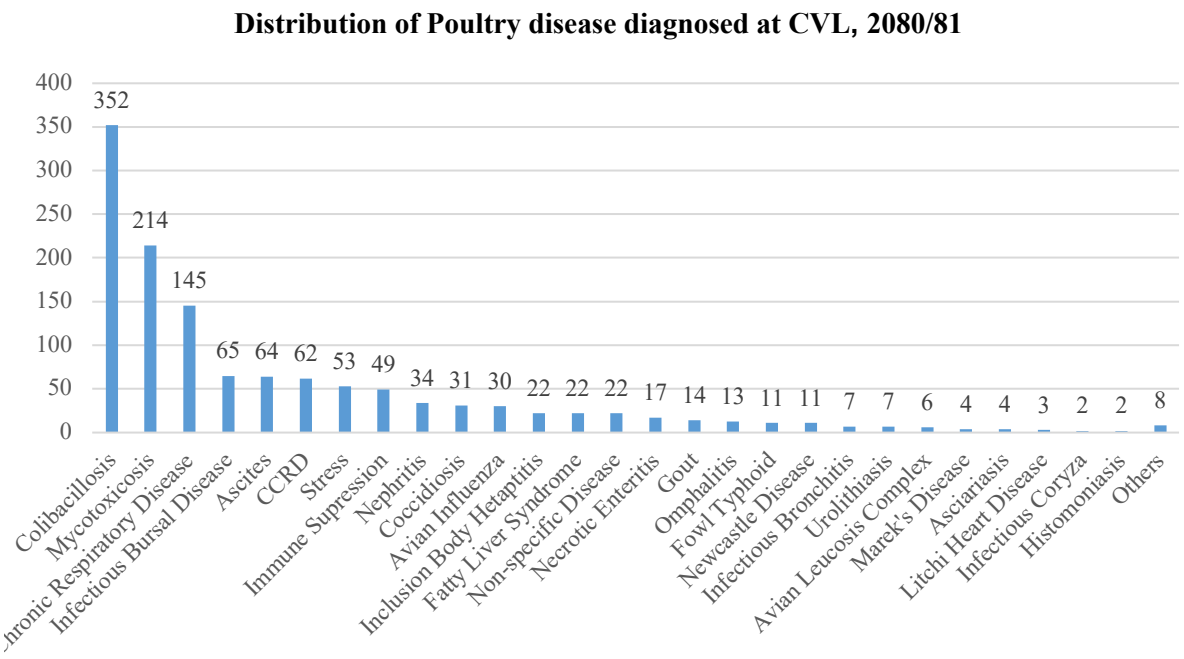


Figure 6: Distribution of Poultry disease diagnosed at CVL, 2080/81

The chart shows the distribution of poultry diseases diagnosed at CVL in 2080/81. The most common diseases were Colibacillosis (352 cases), Mycotoxicosis (214), and Chronic Respiratory Disease (145). Less common conditions included Histomoniasis and Infectious Coryza, with only 2 cases each.

7.2 Hematology and biochemistry unit

A total of 1501 blood samples were tested in FY 2080/81. Blood samples were tested for hematological parameters and blood parasites.

7.2.1 Blood parasites

A total of 1,501 samples from various animal species were tested for haemoprotozoal infestation. The most frequently detected pathogen was *Babesia spp*, with 345 positive cases, primarily in cattle (310 cases). *Anaplasma spp* was detected in 16 samples, mainly from cattle. Other detected pathogens included *Trypanosoma* spp (4 cases) and Ehrlichia (10 cases), found only in dogs. No cases of Microfilaria or *Theileria* were reported. Among the total tested, 1,126 samples were negative. Cattle represented the highest number of samples tested (1,040), followed by goats (272) and buffaloes (40).

Table 18: Blood parasites diagnosed in different animal species in 2080/81

Species	*Babesia*	*Anaplasma*	*Trypanosoma*	*Microfilaria*	*Theliaria*	*Ehrlichia*	Negative	Total
Dog	7	0	0	0	0	10	25	42
Cattle	310	15	0	0	0	0	715	1040
Buffalo	8	1	4	0	0	0	27	40
Goat	15	0	0	0	0	0	257	272
Pig	3	0	0	0	0	0	7	10
Horse	0	0	0	0	0	0	16	16
Cat	0	0	0	0	0	0	2	2
Sheep	0	0	0	0	0	0	62	62
Donkey	2	0	0	0	0	0	14	16
Wild Animal	0	0	0	0	0	0	1	1
Total	345	16	4	0	0	10	1126	1501

In FY 2080/81 1862 serum samples from different clinical conditions and from livestock farms were tested for biochemical parameters.

Table 19: Biochemical analysis of blood samples collected from sheep and goat

Parameters	Number of Test
Calcium	266
Phosphorus	266
Total Protein	266
SGPT	266
SGOT	266
Albumin	266
Magnessium	266
Total	**1862**

In FY 2080/81 56 urine samples brought by the farmers for testing mostly from clinical cases were tested using uristrips.

Table 20: Urine sample tested in fiscal year 2080/81

S.N	Animal	Sample Tested
1	Cattle	39
2	Goat	2
3	Dog	10
4	Buffalo	5

7.3 Parasitology Unit

The parasitology unit is involved in routine examination of different types of internal and external parasites of animals and birds. For the investigation and diagnosis of parasites, fecal samples, and skin scrapings samples were collected and examined by adopting standard veterinary laboratory protocols.

7.3.1 Fecal examination

A routine examination or diagnosis of internal parasites was conducted using direct smear method, sedimentation method and the floatation methods. During FY 2080/81 a total 923 faecal samples were tested, out of which 673 samples (72.91 %) were found to be positive for at least one parasite.

Table 21: District wise result of parasites found in fecal test

Month	District	Species	No. of sample	Positive	Parasite
Shrawan	Kathmandu	cow	16	12	Fasciola/Paramphistomum/Strongyles
	kavre	Goat	13	13	Fasciola/Paramphistomum/Strongyles
	lalipur	cow	2	1	Paramphistomum
	Nuwakot	Goat	3	1	Strongyles
	Kathmandu	Goat	37	31	Fasciola/Paramphistomum/Strongyles
Bhadra	Kathmandu	cow	12	2	Fasciola/Paramphistomum
	lalitpur	Cow	3	2	Fasciola/Paramphistomum
Ashwin	Kathmandu	Cow	4	2	Strongyles
	Kathmandu	Pig	1	1	Fasciola/Paramphistomum
	Kavre	Goat	31	31	Strongyles
	Khotang	Goat	7	7	Fasciola/Paramphistomum/Strongyles
	Lalitpur	Goat	14	14	Strongyles
	Kavre	Goat	32	32	Fasciola/Paramphistomum/Strongyles
Kartik	Kathmandu	Chengra	12	0	
	Bhojpur	Goat	53	45	Strongyles
	Chitwan	Goat	4	1	Strongyles
	Lalitpur	Goat	1	1	Fasciola/Paramphistomum/Strongyles /Coccidiosis
	Chitlang	Goat	17	17	Strongyles
	Dhading	Cow	11	7	Strongyles
	Bhaktapur	Cow	4	3	Strongyles
Mangsir	sindhupalchok	Goat	55	55	Fasciola/Paramphistomum/Strongyles/Trichuris/Strongyloid/Coccidiosis
	Nuwakot	Goat	1	1	Strongyles
	Kathamandu	cow	1	1	Fasciola/Paramphistomum
	Kavre	Poultry	1	1	Coccidiosis
Paush	Kathamandu	Buff	1	1	Strongyles
	Kathamandu	Pig	1	1	Strongyles/Coccidiosis
	Tanahu	Goat	14	12	Fasciola/Paramphistomum/Strongyles/Trichuris/Strongyloid/Coccidiosis
	Nawalparasi	Goat	9	4	Fasciola/paramphistomum,/Strogyle/Trichuris/Strongyloid/Coccidiosis
Magh	Nawalpur	Cow	5	2	Fasciola/Paramphistomum/Strongyles
	Nawalpur	Goat	26	21	coccidiosis/Heamonchus
	Nawalpur	Buff	11	3	Fasciola/Paramphistomum
	Nawalpur	Cow	2	1	Fasciola/Paramphistomum
	Nawalpur	Goat	3	3	Strogyles/Trichuris/Strongyloid/Coccidiosis/Moniezia
	Nawalpur	Buff	8	6	Fasciola/Paramphistomum
	Sindhupalchowk	Goat	3	1	Strongyles
	Kathmandu	Cow	4	1	Fasciola/Paramphistomum
	Nuwakot	Cow	1	1	Fasciola/Paramphistomum
Falgun	Kathmandu	Cow	1	0	
	Kathmandu	pig	1	0	
	Nuwakot	Sheep	64	51	Fasciola/Paramphistomum/Strogyle/Trichuris/Strongyloid/Coccidiosis
Chaitra	Kathmandu	Cow	1	0	
	Kathmandu	Goat	1	0	
	Dhading	Goat	1	0	
	Nuwakot	Cow	1	0	
	Lahan	Cow	23	6	Fasciola/Paramphistomum/Strongyles
	Lahan	Buff	10	3	Fasciola/Paramphistomum/Strongyles

Baishakh	Sindhupalchok	Goat	10	10	Fasciola/Paramphistomum/Strongyles
Jeshth	Kathmandu	Pig	1	1	Strongyles
	Kathmandu	Equine	15	1	Fasciola/Paramphistomum/Strongyles
	Okhaldunga	Goat	9	8	Fasciola/Paramphistomum/Strongyles
	Okhaldunga	Buff	7	1	Strongyles
	Sindhuli	Cattle	1	0	
	Rasuwa	Cattle	1	1	Fasciola/Paramphistomum/Strongyles/Coccidiosis
	Sankhuwa sabha	Cattle	1	0	
	Sankhuwa sabha	Buff	1	0	
	Manag	Goat	4	1	Strongyles
Ashad	Kathmandu	Buff	1	0	
	Kathmandu	Goat	26	25	Strongyles
	Makwanpur	Poultry	4	0	
	Makwanpur	Goat	1	0	
	Bardiya	Goat	20	20	Fasciola/Paramphistomum/Strongyles/Heamonchus
	Dang	Goat	34	33	Fasciola/Paramphistomum/Strongyles/Heamonchus
	Rolpa	Goat	13	13	Fasciola/Paramphistomum/Strongyles/Heamonchus
	Rukum	Goat	6	6	Fasciola/Paramphistomum/Strongyles/Heamonchus
	Kailali	Goat	14	14	Ascaris
	Salyan	Goat	5	5	Fasciola/Paramphistomum/Strongyles/Heamonchus
	Kanchanpur	Goat	9	9	Coccidiosis/Heamonchus
	Rasuwa	Goat	4	3	Fasciola/Paramphistomum/Strongyles/Heamonchus
	Dhading	Buff	2	1	Fasciola/Paramphistomum
	Mustang	Goat	125	68	Strogyles/Trichuris/Strongyloid/Coccidiosis/Moniezia
	Mustang	Cattle	73	45	Fasciola/Paramphistomum/Strongyles/Heamonchus
	Kathmandu Khasibazar	Goat	10	10	Strongyles
Total			**923**	**673**	

7.3.2 Districtwise EPG Count

The table below summarizes parasitic infections in animals across districts in Nepal. Out of 831 total samples, 624 tested positive. Goats were the most tested species, with high positive rates in districts like Kavre and Sindhupalchok. Strongyle was the most common parasite, with EPG values reaching 10,000 in samples from Sheep genetic resource farm, Nuwakot. Some districts, like Kathmandu and Mustang, tested multiple species, while others had one. No positive cases were found in samples collected from Chyangra in Kathmandu and from breeding animals from National Livestock Breeding office, Lahan.

Table 22: EPG count result

District	Species	No. of samples	Positive	Parasite and EPG Value
Kathmandu	Cow	16	12	Strogyle (1700) Coccidia (700)
Kavre	Goat	76	76	Strogyle (700)/Trichuris (300)/ Strongyliod (300)/ Coccidia (200)
Kathmandu	Goat	37	31	Strogyle (1700)/Trichuris (1300)/ Strongyliod (900)/ Coccidia (500)

District	Species	No. of samples	Positive	Parasite and EPG Value
Khotang	Goat	7	7	Strogyle (700)/Trichuris (300)/ Strongyliod (300)/ Coccidia (200)
Lalitpur	Goat	14	14	Strogyle (2300)/Trichuris (1300)/Coccidia (500)
Kathmandu	Chyangra	12	0	
Bhojpur	Goat	52	39	Strogyle (2300) Coccidia (500)
Chitwan	Goat	4	1	Strongyle (2700)
Makwanpur, Chitlang	Goat	10	10	Strongyle (2300)
Makwanpur, Chitlang	Rabbit	7	7	Strongyle (1700)
Dhading	Cow	11	7	Strongyle (2200)
Sindhupalchok	Goat	55	55	Strogyle (4300)/Strongyliod (2300)/Cocci (700)
Tanahu	Goat	14	12	Strongyle (400)/Heamonchus (300)
Nawalparasi	Goat	9	4	Heamonchus (1400)
Nawalpur	Goat	26	21	Heamonchus (1400)
Nawalpur	Buff	11	1	Strogyle (800)
Nuwakot	Sheep	64	51	Strogyle (10000)/Trichuris (300)/Strongyloid (1200)
Siraha, Lahan	Cow	23	0	Strogyle (800)/Trichuris (200)
Siraha. Lahan	Buff	10	0	Strogyle (800)
Sindhupalchok	Goat	10	10	Strogyle (1100)/Trichuris (400)/Strongyliod (200)
Kathmandu	Equine	15	9	Strogyle (600)/Strongyloid (200)
Okhaldhunga	Goat	9	9	Strogyle (1800)/Trichuris (600)/Strongyliod (700)
Kathmandu	Goat	26	25	Strogyle (800)/Trichuris (300)/Strongyliod (200)/Cocci (300)
Bardiya	Goat	20	20	Strogyle (900)/Trichuris (200)/Strongyliod (800)
Dang	Goat	34	33	Strogyle (800)/Trichuris (300)/Strongyliod (200)
Rolpa	Goat	13	13	Strogyle (1200)/Trichuris (400)/Strongyliod (200)
Rukum	Goat	6	6	Strogyle (800)/Strongyliod (200)
Kailali	Goat	14	14	Strogyle (1800)/Trichuris (300)/Strongyliod (1200)/Cocci (200)
Salyan	Goat	5	5	Strogyle (800)/Trichuris (200)/Strongyliod (200)
Kanchanpur	Goat	9	6	Strogyle (1100)/Trichuris (500)/Strongyliod (200)
Rasuwa	Goat	4	3	Strogyle (800)/Trichuris (300)/Strongyliod (200)/Cocci (400)
Mustang	Goat	125	68	Strogyle (1800)/Trichuris (1300)/Strongyliod (1200)
Mustang	Cattle	73	45	Strogyle (900)/Trichuris (300)/Strongyliod (200)
Goat Market, Kathmandu	Goat	10	10	Strogyle (800) Strongyliod (200)/Cocci (400)
Total		**831**	**624**	

7.3.3 Skin Scrapping examination

In the FY 2080/81, 67 skin scrapping samples from different species were tested for the presence of external parasites. 53.73% of the samples were found to be positive.

Table 23: Skin Scrapping test result

S.N.	Species	Number of samples	Positive	Parasite
1	Pig	5	3	Demodex
2	Goat	11	5	Demodex/Sarcoptic
3	Dog	27	18	Demodex/Sarcoptic
4	Cow	7	3	Sarcoptic
6	Buff	13	7	Demodex/Sarcoptic
8	Sheep	4	0	
Total		**67**	**36**	

7.3.4 Larva Culture

The table below summarizes larvae culture data for the fiscal year 2080/081 across several districts in Nepal, focusing on parasite infections in goats, sheep, and grass samples. Out of 101 total samples, 97 tested positive. Goats were the most tested species, with all faecal samples from Kavre, Kathmandu, Lalitpur, Makawanpur, and Sindhupalchok showing infections, primarily Trichostrongylus and Heamonchus, with Kavre also reporting Ostertagia. Grass samples from Kavre showed no infection, while those from Makawanpur and Sindhupalchok had one positive case each.

Table 24: Larva Culture test result

District	Species	Sample	No. of sample	Positive	Parasite
Kavre	Goat	Faecal	33	33	Trichosrtongylus/Heamonchus/Ostertagia
Kavre	Grass	Grass	2	0	
Kathmandu	Goat	Faecal	35	35	Trichosrtongylus/Heamonchus
Lalitpur	Goat	Faecal	8	8	
Makawanpur	Goat	Faecal	4	4	
Makawanpur	Sheep	Faecal	1	1	
Makawanpur	Grass	Grass	2	1	
Sindhupalchok	Grass	Grass	2	1	
Sindhupalchok	Goat	Faecal	14	14	
Total			**101**	**97**	

8. Molecular biology section

8.1 Molecular biology unit

Molecular biology unit was established in Central Veterinary Laboratory (CVL) in 2003 A.D. Earlier this laboratory started to diagnose avian influenza by using RT-PCR technique. Later, from 2010, CVL started real time PCR for diagnosis of avian diseases like Avian Influenza (AI), Newcastle disease (ND), and Infectious Bursal Disease (IBD). CVL also started multiplex for respiratory disease of small ruminant (PPR, MCCP, Capripox, Pasteurella) and swine diseases (African swine fever virus, Classical swine fever virus, Salmonella and Erysipelas*)* and other diseases like Porcine Reproductive and Respiratory Syndrome (PRRS-NA and PRRS-EU), since 2016. Later on, the technologies expand for diagnosis of other zoonotic and economic importance diseases like Glanders, Lumpy skin Diseases (LSD) and Enterotoxaemia. Molecular unit also participate in proficiency testing (PT) for AI, PPR and Swine diseases since 2016.

In the Fiscal year 2080/81, a total of 210 swab samples of avian species suspected for avian influenza were received from twenty-seven districts. The samples were tested by using Real Time Reverse Transcriptase Polymerase Chain Reaction (rRT PCR). Out of those samples, 190 (90.47%) samples were found to be positive for subtype H9N2 and no any HPAI cases were detected.

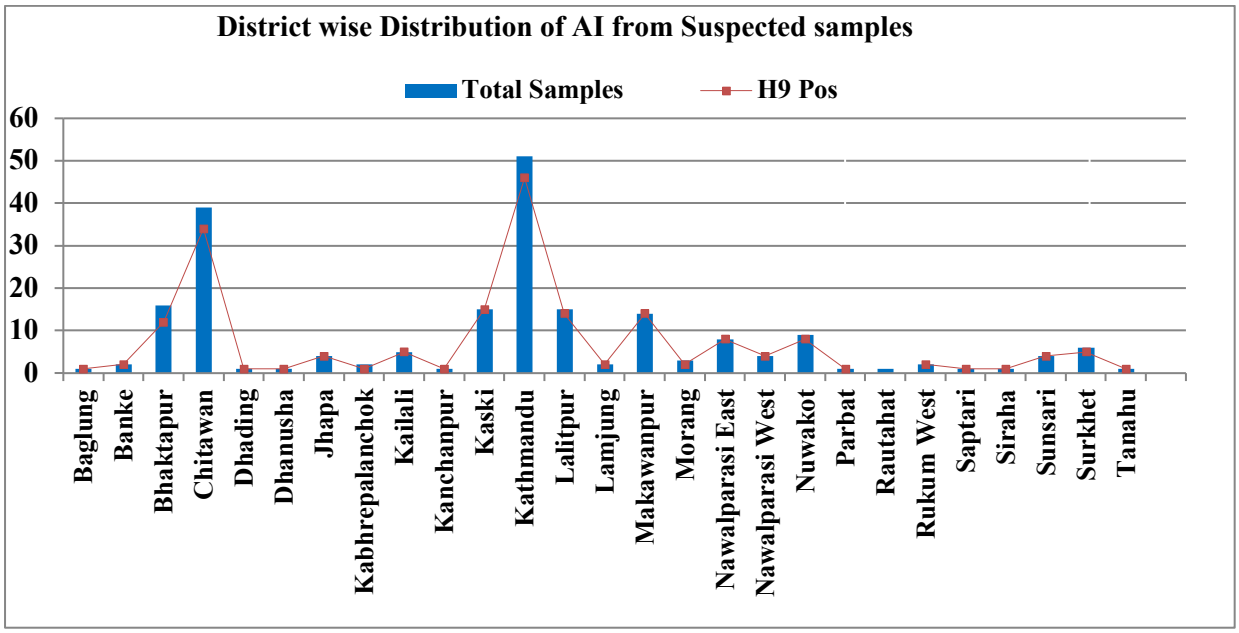


Figure 7: District wise H9 outbreak of AI.

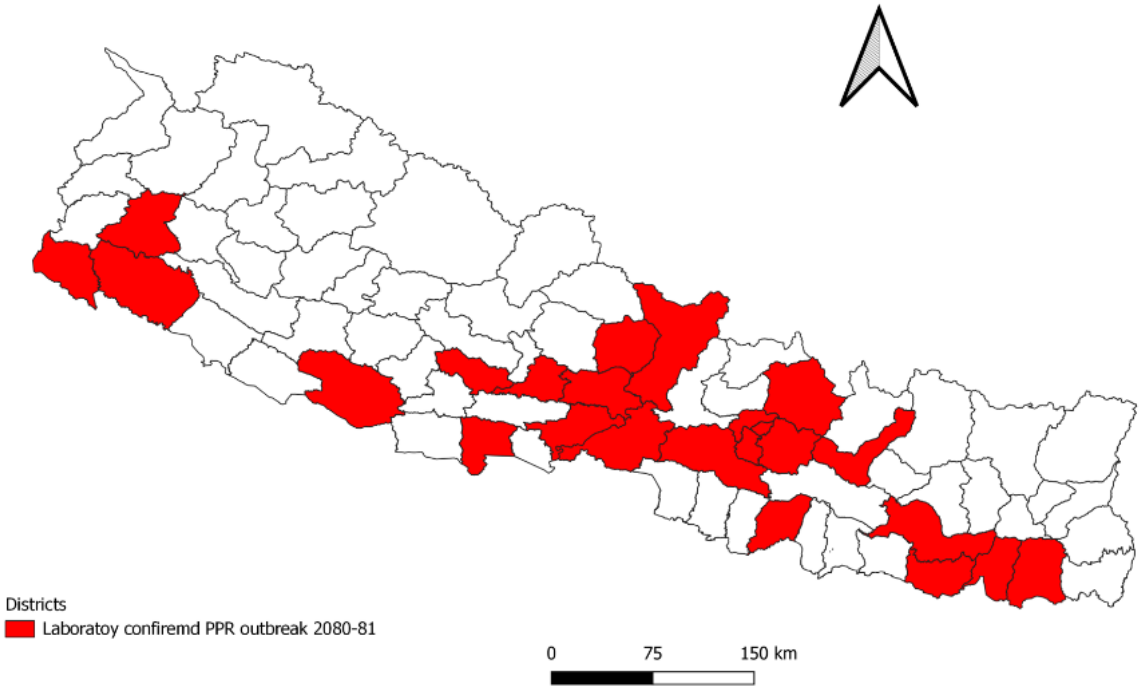


Figure 8: Spatial Distribution of PPRV cases in FY 2080/81

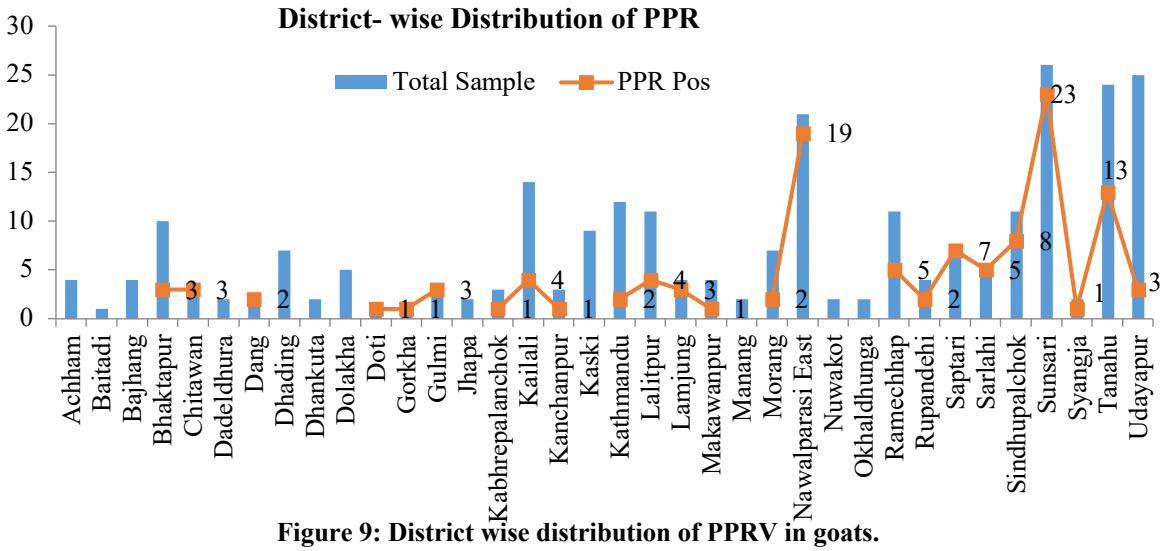


Figure 9: District wise distribution of PPRV in goats.

The chart shows the district-wise distribution of PPR cases, A total of 256 samples was collected from the 36 districts out of which 45.70 % were positive from 24 districts. Sunsari district has the highest number of PPR positive cases (23) from the samples submitted from the outbreak area, followed by Nawalparasi East (19) and Tanahu (13).

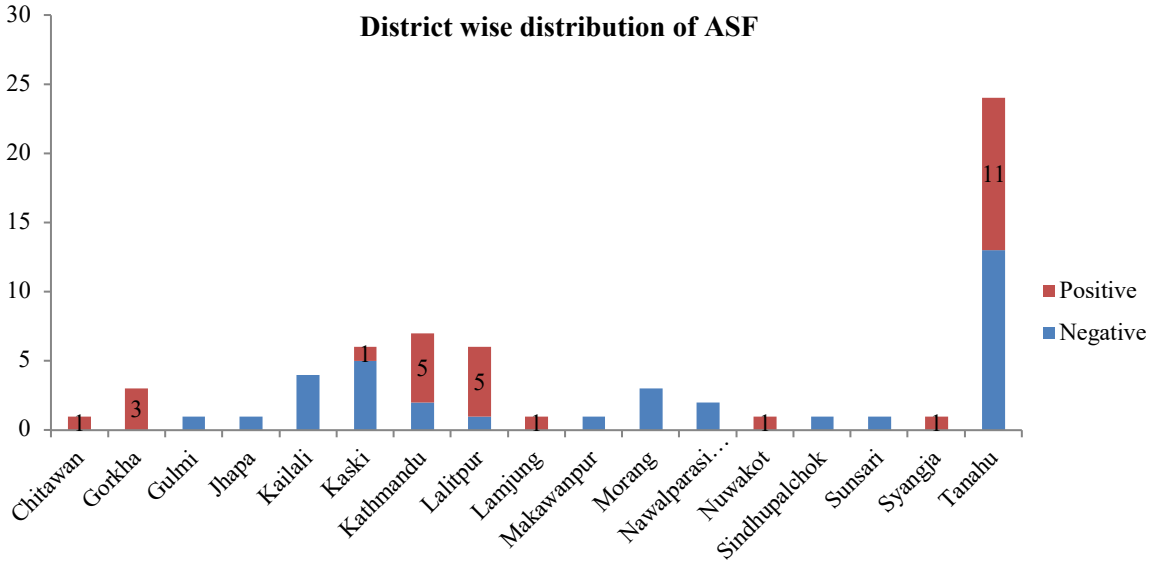


Figure 10: District wise distribution of ASF

CVL received 64 samples (Tissues/blood) from 17 districts for Swine diseases. The samples were initially tested for ASF followed by CSF, PRRS-NA, PRRS-EU, Salmonella and Erysipelas. Out of those samples, 45.31 % samples from 9 districts were found to be positive for ASF. Tanahu district has the highest number of ASF positive cases (11) followed by Lalitpur and Kathmandu, each with 5 positive cases and Gorkha has 3 positive cases, however other district has reported one or no positive cases.

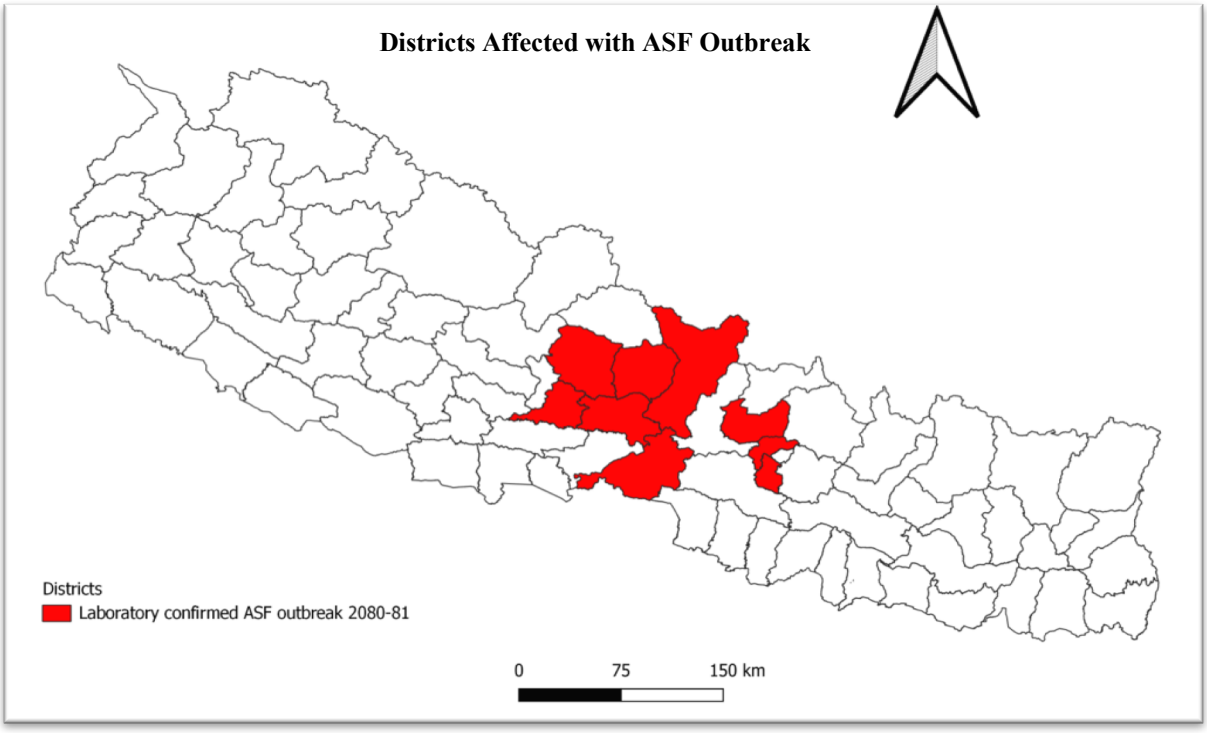


Figure 11: Spatial Distribution of PPRV cases in FY 2080/81

CVL also received bovine samples (Swab/pus/scar) from 23 districts for Lumpy Skin Disease (LSD). A total of 202 samples were tested by using PCR method. 64.35 % of the samples were positive for LSD.

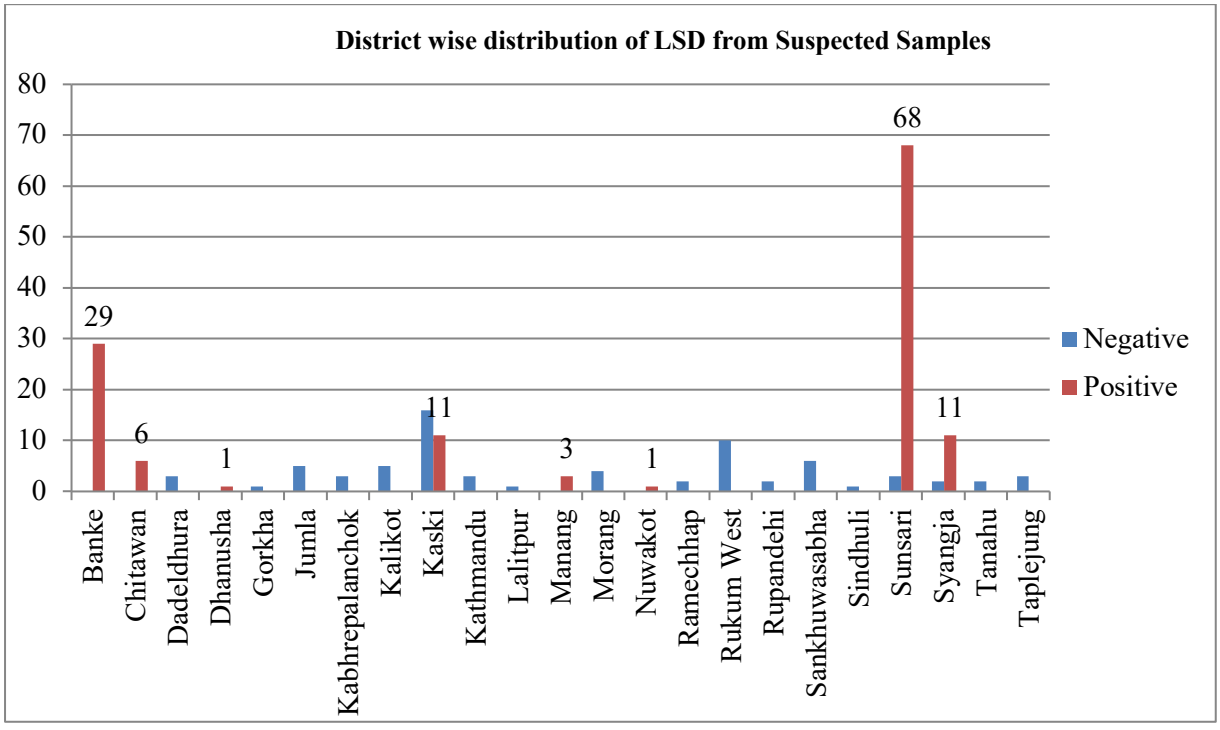


Figure 12 : District wise distribution of LSD in bovine.

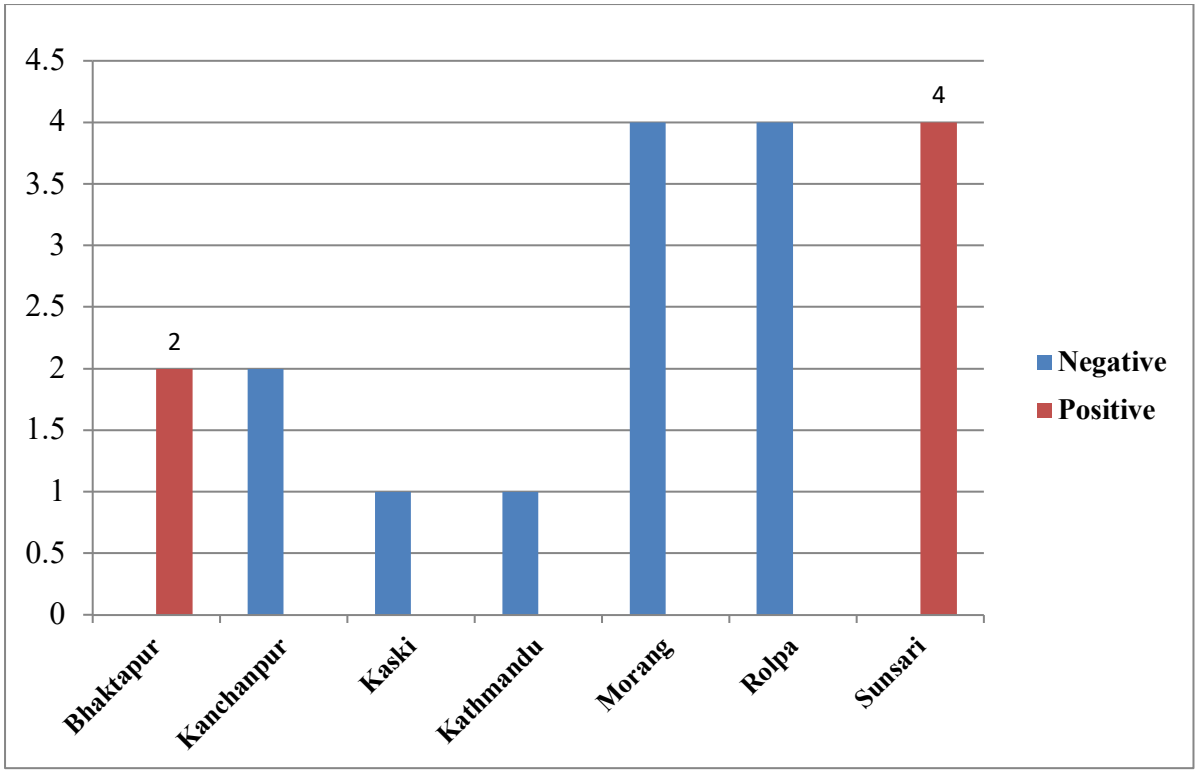


Figure 13: District-wise distribution of Anthrax in bovine.

CVL also received blood samples from 7 districts suspected of Anthrax. A total of 18 samples were tested by using the Blood smear examination and PCR method. 33.33 % of the samples were positive for Anthrax.

In FY 2080/81, total of 58 samples were tested by multiplex rt-PCR for abortive panels (Brucellosis, Leptospirosis, Listeriosis and Q fever) from 10 districts. Out of 58 samples tested, only one sample from Madi municipality was found to be positive for Q fever.

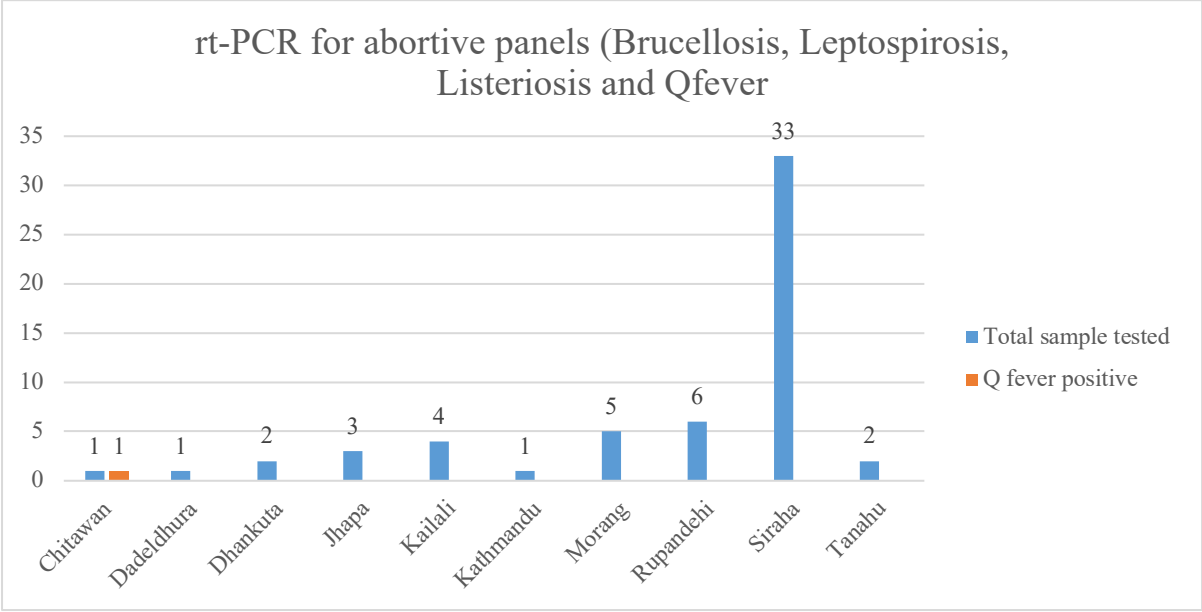


Figure 14: rt-PCR for abortive panels (Brucellosis, Leptospirosis, Listeriosis and Q fever

Likewise in 2080/81, 129 suspected samples from small ruminants were tested for Pasteurellosis, 129 samples for capripox and 106 samples for MCCP. Only one sample from goat of Baitadi district was found to be positive for Pasteurellosis.

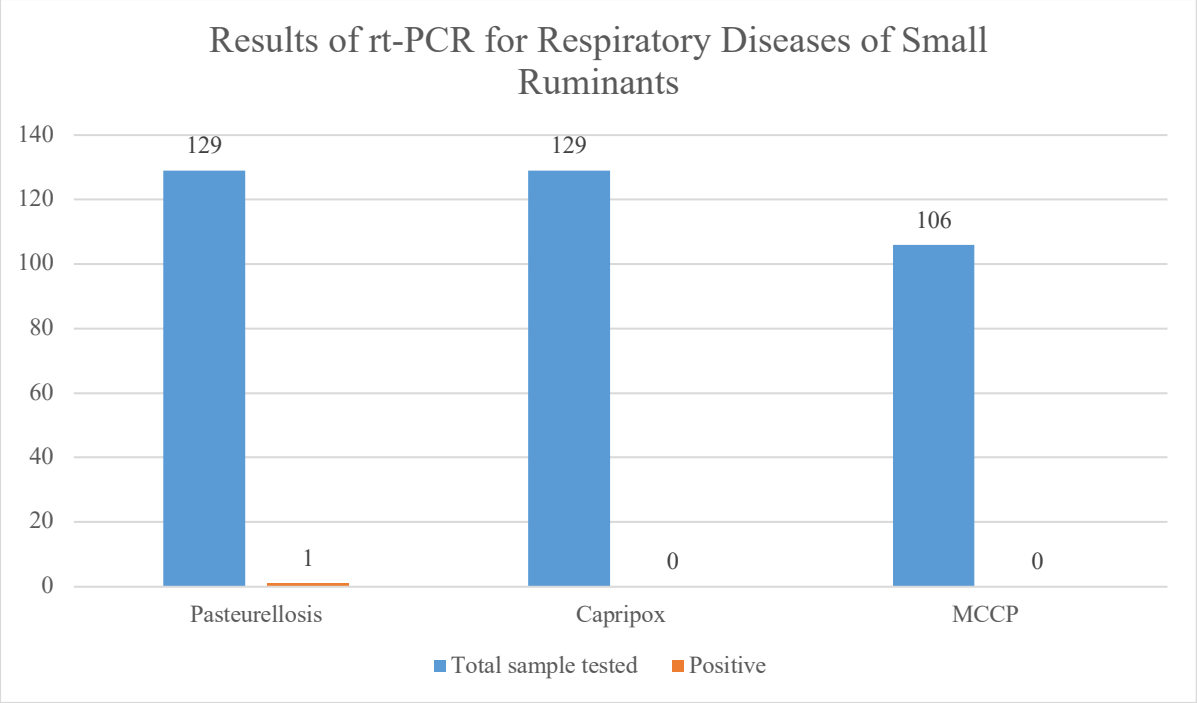


Figure 15: Results of rt-PCR for Respiratory Diseases of Small Ruminants

A total of 576 swab samples were collected from 7 districts for the surveillance of Avian Influenza.3.12% of samples from Dhading and Dang district were found to be positive for Low Pathogenic Avian Influenza (H9).

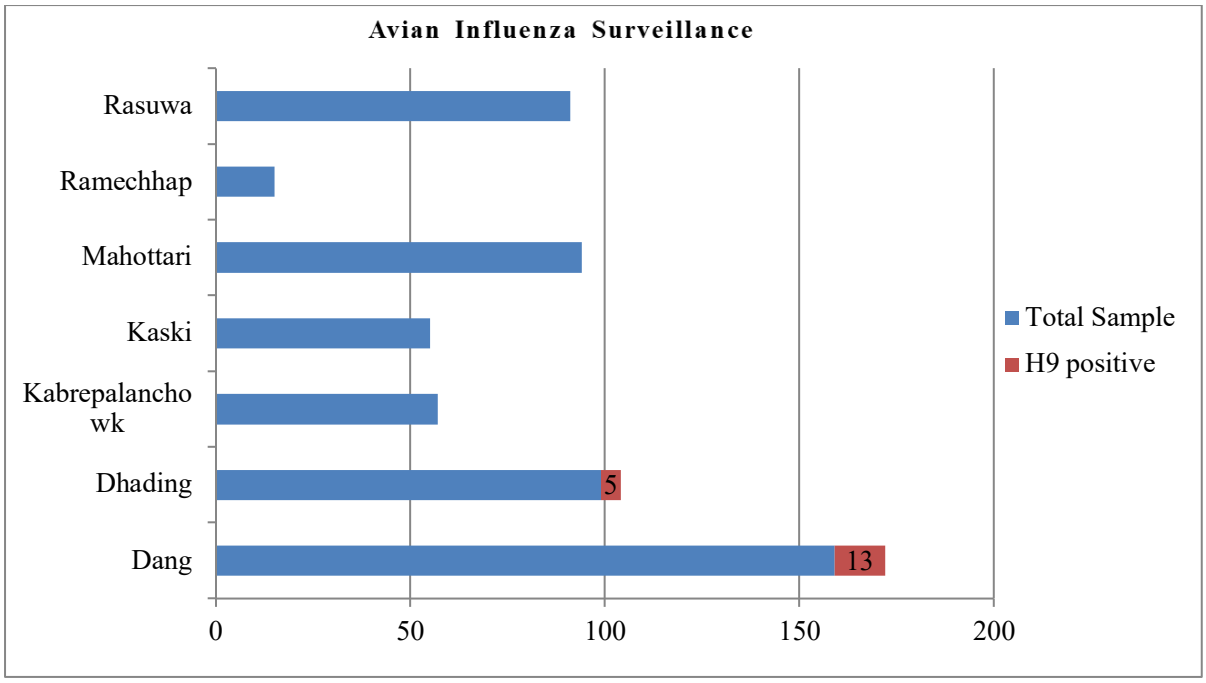


Figure 16: Avian Influenza surveilliance

CVL also performed rt-PCR for different diseases in FY 2080/81 from different species. The results are shown in below table.

Table 25: Results of rt-PCR for different diseases in FY 2080/81

Disease	Total Sample tested	Positive	Negative	Positive district/species
Bovine Papular Stomatitis	3	0	3	
Campylobacter	7	0	7	

Disease	Total Sample tested	Positive	Negative	Positive district/species
Cowpox	3	0	3	
CSF	23	0	23	
Enterotoxaemia	15	8	7	Bhaktapur, Morang, Tanahun, Jhapa, Udhayapur, Kailali (Caprine)
Erysipelas	13	0	13	
Glanders	26	1	25	Banke (Equine)
Hemorrhagic septicaemia	7	5	2	Sindhuli (Cattle)
Ranikhet	16	3	13	Bhaktapur and Surkhet (Backyard chicken)
Neospora	7	0	7	
Nipah	18	0	18	
PRRS	33	0	33	
Pseudocowpox	3	0	3	
Q fever	9	2	7	Dadeldhura and Kailali (Caprine)
Salmonellosis	13	0	13	

8.2 Serology Unit

Serology section of CVL performs different serological tests for the diagnosis, monitoring and surveillance of animal diseases. Most of the samples are submitted to this unit by Veterinary Laboratories, NADIL, Livestock Service Offices (Veterinary Hospital and Livestock Service Centers), Animal Quarantine Check-posts, private veterinary practitioners, farmers and staff of CVL during disease outbreak investigations, routine diagnosis as well as sero-monitoring. This section possesses facility of Competitive Enzyme Linked Immunosorbent Assay (cELISA), Immuno-capture ELISA, Indirect ELISA, Tube agglutination Test, Agar-Gel Immuno-Diffusion (AGID) test, Plate agglutination test.

Serology unit also participates in proficiency testing (PT) for PPR by ELISA and Brucellosis by PAT since 2016. Progress report of Serological investigation of various diseases in animals and birds during 2080/81 is as follows.

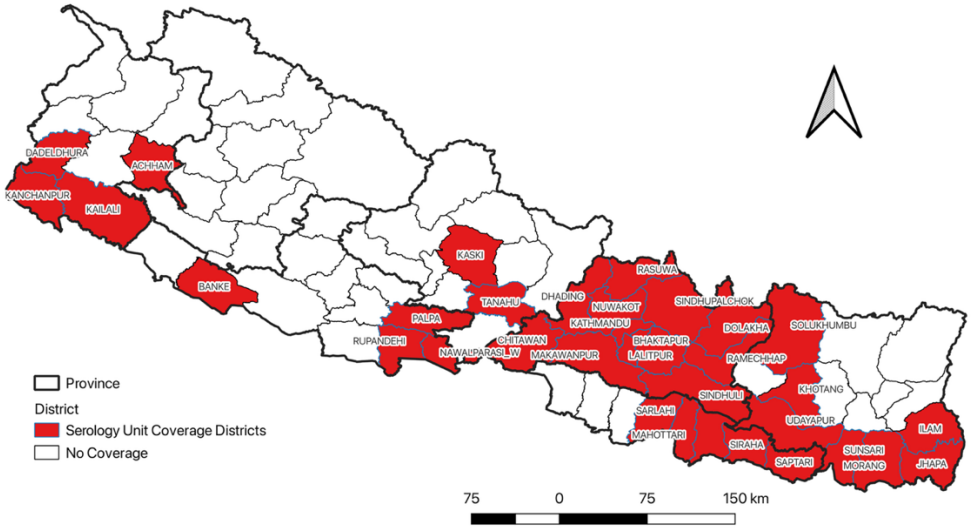


Figure 17: Districts coverage by Serology Unit under Molecular Section of CVL

8.2.1 PPR Seromonitoring

Department of Livestock Services has launched the annual PPR Vaccination Program throughout the country as per National PPR Control Program. CVL is responsible for conducting the seromonitoring of PPR vaccination in the country. In the fiscal year 2080/81 CVL received 7128 serum samples for investigation of seroconversion of PPR vaccination from 33 districts mostly from the districts of Bagamati Province. The seroconversion was above 85% in 5 districts; Nuwakot, Kathmandu, Chitwan, Dhading and Taplejung with the Taplejung having highest seroconversion of 96.88% followed by Dhading with 94.50%. Low seroconversion (less than 50%) was found in 8 districts; Rukum East (49.40%), Baitadi (48.19%), Kaski (45%), Panchthar (42.06%), Nawalparasi East (38.33%), Illam (33.33%), Bardiya (29.35%) and Bajhang (19.95%).

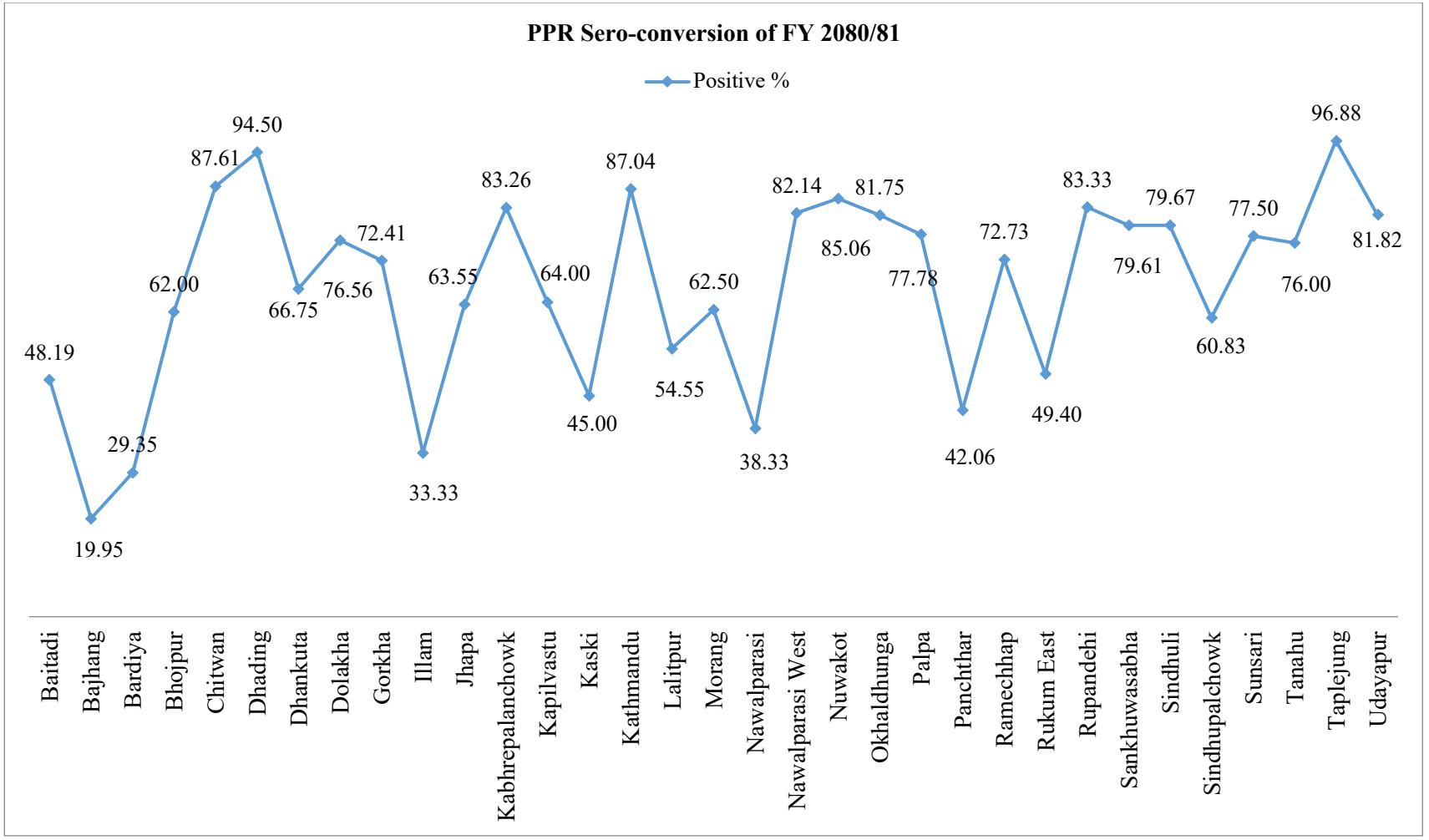

PPR Sero-conversion of FY 2080/81
Positive %
48.19
19.95
29.35
62.00
87.61
94.50
66.75
76.56
72.41
33.33
63.55
83.26
64.00
45.00
87.04
54.55
62.50
38.33
82.14
85.06
81.75
77.78
42.06
72.73
49.40
83.33
79.61
79.67
60.83
77.50
76.00
96.88
81.82
Baitadi
Bajhang
Bardiya
Bhojpur
Chitwan
Dhading
Dhankuta
Dolakha
Gorkha
Illam
Jhapa
Kabhrepalanchowk
Kapilvastu
Kaski
Kathmandu
Lalitpur
Morang
Nawalparasi
Nawalparasi West
Nuwakot
Okhaldhunga
Palpa
Panchthar
Ramechhap
Rukum East
Rupandehi
Sankhuwasabha
Sindhuli
Sindhupalchowk
Sunsari
Tanahu
Taplejung
Udayapur

Figure 18

8.2.2 Serological Tests conducted at CVL

In fiscal year 2080/81, total number of samples received at CVL for various serological tests was 4661 with 4123 samples from active surveillance were subjected for several serological tests and 538 samples from outbreaks were subjected for several serological tests in CVL.The highest number of samples from active surveillance was from Bagamati province (1579) followed by Sudurpaschim province (1065), while the number of samples from active surveillance was lowest from Lumbini province (129). Similarly the higest number of samples from outbreaks was from Sudurpaschim province (327) and samples from oubtreak was lowest from Lumbini province. The distribution of samples received at CVL by province in fiscal year 2080/81 is presented in following figure.

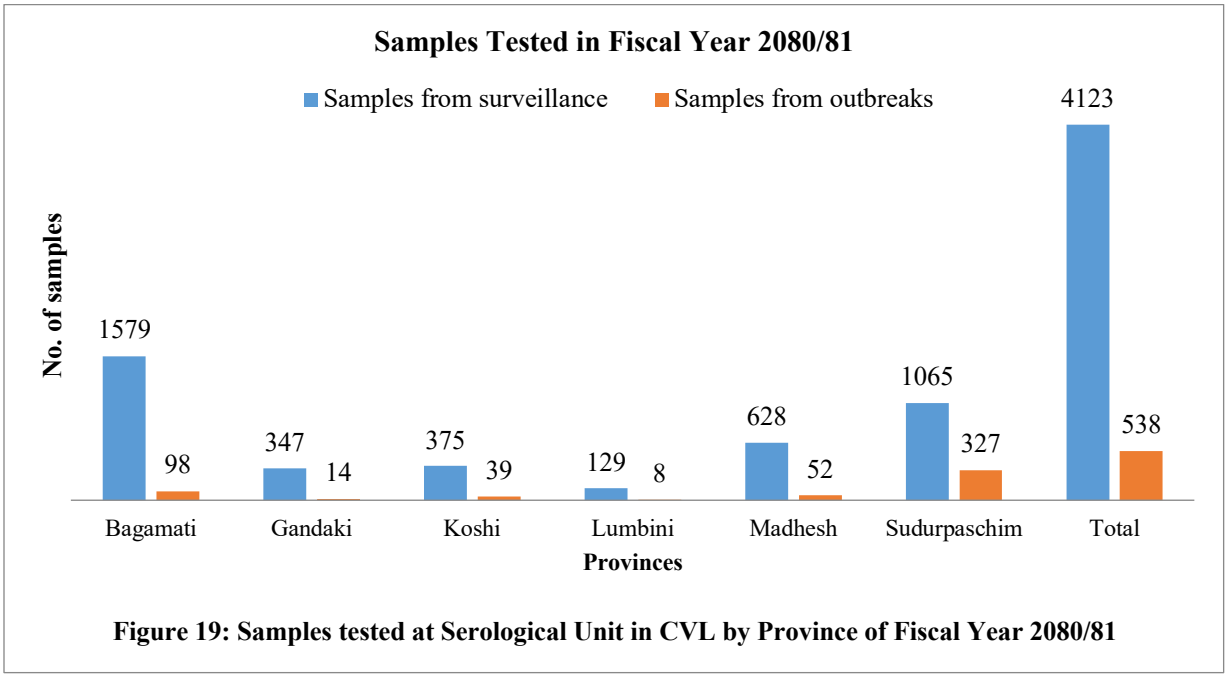


Figure 19: Samples tested at Serological Unit in CVL by Province of Fiscal Year 2080/81

The highest number of samples were obtained for test of Brucellosis (1066) followed by CCPP (809) and Toxoplasmosis (648). The number of samples tested for various diseases by ELISA and PAT is presented in following table with the number of positive samples of respective disease.

Table 26: Samples tested for various diseases at Serology Unit of CVL of FY 2080/81

S. N.	Test for diseases	Total Samples	Positive	Negative
1	ASF Antibody ELISA	4	0	4
2	Brucellosis Antibody ELISA	1066	29	1037
3	BSE Prion Protein ELISA	50	0	50
4	BVD Antibody ELISA	57	3	54
5	CBPP Antibody ELISA	315	198	117
6	CCHF Antibody ELISA	578	51	517
7	CCPP Antibody ELISA	809	24	785
8	CHLAMYDIA Abortus Antibody ELISA	149	0	149
9	CSF Antibody ELISA	4	2	2
10	Enterotoxemia multiscreen toxin detection ELISA	54	40	14

S. N.	Test for diseases	Total Samples	Positive	Negative
11	Glanders Antibody ELISA	62	6	56
12	ILT Antibody ELISA	8	1	7
13	Leptosirosis Antibody ELISA	116	46	70
14	M.Bovis/Tuberculosis Antibody ELISA	42	1	41
15	Mycoplasma PAT Test	101	20	81
16	Paratuberculosis Antibody ELISA	59	4	55
17	PPR Antibody ELISA	6	4	2
18	PRRS Antibody ELISA	4	0	4
19	Q-fever Antibody ELISA	474	243	231
20	Salmonella PAT Test	101	7	94
21	Toxoplasmosis Antibody ELISA	648	249	399
	Total Test	**4661**	**928**	**3723**

8.2.2 Status of Brucellosis

The number of serum samples from bovine, caprine, ovine were received for diagnosis of Brucellosis was 1066. The distribution of samples by species and number of positive samples of respective species is presented in following figure. These samples were subjected for ELISA test to identify the presence of antibody of Brucellosis. Out of 1066 suspected samples 29 (2.72%) were found to be positive for antibody of Brucellosis. The number of samples by district alongwith positive samples of respective district is presented in following figure.

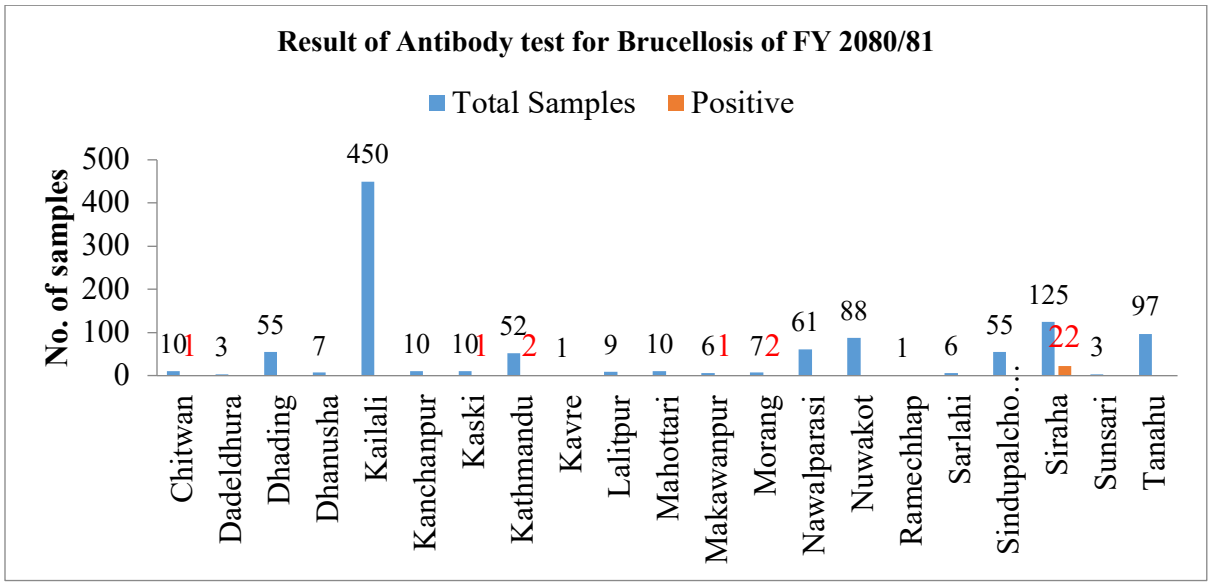


Figure 20: Result of Antibody test for Brucellosis FY 2080/81

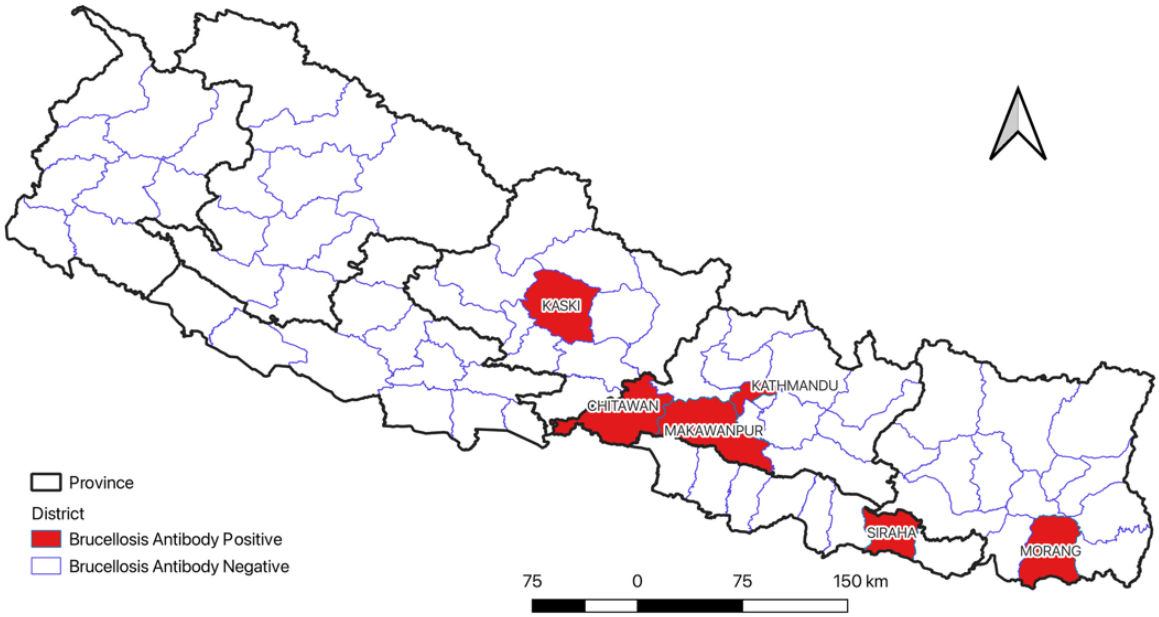


Figure 21: Map of Nepal showing Brucellosis Antibody Positive Districts of FY 2080/81

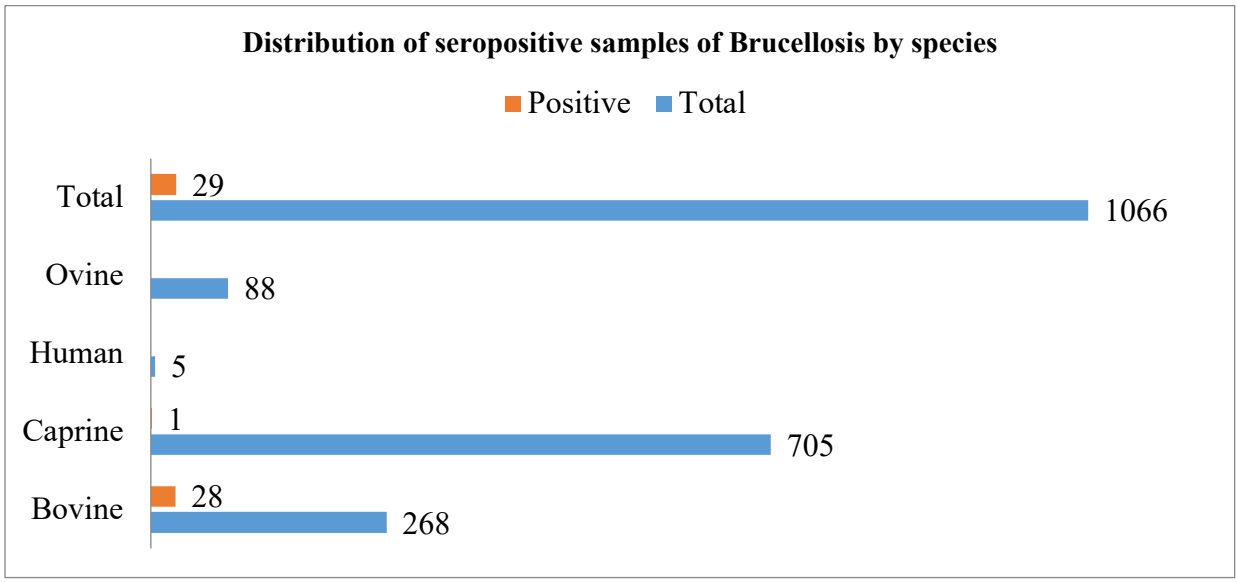


Figure 22: Distribution of seropositive samples of Brucellosis by species of FY 2080/81

8.2.3 Status of Toxoplasmosis

The number of serum samples received for diagnosis of Toxoplasmosis was 648. These samples were subjected for ELISA test to identify the presence of antibody of Toxoplasmosis. Out of 648 samples 249 (38.43%) were found to be positive for antibody of Toxoplasmosis. The highest number of positive samples was from Kailali (217/433) follwoed by Kanchanpur (10/26). The number of samples by district alongwith positive samples of respective district is presented in following figure. Highest number of samples from caprine (235/529) were seropositive for Toxoplasmosis. The distribution of seropositive Toxoplasmosis by species is presented in following figure.

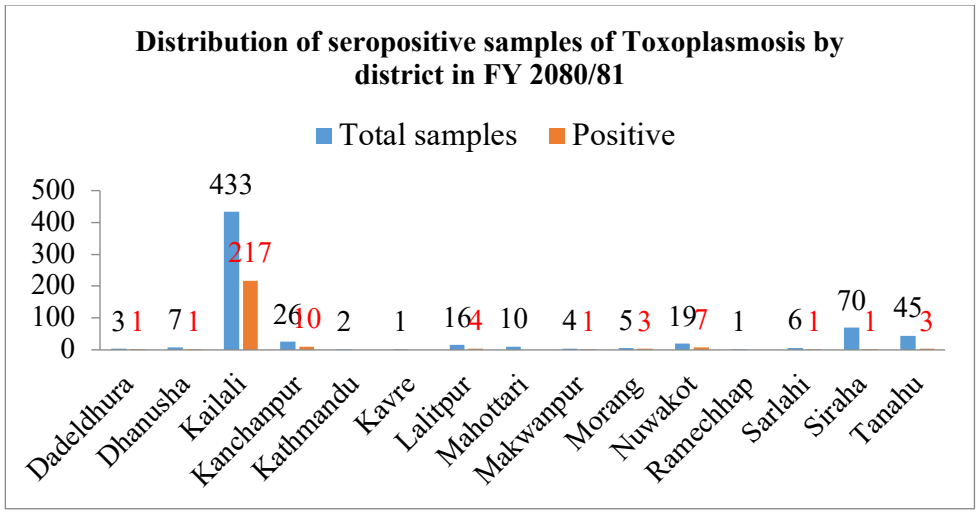


Figure 23: Distribution of seropositive samples of Toxoplasmosis by district in FY 2080/81

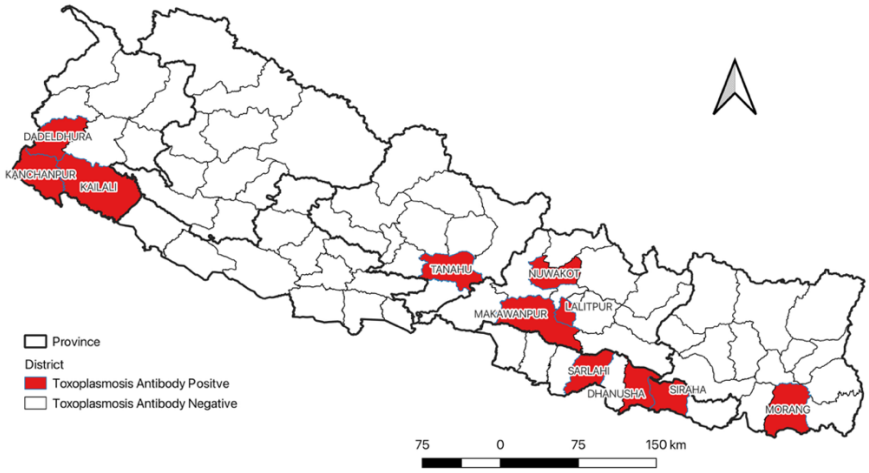


Figure 24: Map of Nepal showing Toxoplasmosis Antibody Positive Districts of FY 2080/81

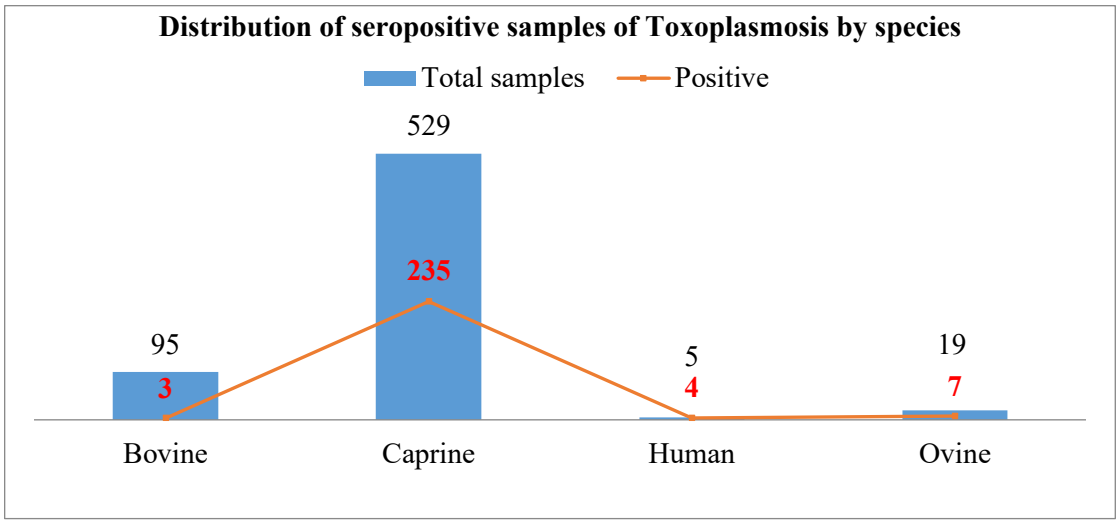


Figure 25: Distribution of seropositive samples of Toxoplasmosis by species

8.2.4 Status of Q-fever

The number of serum samples received for diagnosis of Q-fever was 474. These samples were subjected for ELISA test to identify the presence of antibody of Q-fever. Out of 474 samples 243 (51.3%) were found to be positive for antibody of Q-fever. The samples from Kailali (237/403), Nawalparasi (3/7) and Dadeldhura (3/3) were found to be positive and rest of the samples from other districts were found to be negative. The number of samples by district alongwith positive samples of respective district is presented in following figure.

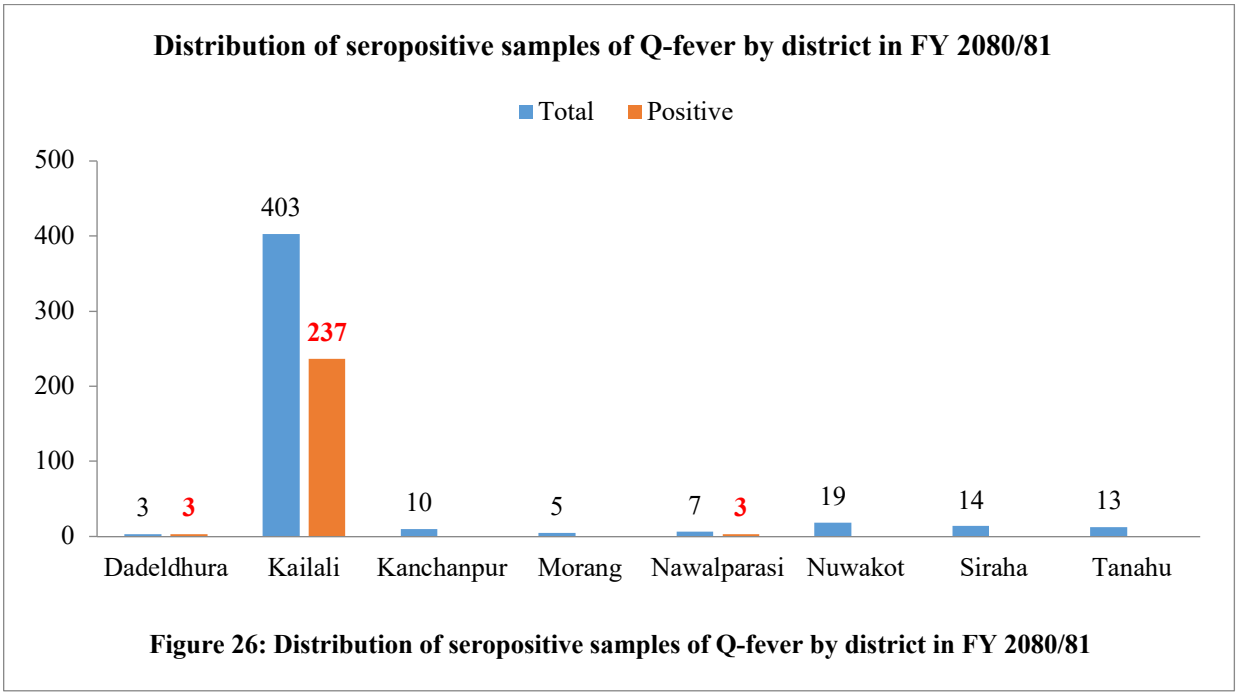


Figure 26: Distribution of seropositive samples of Q-fever by district in FY 2080/81

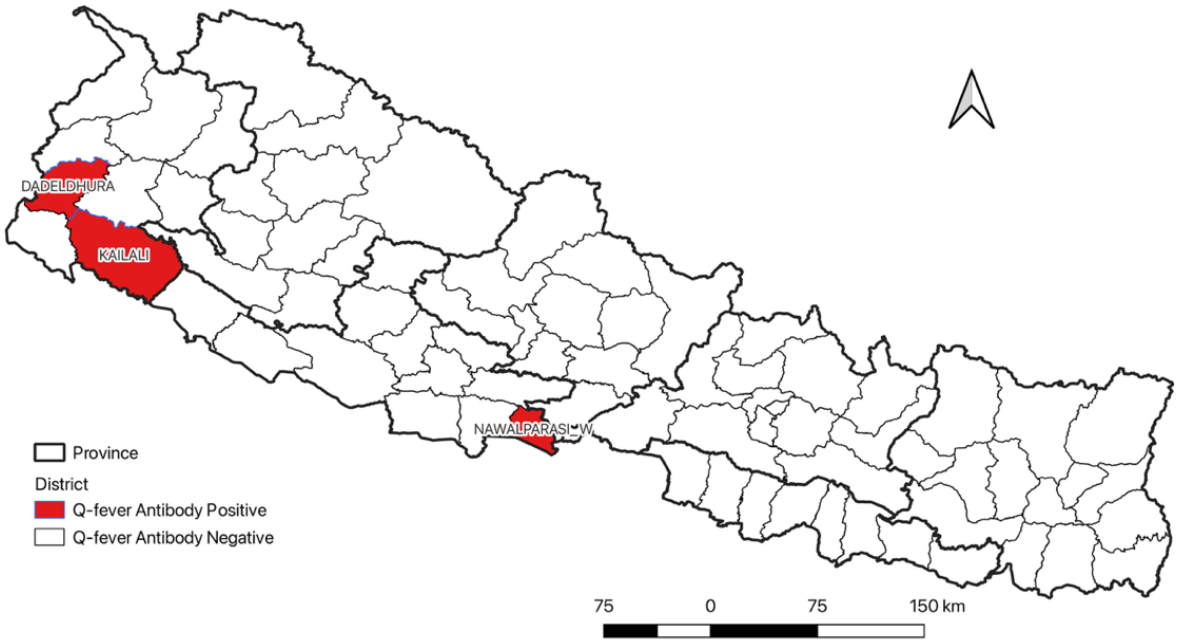


Figure 27: Map of Nepal showing Q-fever Antibody Positive Districts of FY 2080/81

8.2.5 Status of Leptospirosis

The number of serum samples received for diagnosis of Leptospirosis was 116. These samples were subjected for ELISA test to identify the presence of antibody of *Leptospira hardjo*. Out of116 samples 46 (39.7%) were found to be positive for antibody of Leptospirosis. The samples from Dhanding and Kathmandu districts were only found to be positive while rest of the samples from other districts were negative. The number of samples by district alongwith positive samples of respective district is presented in following figure.

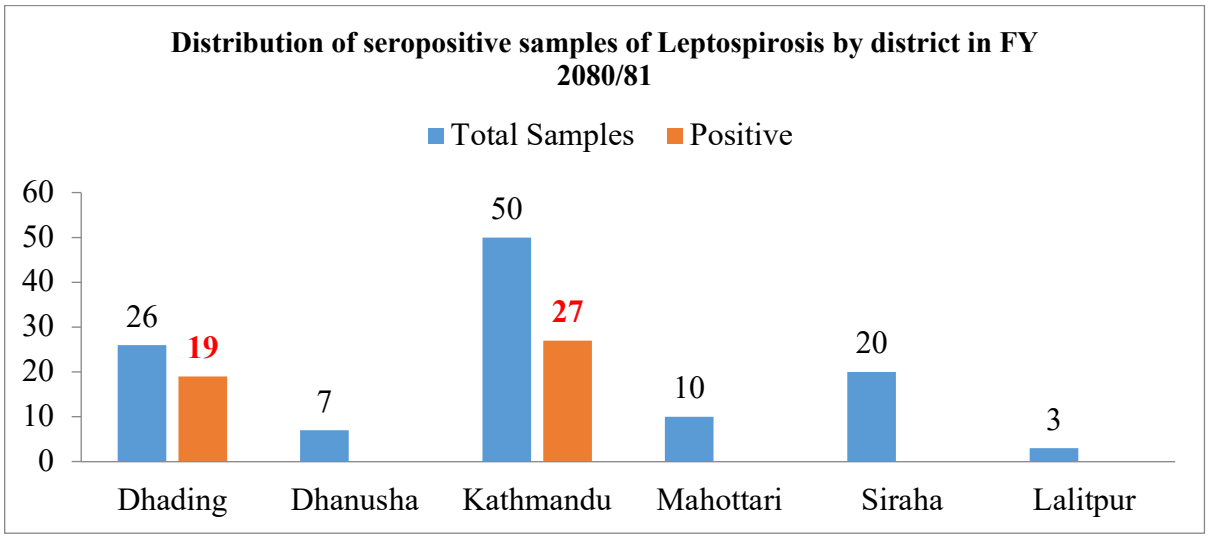


Figure 28: Distribution of seropositive samples of Q-fever by district in FY 2080/81

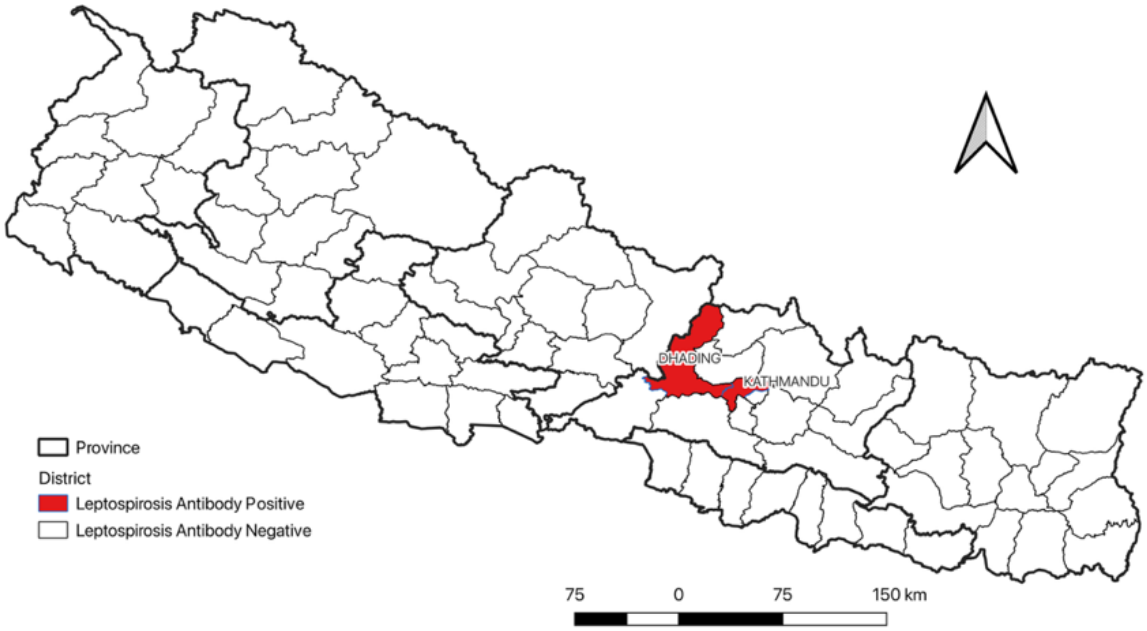


Figure 29: Map of Nepal showing Leptospirosis Antibody Positive Districts of FY 2080/81

8.2.6 Status of Enterotoxaemia

The number of serum samples received for diagnosis of Enterotoxaemia was 54 from 16 districts. These samples were tested for different toxin for enterotoxemia from *Clostridiun perfringens* toxin detection multiscreen antigen ELISA test. Out of 54 samples 40 (74.1%) were found to be positive for Enterotoxaemia toxins. The highest number of positive

samples were from Tanahu (8/9) followed by Dhading (6/8). The number of samples by district alongwith positive samples of respective district is presented in following figure.

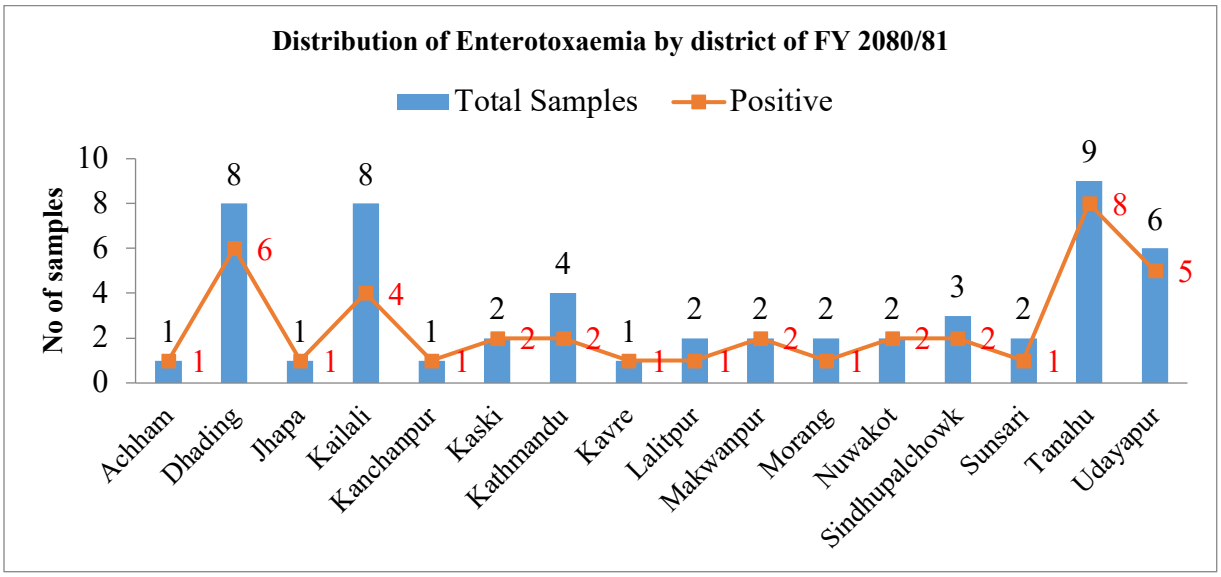


Figure 30: Distribution of Enterotoxaemia by district of FY 2080/81

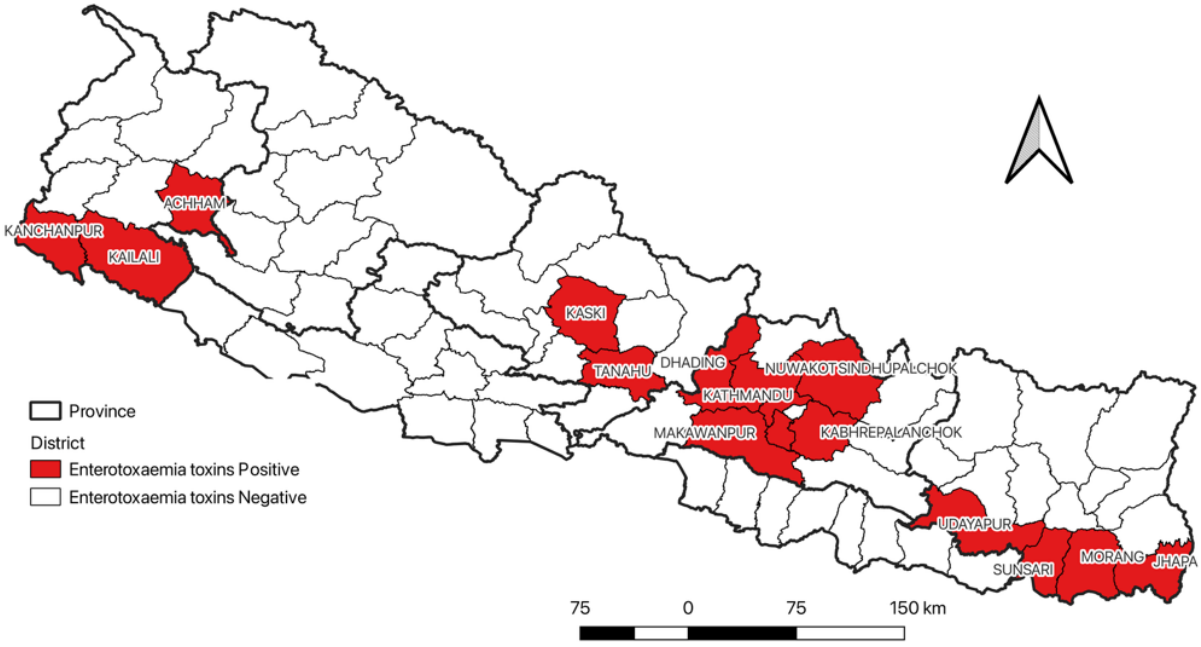


Figure 31: Map of Nepal showing Enterotoxaemia Toxin Positive Districts of FY 2080/81

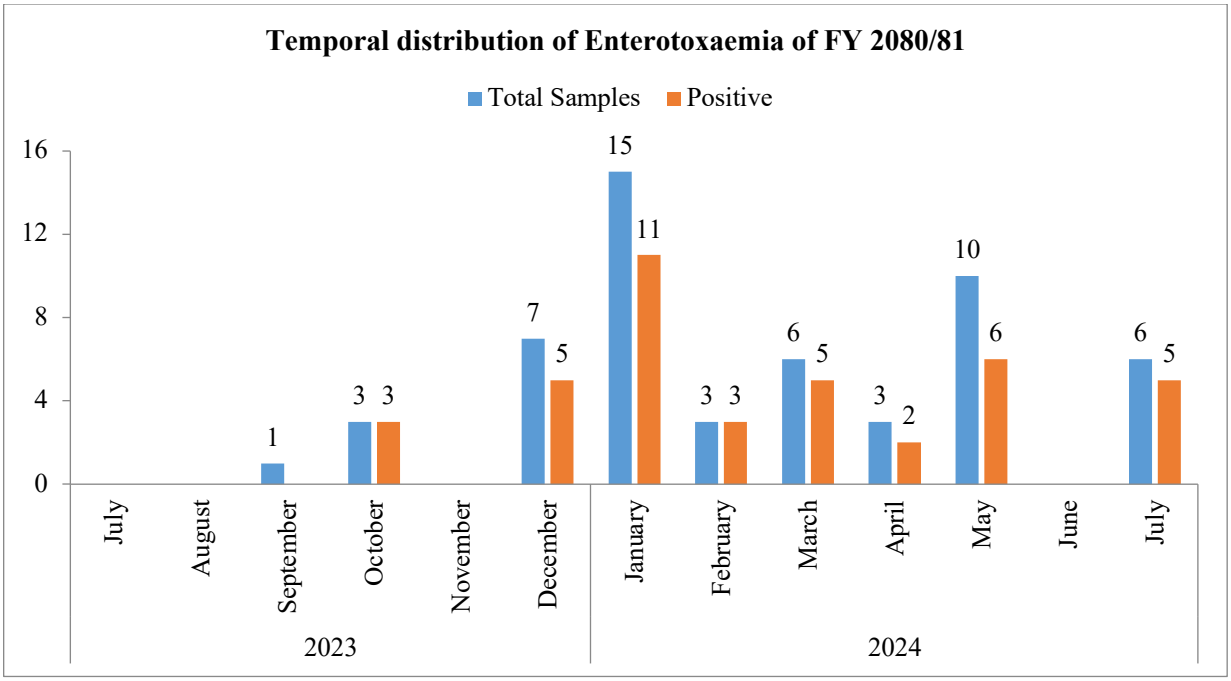


Figure 32: Temporal distribution of Enterotoxaemia suspected samples and positive samples

8.2.7 Status of BSE

BSE surveillance in cattle was conducted as per the national BSE surevillance plan, Samples were collected from different parts of the country from cattles showing neurological signs such as limping, lameness etc. As cattles slaughtered is prohibited by law in Nepal collecting samples is very difficult and also as cow being treated as a holy animal, if found dead are buried deepily. So animals which were insured and found dead and cattles that died in gaushala were targeted for sample collection. The samples were collected from Morang, Jhapa, Susnsari, Nawalparasi, Tanahau, Kaski, Surkhet, Dhangadhi and Kathamandu valley. Alltogether 50 samples were collected and tested using PrioSTRIP BSE test kit and all samples were found negative.

9. Veterinary Public Health Section

Veterinary Public Health section is responsible to assure the safety of public with consumption of animal products. This section conducts various programs to address public health issues such as veterinary drugs, insecticides/hormones/pesticides residue testing in milk, egg, meat and fish. This section is conducting antibiotic residue testing in certain group of antibiotics like as Streptomycin, Gentamycin, Sulphonamides and Tetracycline. It conducts hormone test in the milk and meat that are harmful to the health of people. It is conducting the ractopomine and progesterone hormone residue test in milk and meat sample. It is responsible to conduct zoonotic disease surveillance that are prevalent and at high risk in Nepal and monitoring of meat shop.

9.1 Antibiotic residue test in milk and meat

In the FY 2080/81, 276 meat and 158 milk samples were tested for the presence of antibiotic residue of the drugs that are commonly used in the field. The list included fluoroquinolones, colistin sulphate and tetracycline for the meat samples whereas for the milk samples it included ampicillin, gentamicin and sulphonamide. Residue was detected only in meat samples. 1.08% of the meat samples showed presence of the tested antibiotics residue.

Table 27: Antibiotic residue test result

S.N.	Sample	Test	District	Negative	Positive	Total Sample
1	Meat	Colistin Sulphate	Rupandehi	82	0	82
2	Meat	Tetracycline	Rupandehi	82	0	82

S.N.	Sample	Test	District	Negative	Positive	Total Sample
3	Milk	Ampicillin	Tanahun	90	0	90
4	Milk	Ampicillin	Kathmandu Valley	7	0	7
5	Milk	Ampicillin	Gorkha	5	0	5
7	Milk	Gentamicin	Lalitpur	17	0	17
8	Meat	Fluoroquinolones	Dhading	28	0	28
9	Milk	Sulphonamide residue	Tanahun	39	0	39
10	Meat	Fluroquinolones	Sindhupalchok and Kathmandu	39	3	42
11	Meat	Total Aflatoxin	Sindhupalchok	42	0	42
Total				**431**	**3**	**434**

9.2 Zoonotic Diseases Surveillance

The table provides a concise overview of laboratory surveillance conducted across multiple districts to detect major zoonotic diseases in livestock. In total, 1,284 samples comprising both serum and milk from pigs, cattle, buffalo, goats, and sheep were tested for porcine cysticercosis, toxoplasmosis, and brucellosis, which pose risks to both animal productivity and public health.

- Porcine cysticercosis was tested in pigs, with 4 positives out of 58 samples, indicating a prevalence of about 6.9%.
- Toxoplasmosis was screened in goats, with 79 positives out of 272 tested (combining Makwanpur and Dashain market), resulting in an approximate prevalence of 29%.
- Brucellosis, which was the most extensively tested disease, was checked in cattle, buffalo, goats, and mixed milk samples, yielding 9 positives out of 954 tested, giving an overall brucellosis prevalence of about 0.9% in the tested population.

Table 28: Zoonotic Diseases test results

Month	District	Sample	Species	Test	Positive	Negative	Total Sample
Bhadra	Dolakha	Serum	Pig	Porcine cysticercosis	4	54	58
Kartik	Madesh	Serum	Cattle/ Buffalo	Brucellosis	2	261	263
	Makwanpur	Serum	Goat	Toxoplasmosis	78	123	201
	Dasain market Kathmandu Valley	Serum	Goat	Toxoplasmosis	1	70	71
			Goat	Brucellosis	0	74	74
Mangsir	Tanahun	Milk	Cattle/ Buffalo	Brucellosis	0	87	87
	Khotang	Milk	Cattle/ Buffalo	Brucellosis	0	58	58
	Gorkha	Milk	Cattle/ Buffalo	Brucellosis	0	5	5
Poush	Lalitpur	Milk	Buffalo	Brucellosis	0	180	180
Magh	Dang	Milk	Cattle/ Buffalo	Brucellosis	1	66	67
Chaitra	Tanahun Kathmandu	milk	Cattle/ Buffalo/Goat	Brucellosis	2	37	39
Baisakh	Makwanpur	Milk	Cattle/ Buffalo	Brucellosis	0	68	68
	Sunsari	Milk	Cattle/ Buffalo	Brucellosis	2	58	60
Jestha	Okhaldhunga Lalitpur Kathmandu	Milk	Cattle/ Buffalo	Brucellosis	1	52	53
Total					**92**	**1193**	**1284**

VETERINARY LABORATORY

1. Introduction

To provide diagnostic facilities throughout the country, CVL works through its five Veterinary Laboratories (VLs) located in different provinces of the nation; Veterinary Laboratory, Biratnagar Janakpur, Pokhara, Surkhet and Dhangadhi. Specimens that cannot be processed in the aforementioned laboratories due to insufficient facilities and expertise or needed to be further tested for confirmation are referred to the CVL.

2. Objectives

The objectives of veterinary laboratories as follows;

- To provide prompt and efficient disease diagnostic services to the farmers of respective province/working areas.
- To investigate and diagnose the epidemics in the province.
- To assist and support VHLESC and local level governments for sample collection, disease diagnosis and epidemic control.
- To supervise and assist in diagnostic services to basic and primary laboratories situated in VHLESC in the province.
- To collect, analyze and predict the animal diseases prevailing in the province.
- To develop human resources for the field level veterinary services.
- To coordinate and support national livestock disease control and eradication program.
- To support and facilitate the national veterinary regulatory services.
- To participate actively in collaborative and coordinated research program in animal health and production in the region.

3. Laboratory Services at VL

To meet the above-mentioned objectives, the veterinary laboratories has been providing services under four sections.

3.1 Pathology section

Post-mortem examination, hematology and biochemistry are the major areas under the pathology section. Mostly the section receives specimens from all over the province either directly or through the respective VHLESC or local level government. Besides this, veterinary practitioners, livestock and poultry farms as well as farmers deliver specimens for the purpose of disease diagnosis.

3.2 Microbiology section

This section is responsible for isolation and identification of bacteria and fungus, which receives samples from various sources such as farmers, local level governments, referral samples from private clinics, VHLESC and directly from the field during the outbreaks. Various samples like milk, urine, tissues, water, nasal swabs, ear swabs and skin scrapping are received in this unit for isolation, identification and antibiotic sensitivity testing of the organism. Also, this section is responsible for the diagnosis of viral disease through different tests. Lateral flow assay (antigen based) is used for the initial diagnosis of New Castle Disease, Disease, Avian Influenza, Infectious Bronchitis, African Swine Fever and Rabies. For the further confirmative diagnosis of disease, the samples are sent to the CVL.

3.3 Molecular biology/Serology section

Molecular tools are increasingly important in modern animal disease investigation. Molecular biology section is functioning in some labs and are planning to make functional in other labs facilities for handling infectious

agents. This section also the facility for ELISA and other serological tests. Most of the samples are submitted to this unit by the post mortem unit and field level for the further confirmative diagnosis of disease, the samples are sent to CVL.

3.4 Administration Section

This section governs overall financial, logistic and administrative management of the laboratory. The section is responsible for revenue collection, maintenance of reagents and supplies, financial transaction, vehicle management etc.

4. Organizational structure

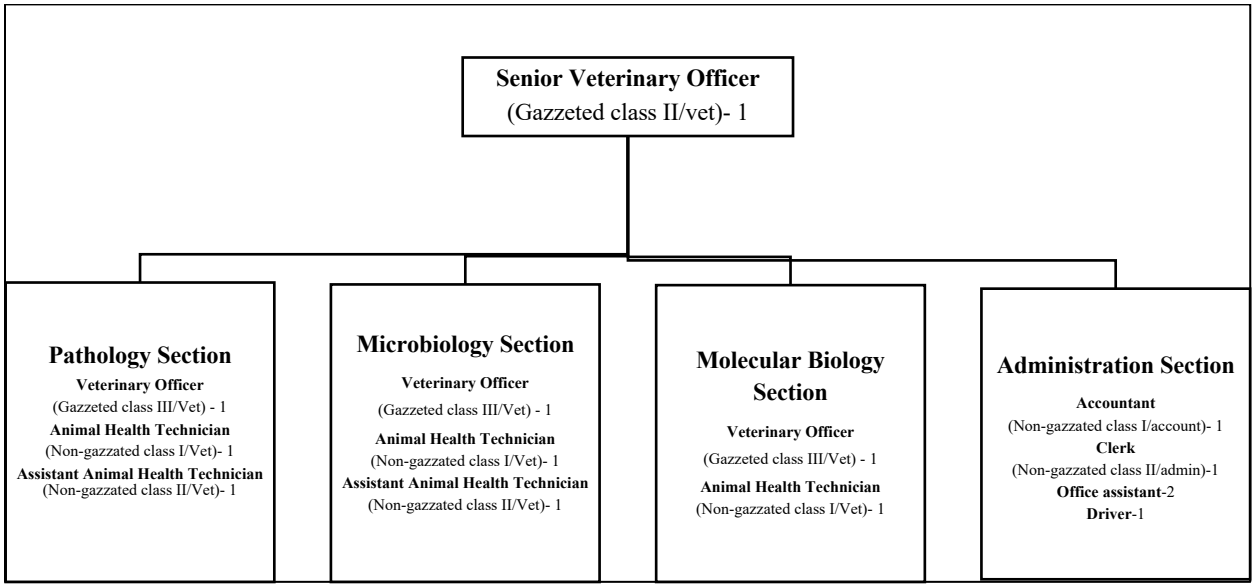


Figure 1: Organizational structure of VL

VETERINARY LABORATORY BIRATNAGAR

1. Introduction

The Veterinary Laboratory, Biratnagar is located in Biratnagar Metropolitan City in Koshi Province. It was established in F.Y.1988/1989 as Regional Veterinary Laboratory, Biratnagar (RVL) and covered all the 16 districts of the Eastern Development region. This laboratory was restructured during 2074/75 with the scope to work in all 14 districts of Koshi Province. In Veterinary Laboratory, Biratnagar, following diagnostic services are available: feacal test, blood test, skin scraping and postmortem examination, bacterial culture etc.

2. Human resource

Table 1: Staffing of Veterinary Laboratory, Biratnagar, Morang

S. N	Name of Staff	Designation
1	Dr. Sanjay Kumar Yadav	Senior Veterinary Officer
2	Dr. Kamal Giri	Senior Veterinary Officer
3	Dr. Ananta Koirala	Veterinary Officer
4	Dr. Khila Bogati	Veterinary Officer
5	Dr. Suleshwor Mandal	Veterinary Officer
6	Dr. Roshan Dahal	Veterinary Officer
7	Mr. Balaram Pokharel	Accountant
8	Mr. Yogendra lal Yadav	Animal Health Technician
9	Ms. Babita Rai	Animal Health Technician
10	Mr. Bikash Adhikari	Asst. Animal Health Technician
11	Mr. Bishnu Prasad Dulal	Asst. Animal Health Technician
12	Mr. Mim GC	Asst. Animal Health Technician
13	Mr. Ramesh Kumar Khadka	Kharidar
14	Mr. Ram Sewak Mandal	Office Attendant

3. Laboratory Service

3.1 Parasitological examination:

Parasitology unit examine the faecal samples of various livestock species by direct smear, sedimentation and flotation method. Parasitological unit identify the parasites and quantify the parasitic burden of the nematodes, trematodes and cestodes by Mc-Master method.

In this fiscal year 080/81, a total of 78 faecal samples were examined under microscope and were found positive for various parasite species. Internal parasites like; Strongylus, Fasciola, Paramphistomum, Trichuris etc. were major internal parasites. Result of the faecal examination is presented in table and figure below.

Table 2: Result of fecal examination (Distict wise)

District	Species	Total sample	Positive	Negative	Positive %
Sunsari	Goat	25	9	16	36%
Morang	Goat	25	14	11	56%
Jhapa	Goat	28	7	21	25%

Among the parasite species identified were Strongyles-7, Paramphistomum-9, Flucke-12, and Trichuris- 2.

3.2 Clinical hematological Test:

Hematology unit examine the blood samples of various species of animals in Koshi province. Hematological test includes the Hb, PCV, DLC, ESR, PLT estimation and identification of blood protozoa. This test is performed by the hematoanalyzer and microscopic examination of blood. In this fiscal year total of 812 blood

samples were tested in which 130 samples were found positive for blood protozoa. Among these samples 240 was of cattle, 14 was of buffalo, 443 of dog, 5 of goat and 4 of swine. Blood protozoa like: Trypanosoma sps., Babesia sps., Anaplasma sps., and Theileria sps. were identified. Result of the blood examination is presented below.

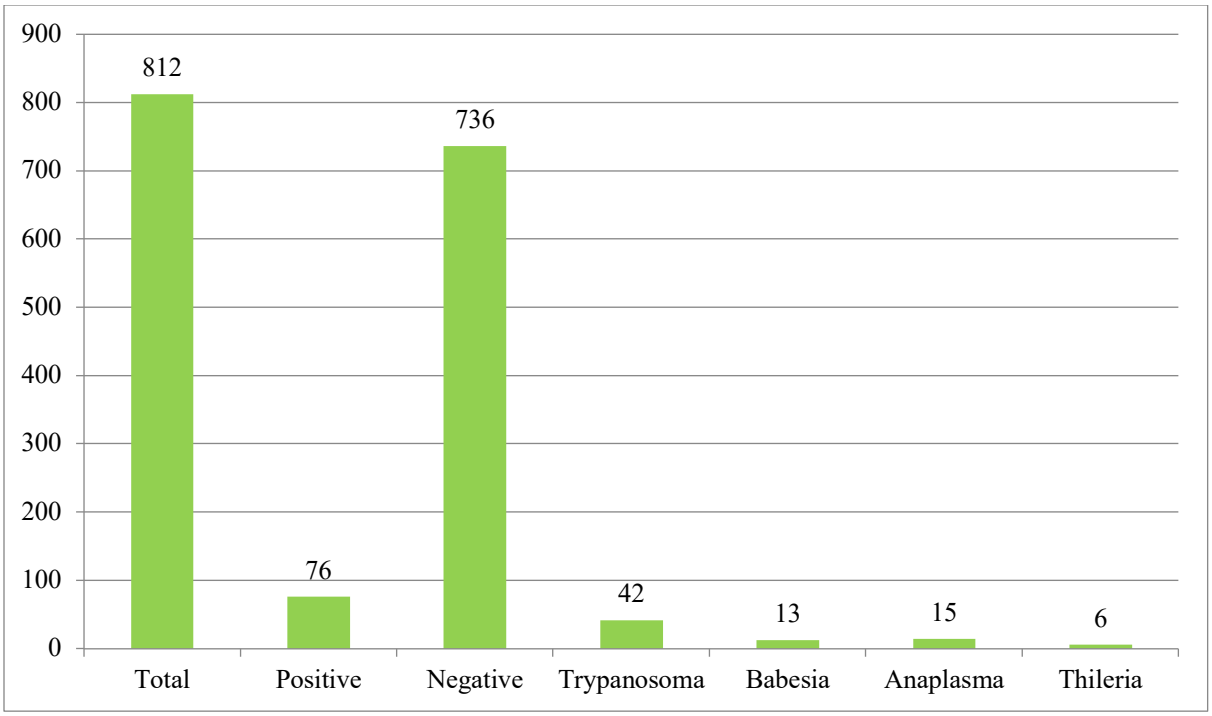


Figure 1: F.Y.080/81 Positive cases details of blood parasites

3.3 Skin scraping test:

In this year, a total of 53 samples of skin was tested for parasites. All the samples were of dog out of which 12 samples were positive for demodex and 2 for sarcoptes spp.

Figure 2: Soroptes in dog

Figure 3 : Demodex in dog

3.4 Urine test:

Out of 48 urine sample submitted for testing, 7 samples were found abnormal with trace blood (5), increase urobilinogen (3) and pus (1) respectively.

3.5 California Mastitis Test (CMT):

CMT test was used to test milk samples for suspected clinical and sub-clinical mastitis. A total of 836 milk samples were tested 270 were found positive and rest are negative.

Table 3: CMT results

SN	Place	Total Sample	CMT Positive	CMT Negative	Remarks
1	Dharan, Sunsari	92	17	75	Active suveillance
2	Barju, Sunsari	76	1	75	
3	Gauriganj, Jhapa	100	9	91	
4	Chaudanadi, Triyuga Udayapur	92	10	82	
5	Jhapa, Morang, Sunsari, Saptary, Udayapur and Siraha	476	233	243	Passive
Total		836	270	566	

Positive milk samples were forward for the bacteria culture, identification and AST.

3.6 Microbiological Examination:

Microbiology unit conducts bacterial culture for bacteria identification and AST. Sample like milk, blood and tissue are routinely processed for bacteriological work. In this fiscal year, out of 341 culture samples, 270 were milk and 71 were blood and tissue. From the culture following bacteria were isolated

- Salmonella
- Escherichia coli
- Enterobacter
- Staphylococci
- Klebsilla
- Citrobactor
- Proteus

3.7 Antibiotic sensitivity test (AST):

A total of 270 milk culture samples were found to be sensitive to Gentamicin, tetracycline, streptomycin, ceftriaxone, penicillin and ampicillin respectively. Result of drug sensitivity is presented in the figure below.

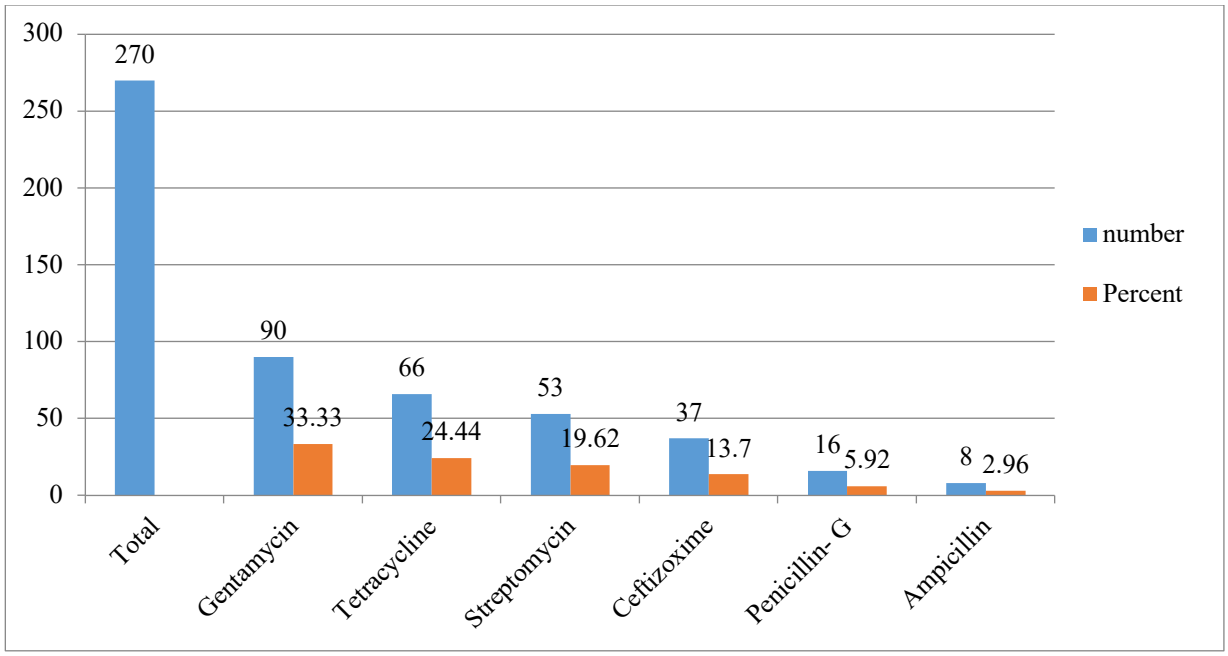
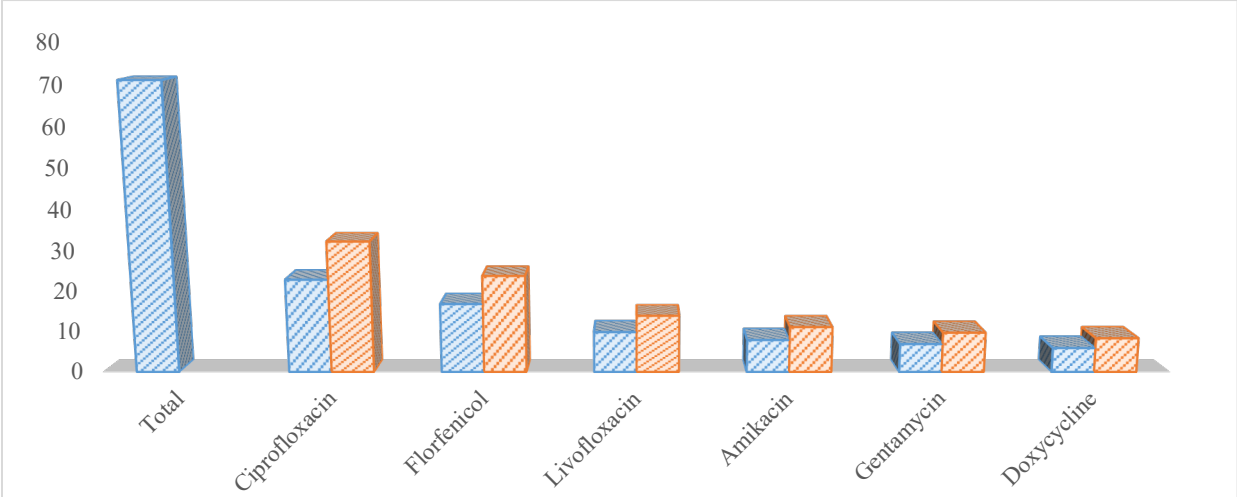


Figure 4: AST result of milk samples

Similarly, a total of 71 swab samples of poultry and sensitivity pattern to ciprofloxacin, florfenicol, levofloxacin, amikacin, gentamicin and doxycycline is presented below.



	Total	Ciprofloxacin	Florfenicol	Livofloxacin	Amikacin	Gentamycin	Doxycycline
Number	71	23	17	10	8	7	6
Percent		32.39	23.94	14.08	11.26	9.85	8.45

Figure 5: AST result of swab samples

3.8 Serological Examination:

Serological unit of VL Biratnagar conduct different types of test like PAT, Lateral flow assay (LFA), and Biochemical Test. Details of the tests are shown in table below.

Table 4: PAT test results

1	PAT	Salmonella, Mycoplasma, RBPT
2	LFA	Bovine Tuberculosis, Brucellosis, *E. canis*, etc
3	Biochemical test	Calcium, Phosphorus, Protein, Glucose, Iron, Creatinine, Magnessium, Urea, Liver Function Test., etc

Table 5

PAT and LFA Results				
	Annual Target	Total sample	Positive	Negative
RBPT	100	311	2	309
Bovine TB	100	100	0	100
Salmonella	100	145	50	95
Mycoplasma	100	145	110	35
Total	400	701	162	539

***Sample from**: Sunsari, Morang, Jhapa, Saptari, Udayapur*

- Brucellosis antibody positive sample from Sunsari and Morang district.

3.9 Disease outbreak samples:

In this fiscal year outbreak were suspected for toxoplasma and enterotoxemia in few districts. Samples and test result of which is presented in table below.

Table 6: Disease outbreak investigation results

S.N.	Disease	Total sample	Type of sample	Positive	Positive sample from
1	Toxoplasma	5	Serum	3	Jhapa, Morang
2	Enterotoxaemia	40	Viscera	27	Sunsari, Morang, Jhapa and Dhankuta

4. Virological Examination:

Virological unit performs tests for different types of viral using LFA and ELISA. List of the virological test conducted by VL, Biratnagar includess:

i. Bovine Disease: - FMD, PPR, ASF, CSF, Rabies, Canine distemper, PRRS, Canine parvo, Canine corona, Rota viral, BVD, etc.
ii. Avian Disease: - ND, IBD, IBV, AIV, etc.

Table 7: Viral Disease Outbreak Details in fiscal year 080/81

S.N.	Disease	Total sample	Type of sample	Positive	Positive sample from
1	FMD (Ag)	40	Saliva, tissue	21	Okhaldhunga, Morang, Jhapa, Sunsari, Khotang and Udayapur
2	PPR (Ag)	150	Nasal discharge	92	Sunsari, Morang, Udayapur and Dhankuta
3	CSF (Ab)	25	serum	25	Sunsari, Morang and Jhapa
4	ASF (Ag)	32	Blood, Tissue	7	Sunsari, Morang and jhapa
5	Rabies (Ag)	68	Brain, saliva	23	Sunsari, Morang, Patchthar, Udayapur and Ilam
6	CDV (Ag)	25	Conjunctiva, serum	17	Sunsari and Morang
7	CPV (Ag)	54	feaces	17	Sunsari and Morang
8	LSD (Ag)	142	Tissue/nasal swab	142	Koshi Province

In this fiscal year 2080/81, there was no severe disease outbreak causing huge loss of livestock. A total of 632 samples were collected from different districts for different disease and seven notifiable diseases were laboratory confirmed. For the confirmation test were done by CVL and FMD &TADS lab Kathmandu. Details of this is shown in table below.

Table 8: Sample collected and test result for notifiable diseases

Disease	Total sample	Positive
Anthrax	5	4
Avian influenza	374	10 H9
FMD	40	21
PPR	150	92
CSF	25	0
ASF	29	12
LSD	9	7
Total	***632***	***146***

5. Pathological Examination:

Pathological unit include the post-mortem examination of animals and birds. Most of the cases brought in the laboratory were poultry and some goat and pigs. Out of total 1394 samples, 1374 chickens, 13 goats and 7 pigs were examined. Cases were brought from Sunsari, Morang, Jhapa, Dhankuta, Saptari and Udayapur.

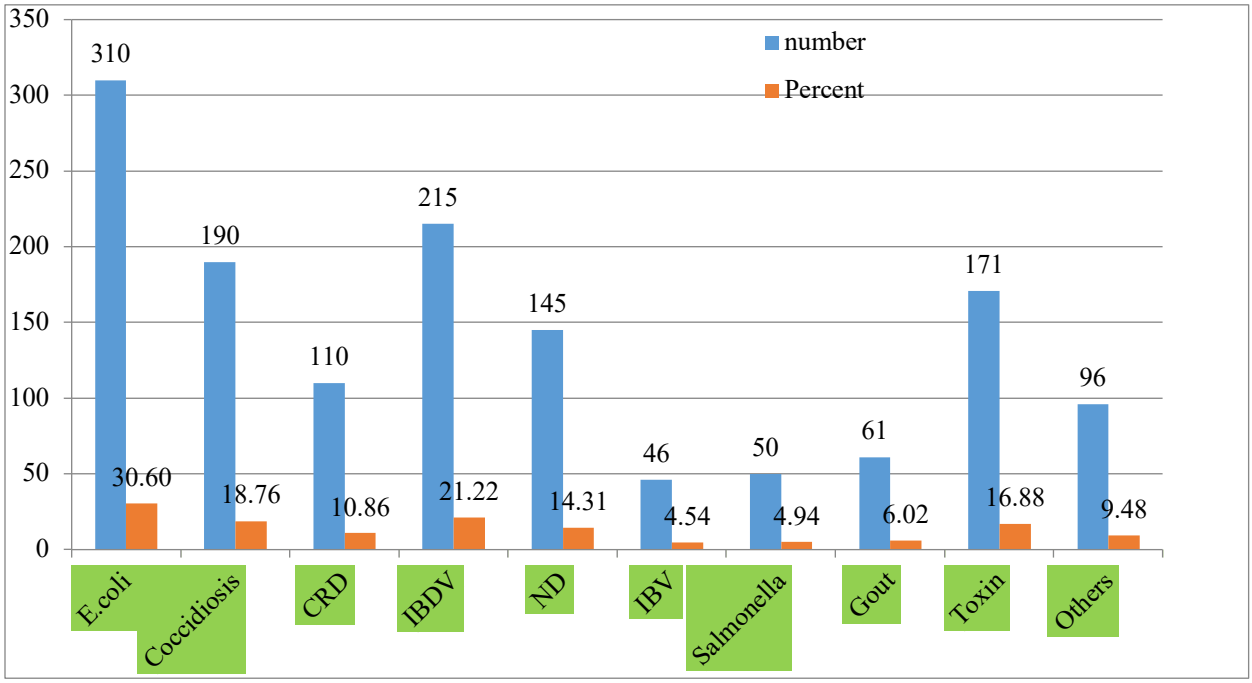


Figure 6: PM examination of poultry

6. Seromonitoring:

6.1 FMD Seromonitoring:

In this fiscal year, samples for seromonitoring were collected as per the sampling plan recommened by CVL. It included minimum three wards from each local level and at least three local level from each district. VL collected 1920 serum sample from different district of the Koshi Province. Out of total sample 867 were for FMD, 961 for PPR and 92 for CSF sero conversing testing respectively. Efficacy of vaccine shown in below figure;

Table 9: FMD seromonitoring result

District	Total	Positive	Pos.%	Negative	Neg.%
Sunsari	99	55	55	45	45
Morang	98	33	33.7	65	66.3
Jhapa	101	65	64.4	36	35.6
Illam	100	39	39	61	61
Patchthar	88	9	10.3	79	89.7
Okhaldhunga	106	85	80.2	21	19.5
Sankhuwasava	81	57	70.4	24	29.6
Udayapur	100	48	48	52	52
Dhankuta	94	55	58.5	39	41.5
Total	867	446	51.4	421	48.6

6.2 CSF seromonitoring;

Table 10: CSF Seromonitoring result

District	Total sample	Positive	Negative	Pos %	Neg %
Morang	45	34	11	75.6	24.4
Sunsari	47	19	28	40.4	59.6

6.3 LSD seromonitoring;

In last fiscal year 2079/80 Koshi province had suffered significant loss of livestock head due to lumpy skin disease outbreak with a total of 290557 infected animals, 11508 deaths and 278822 recoveries. For the control of this disease LSD vaccine was used. To monitor the trend of efficacy of vaccine a total of 332 serum sample collected from different 11 districts of Koshi province, out of which 210 sample were found having positive antibody response for LSD and 122 were found negative.

Table 11: LSD seromonitoring result

S.N.	District	Total sample	Positive	Negative	Positive (%)	Negative (%)
1	Taplejung	28	19	9	67.85	32.15
2	Panchthar	27	12	15	44.44	55.56
3	Ilam	15	12	3	80.0	20.0
4	Jhapa	22	18	4	77.77	23.23
5	Morang	30	15	15	50.0	50.0
6	Sunsari	35	20	15	57.14	42.85
7	Sankhuwasabha	33	25	8	75.75	24.25
8	Udyapur	38	29	9	76.32	23.68
9	Okhaldhunga	35	20	15	57.14	42.85
10	Terahthum	42	27	15	64.28	35.72
11	Khotang	27	13	14	48.14	51.86
	Total	**332**	**210**	**122**	**63.25**	**36.75**

6.4 Glanders Antigen test:

Glanders is a highly contagious and life-threatening disease that mainly affects horses, donkeys or mules caused by the bacterium Burkholderia mallei. Glanders is transmitted to human through the contact with infected body fluids, animals etc abd can cause the fever, headache, localize infection, respiratory problems.

In this fiscal year, a total of 61 serum samples were collected from two districts Bhojpur and Ilam where equines have high contact with humans and were tested by ELISA using ID vet Double Antigen test kit. All samples were found negatives for glanders.

Table 12: Test result of Glanders Antigen test

S.N.	District	Total sample	Positive	Negative
1	Ilam	29	0	29
2	Bhojpur	32	0	32
	Total	61	0	61

7. Vaccine Bank Management:

In our country, outbreaks of different diseases are recorded each year. Department of Livestock Services (DLS) has been distributing vaccines for use in animals under Natioanl Animal Disease Control Program.

In this fiscal year, under the national programme, vaccine distribution was done to all district of the Koshi province. Vaccine distributed included FMD, PPR, CSF, RD, and HS&BQ.

Table 13

District	FMD	HS&BQ	LSD	PPR	CSF	ND	Rabies
Morang	106000	4100	42000	225000	95300	50000	3080
Sunsari	102300	13000	36000	180000	20000	84000	1600
Panchthar	30000	0	18000	145000	48000	80600	1050
Okhaldhunga	62700	1000	12000	128000	17000	124000	300
Dhankutta	43800	1300	18000	174000	16000	46000	500
Udyapur	23100	119000	21000	288000	32000	291000	720
Sankhuwasabha	39600	8000	18000	179000	46000	332000	0
Jhapa	86200	10000	60000	357100	101000	168000	1250
ToTal	493700	156400	215000	1676100	375300	1175600	8500

VETERINARY LABORATORY JANAKPUR

1 Introduction

Veterinary Laboratory is situated in Janakpurdham city of Madhesh province. The laboratory is providing diagnostic services to eight districts of Madhesh Pradesh and also to the adjoinging districts of Bagamati province. The working areas of this laboratory is mainly focused on surrounding districts: Dhanusha, Mahottari, Sarlahi, Rauthat, Bara, Parsa, Siraha, Saptari, and Sinduli. The laboratory has various units viz pathology, parasitology, microbiology, hematology, biochemistry, sterilization and serology. Histopathological and molecular laboratory test results are obtained by dispatching the relevant specimens to CVL, as these diagnostic facilities are not available in Veterinary Laboratory, Janakpur at present.

2. Human resources

Table 1: Staffing of Veterinary Laboratory, Jankpur, Dhanusha

S.N.	Name of staff	Position
1.	Dr. Rakesh Mahoan Singh	Senior Veterinary Officer
2.	Dr. Mukesh Nayak	Veterinary Officer
3.	Mr. Rakesh Kumar Sah	Veterinary Officer
4.	Mr. Anirudh Sah	Animal Health Technician
5.	Mr. Laxmi Mandal	Animal Health Technician
6.	Mr. Satyanarayan Sah	Animal Health Technician
7.	Mr. Sudhir Kumar Sah	Accountant
8.	Mr. Kula Nand Jha	Driver
9.	Mr. Surendra Mishra	Office assistant
10.	Mr. Binod Kapad	Office assistant

3. Laboratory service

The routine work of Veterinary Laboratory, Janakpur mainly involves examination of fecal sample, postmortem examination, Sero-Surveillance, CMT test of milk samples and bacterial culture and sensitivity testing, outbreak investigation and vaccine bank management. Milk samples were tested to isolate and identify the bacteria responsible for clinical and subclinical mastitis. Blood samples was brought from different districts of Madhesh Province for complete blood count and blood parasite identification. Serum samples were examined for total protein, calcium, phosphorus, glucose, magnesium, brucellosis, etc. Examination of skin scraping and urine was frequently conducted in VL Janakpur. Drug sensitivity test is in regular basis after bacterial culture of positive sample.

3.1 Pathology section

3.1.1 Parasitological examination

Parasitological examination from faeces of different animals has been done routinely. The fecal sample are received mainly from farmers directly or referred by province veterinary hospitals of Dhanusha, Mahottari, Sarlahi, Sinnduli, Rautahat and Bara districts. For the gastro intestinal parasites, Mc'master technique is followed to count eggs per gram (EPG) in feces.

In the F/Y 2080/81, a total of 1778 fecal samples were received among them 1712 from cattle and 66 from goat were examined. Among these samples 1682 samples (95%) were found positive and 96 samples (5%) were found negative. The results of fecal test revealed that *Fasciola* 670 (38%), *Paramphistomum* 572 (32%), *Ascaris* 261 (14%), *Strongylus* 137 (8%), *Trichuris* 124(7%) and *Toxocara* 14(1%).

Table 2: Average number of eggs found in EPG

Nematodes			
Species	**Mild infection**	**Moderate infection**	**Severe infection**
Cattle/Buffalo	100-300	300-600	600-800
	3	13	6
Sheep/Goat	300-500	1000-1500	2000-3000
	2	7	1
Trematodes			
Cattle/ Buffalo	50-100	100-200	200-400
	23	73	94
Sheep/Goat	50-100	100-200	300-600
	4	9	2

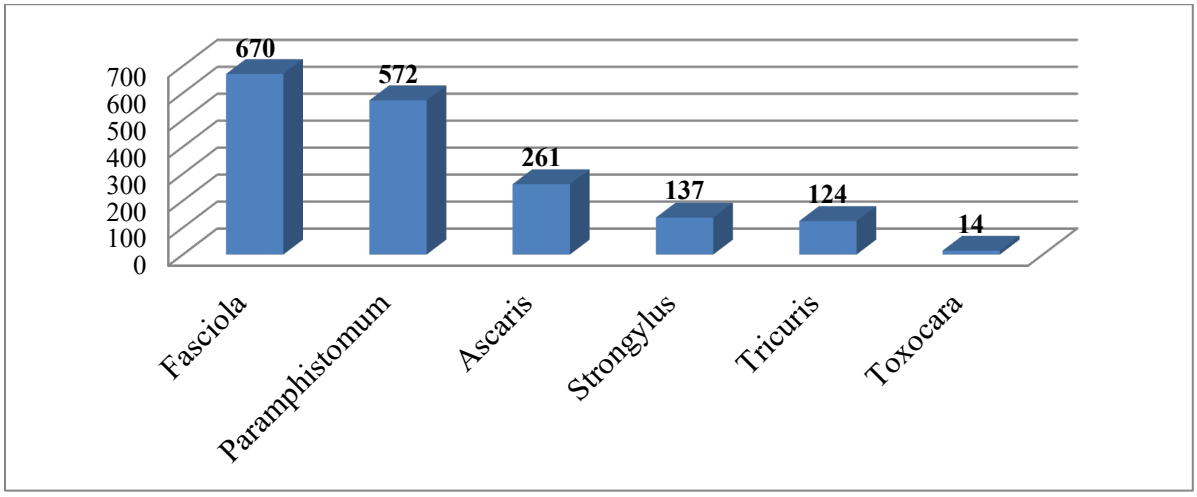


Figure 1: Showing species of parasite found during feacal examination

3.1.2 Haematological examination

A total of 120 Blood sample were examined for different blood parameters as well as for blood parasites. Among them 78 samples were found negative for any blood parasites and rest 42 were found positive for different blood parasites.

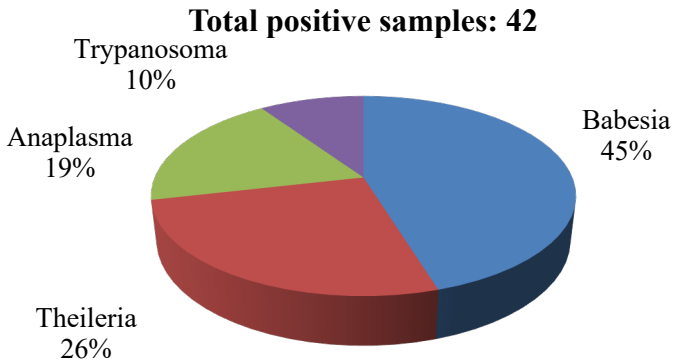


Figure 2: Hemoprotozoans species identified at VL.

3.1.3 Pathological Examination

The pathological examination includes mostly post-mortem examination of the dead birds received from commercial poultry farms Most of the cases were from Dhanusha and Mahottari district and sometimes from Sindhuli, Sarlahi, Rauthat and Sirha district. A total 1032 cases of post mortem were performed during the F/Y 2080/81. All case received were of birds. No cases of other species of animals were received. The status of spatial and temporal case trend and different diseases is shown below.

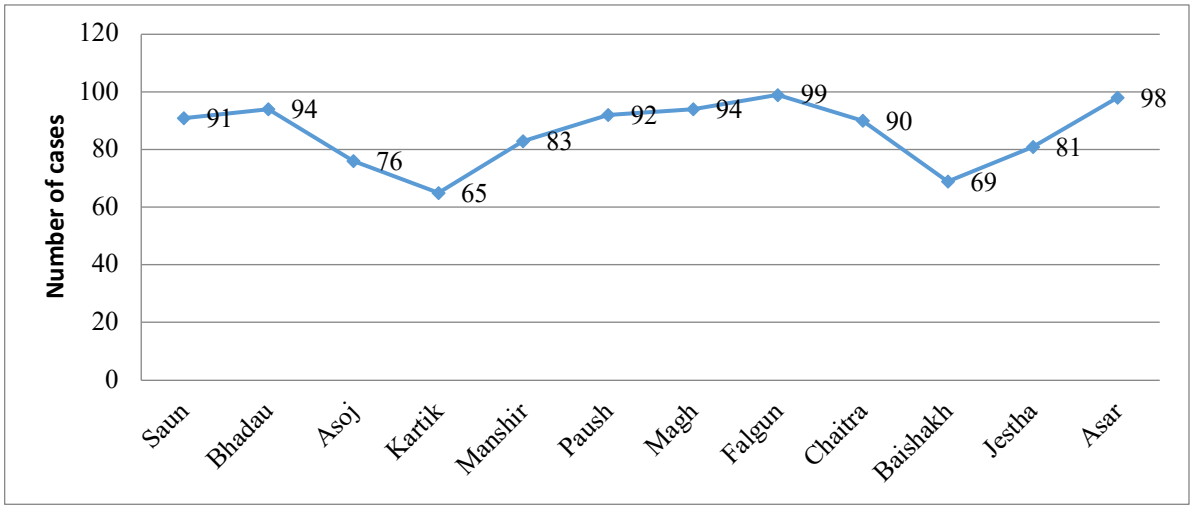


Figure 3: Month wise postmortem case flow at VL Janakpur.

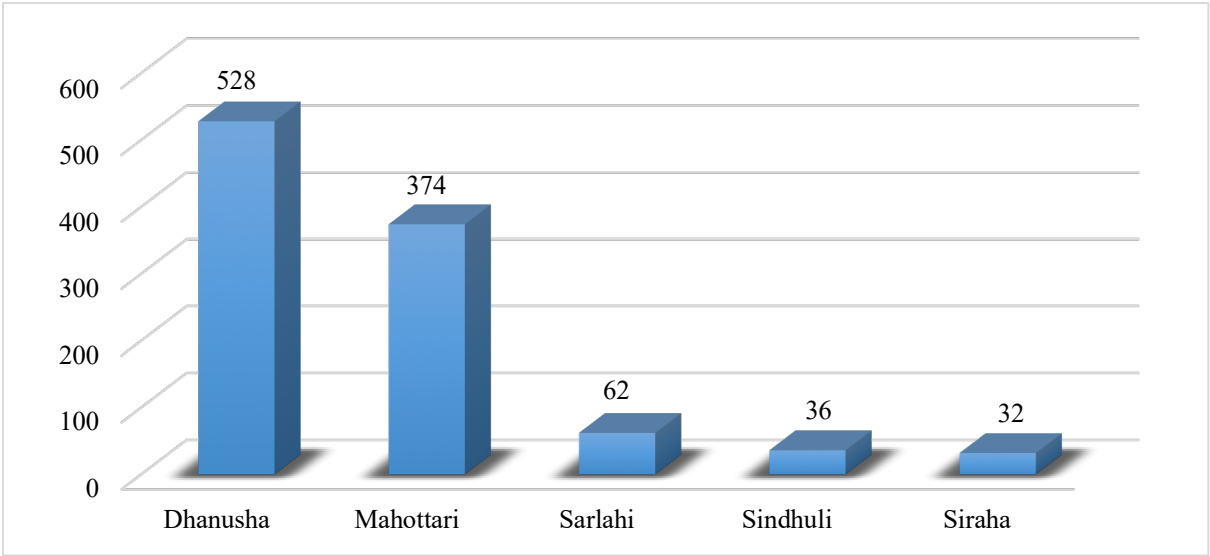


Figure 4: District wise case flow at VL

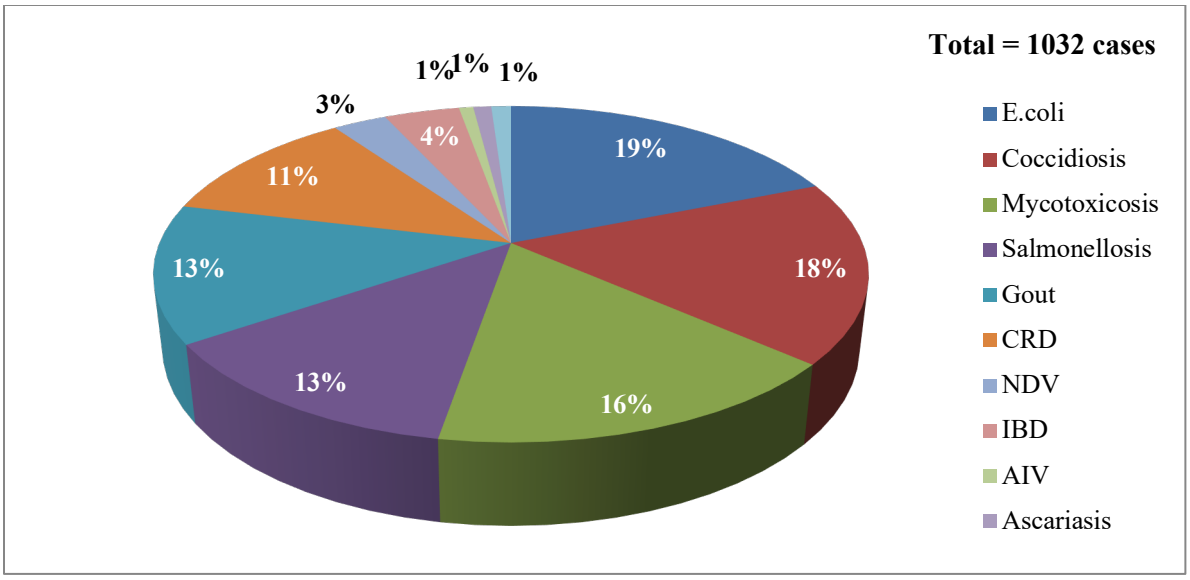


Figure 5: Disease diagnosed based on postmortem examination

3.1.4 Biochemical examination

Samples were collected from different species for biochemical testing. Tests were performed for serum calcium and phosphorus level. Result of the test is shown in table below.

Table 3: Result of biochemical tests.

Type of animal	Number of Sample	Calcium gm/100ml Normal Value	Calcium gm/100ml Result	Phosphorus gm/100ml Normal Value	Phosphorus gm/100ml Result
Cow	152	9-12	7-9	4-7	3-6
Buffalo	127	9-12	7-10	4-7	3-6
Goat	21	10-11	9-10	3-11	4-8
Poultry	1	9-12	10-12	4-8	4-7

3.2 Microbiology section

Milk samples were received from farmers for the bacterial culture and identification. A total of 356 (Cattle-202 and Buffalo-154) milk sample collected from the following district on which microbiological culture and AST was performed. The most prevalent bacteria isolated show *Staphylococcus, Streptococcus and E. coli* etc.

Table 4: Bacterial species isolated at VL.

S.N.	District	No. of samples	Organism
1.	Dhanusha	181	*Staphylococcus, Streptococcus and E. coli*
2.	Mohattari	115	*Staphylococcus, Streptococcus and E. coli*
3.	Sindhuli	9	*Staphylococcus, Streptococcus and E. coli*
4.	Sarlahi	12	*Staphylococcus, Streptococcus and E. coli*
5.	Bara	2	*Staphylococcus, Streptococcus and E. coli*
6.	Parsa	1	*Staphylococcus, Streptococcus and E. coli*

3.3 Molecular biology and serological examination

3.3.1 Serological examination

A total of 204 samples were tested for PPR out of which 47 samples were found positive. A total of 84 samples from the infertile and repeat breeder cattle/buffalo were tested for Brucellosis in which none of the samples were found positive. 207 serum samples from birds were tested for mycoplasma out of which 137 samples were found positive. A total of 188 samples from poultry with suspected Salmonellosis was tested in which 132 samples were found positive.

3.3.2 Disease Outbreak

During this fiscal year a total of 172 samples were tested for Avian Influenza Virus (AIV) in which 8 samples were positive. All positive samples were further tested at CVL using molecular test. There was an outbreak of Foot and Mouth Disease in the working area of VL Janakpur from where 184 samples were collected and tested in which 32 samples were found positive for FMD. Similarly, 106 and 108 samples of suspected ND and IBD were tested in which 30 and 42 samples were found positive respectively.

3.4 Sample send to CVL for further investigation

137 Samples were dispatched to CVL for further testing.

VETERINARY LABORATORY POKHARA

1. Introduction

Veterinary Laboratory (VL), Pokhara was established in 2049 B.S. as a Regional Veterinary Laboratory with the objective of disease diagnosis and outbreak investigation in sixteen districts of western development region at that time. After the organization reform as per the constitution the Veterinary Laboratory, Pokhara belongs to the federal government and provides services to 11 districts of Gandaki province and 6 districts of Lumbini Province.

The laboratory is located at Pokhara Metropolitan City, Ward number 12, Hospital Chowk. Pokhara is the capital of Gandaki province. The laboratory is easily accessible. It lies 400 meters north of Prithvi highway and 3.4 km northwest of Pokhara international airport.

The mission of the Veterinary Laboratory, Pokhara is to promote the health of livestock, poultry and companion animals and to ensure safe animal products for the consumer by assisting VHLSEC of these provinces and Livestock Service Sections (AHS) of local levels, veterinarians, clients, and others responsible for animal health in the detection and prevention of disease by conducting responsible investigation on animal diseases and providing accessible, accountable, timely, and accurate diagnostic services. The laboratory is responsible for food safety, outbreak investigation, formulating disease control strategy, prepare epidemiological profile of livestock and poultry diseases and maintain and disseminate the epidemiological information database on animal health in the provincial as well as in the national networks. In the present context, commercialization in Livestock and poultry production has increased the challenge for precise and prompt diagnosis of different animal and poultry diseases. For this specific reason the molecular basis of disease diagnosis has been set up at Veterinary Laboratory. Currently lab has both Conventional and Real-time PCR facilities.

2. Major Laboratory Facilities at VL, Pokhara

The major facilities provided by VL, Pokhara are described below.

2.1 Pathology Section

A. Parasitological Unit: Parasitological unit tests for internal parasites (cestodes, trematodes and nematodes) in feces, external parasites (mange) in skin scrapings, blood parasites (Babesia, Ehrlichia, Trypanosoma) through microscopic examination

B. Post-mortem Unit: Pathology unit mainly performs postmortem examinations of various species of animals and collects appropriate samples for the microbiological, parasitological and molecular biological examination.

C. Biochemistry Unit: Biochemistry unit analyzes serum for the estimation of minerals and protein (Ca, P, Mg, TP, Fe, Albumin etc.), urine for estimating albumin, bilirubin, ketone bodies, urobilinogen etc. using a dipstick test kit.

D. **Hematology Unit**: This unit conducts routine hematological examinations using an automated hemato-analyzer.

2.2 Microbiology Section

In this section, milk, tissues, blood, aspirated fluids, feces and other samples are examined. Both aerobic and anaerobic culture facilities are available.

A. Bacteriology and Mycology Unit: Culture, biochemical tests, staining and other tests as required for identification of bacterial and fungal organisms are carried from this unit. This unit also performs antibiotic susceptibility test and advice for the appropriate antibiotic for the treatments.

B. Serological Unit: The major activities under this section are RBPT for *Brucella*, PAT test for *Mycoplasma* and *Salmonella* as well as ELISA for various viral and bacterial diseases of livestock and poultry. Similarly, this unit has facilities for HA/HI tests.

C. Virology: Immunochromatographic assays (Rapid test) are regularly conducted for prompt diagnosis of livestock and poultry disease. Similarly, this unit has facilities for Florescent antibody test (FAT) for rabies diagnosis.

2.3 Molecular Biology Section: The Molecular Biology section has facilities for both conventional and real time PCR

3. Human Resource

Table 1: Staffing of VL Pokhara

S.N	Name of Staff	Designation
1	Dr Kiran Pandey	Senior Veterinary officer
2	Dr Ganesh K.C.	Veterinary Officer
3	Dr Dilip Kumar Upadhyaya	Veterinary Officer
4	Dr Anil Regmi	Veterinary Officer
5	Mr Bishow Raj Baral	Accountant
6	Mr Khimlal Adhikari	Animal Health Technician
7	Mr Amrit Saud	Animal Health Technician
8	Mr Radheshyam Malla	Asst. Animal Health Technician
9	Ms Laxmi Sharma	Asst. Animal Health Technician
10	Ms Yamuma Sharma	Kharidar
11	Mr Surya prasad Sapkota	Office Attendant
12	Mr Jhalak Bahadur Chhetri	Office Attendant
13	Mr Balram Acharya	Driver

4. Sample Flow at VL during 2080/2081

4.1 District wise sample flow

In the fiscal year 2080/81, a total of 9711 samples were received from different districts. Samples were received from all seventeen districts of laboratory coverage. Most samples were received from Kaski district (53.68%) followed by Tanahun (10.64%), Mustang (5.25%), Myagdi (3.59%), Baglung (3.58%), Gorkha (3.29%), Rupandehi (3.26%), Lamjung (2.5%), Syangja (2.5%), Nawalparasi W (2.4%), Palpa (2.29%), Parbat (2.04%), Kapilvastu (1.72%), Gulmi (1.68%), Nawalparasi E (1.32%), Arghakhanchi (0.1) and Manang (0.05%), as shown in Figure below.

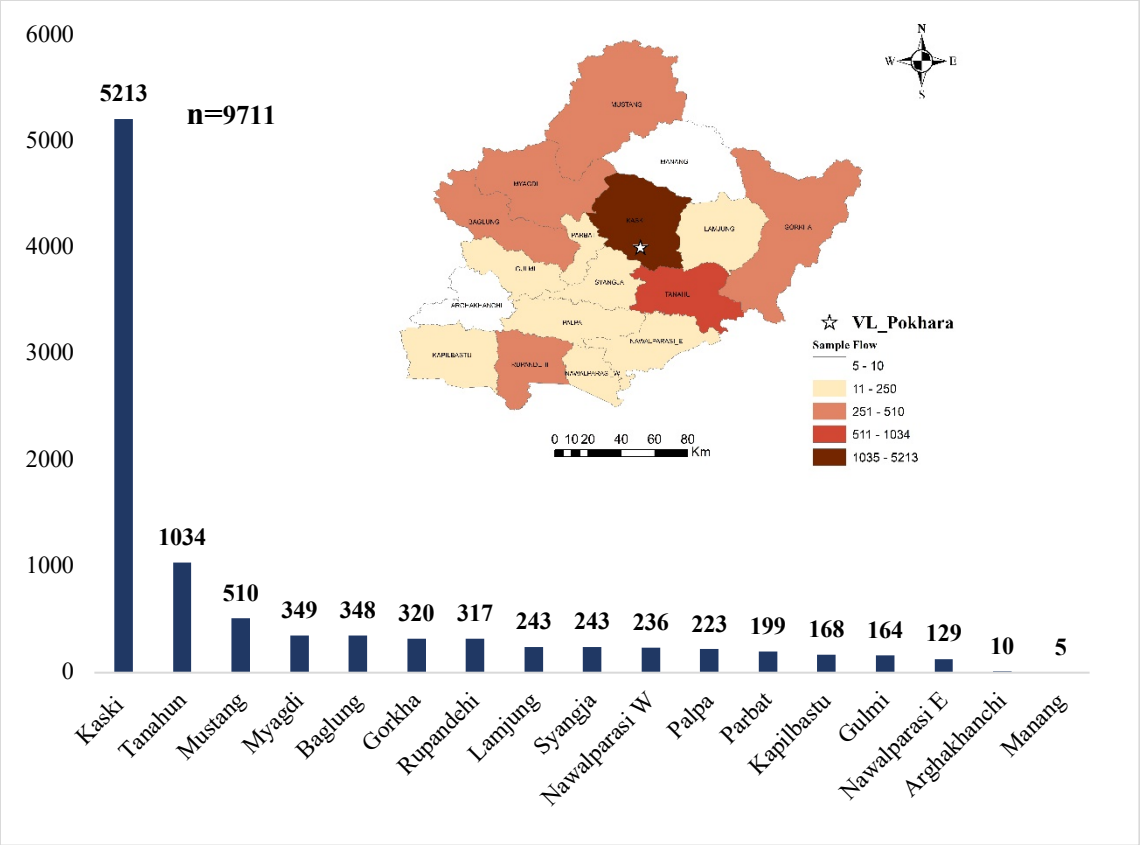


Figure 1: District wise sample flow

4.2 Specieswise sample flow

In FY 2080/81 a total of 9711 samples from nine different species were tested at Veterinary laboratory Pokhara. Most frequent samples were from goat (45%) followed by poultry (27%) and cattle (15%). Other species include buffalo (4%), dog (4%), sheep (3%), pig (1%), horse (1%), and rarely from cats and fish as shown in Figure below.

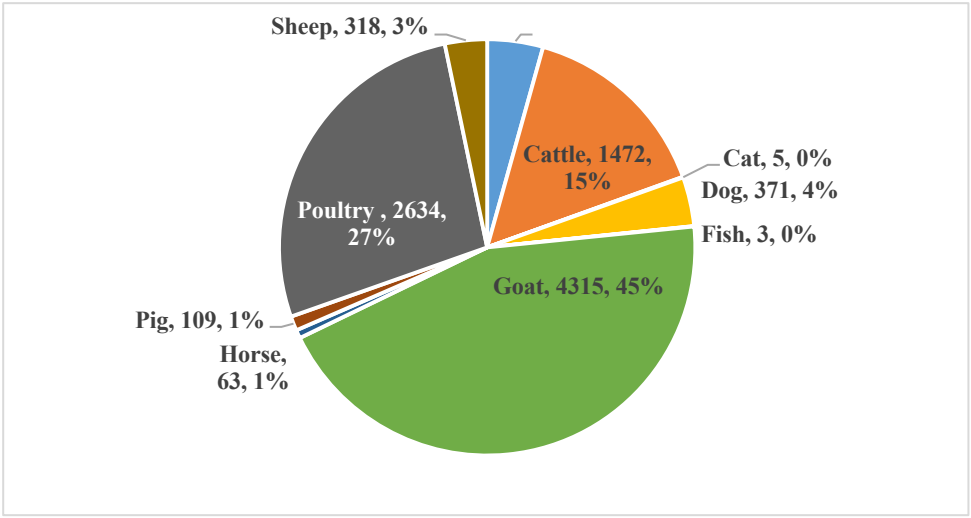


Figure 2

4.3 Temporal pattern of sample flow

During FY 2080/81 the temporal distribution of sample flow shows steady increase in samples from Mangsir onwards and peaking at Ashar as shown in figure below. The Sero-monitoring programs for various diseases in cattle, buffalo, goats, sheep, pigs, and dogs accounted for higher samples flow during chaitra to Ashar. Relatively lower sample flow during initial four months of fiscal year is due to transient distribution in laboratory services because

of zero budgeting. Except for Ashoj and Falgun due to public holidays, other months show a steady number of sample flow.

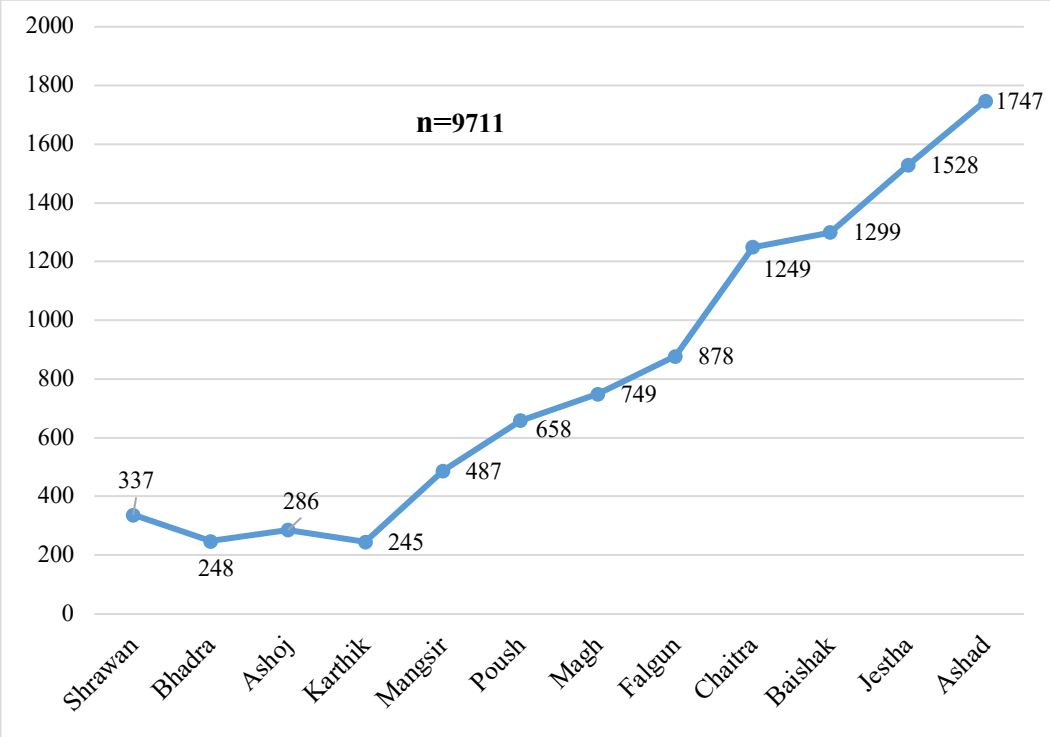


Figure 3: Temporal pattern of sample submission

4.4 Types of sample

Serum sample made up most of the samples, followed by dead bodies for necropsy examination, milk, whole blood, and feces. A nasal swab, urine sample, skin scab, brain sample, tracheal sample, and fresh tissue were also received as shown in figure 4

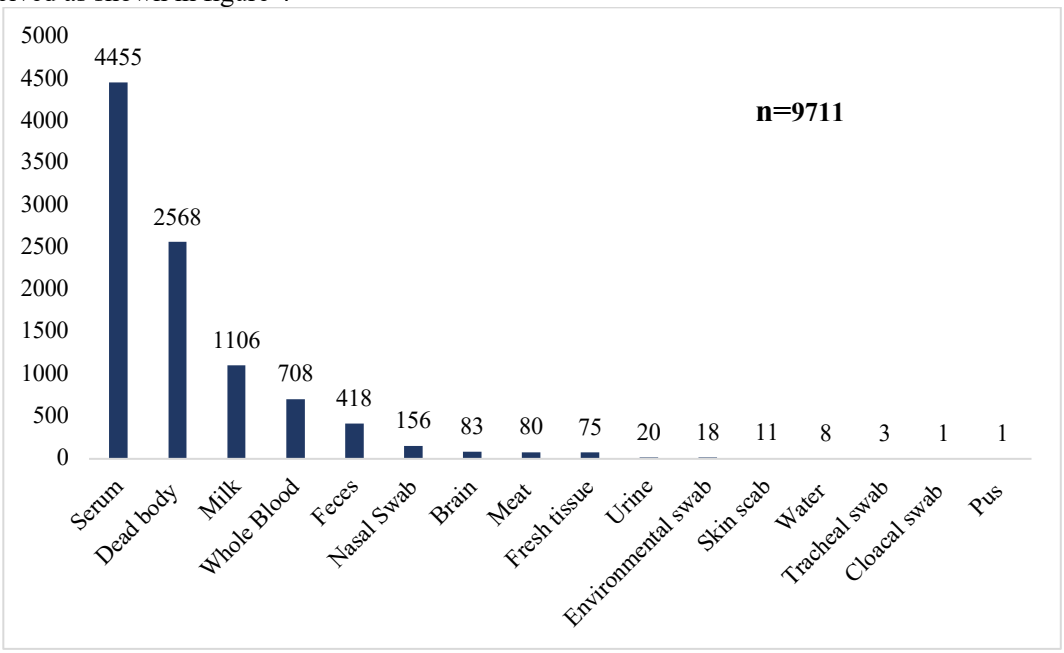


Figure 4: Types of sample

4.5 Details of postmortem examinations

Postmortem examination is one of the major works of veterinary laboratory Pokhara. On average 10-12 necropsies are performed daily on different livestock and poultry. Majority of necropsies are done on poultry birds followed by small ruminants and swine. Occasionally canine and other animal necropsies are also done. Most of the samples are received from small scale and few from medium scale farmers and large-scale farmers/entrepreneurs.

Table 1: Species wise Postmortem detail of F/Y 2080.81

S.N	Species	Total no of sample	Major PM findings	Remarks
1	Avian	2513		
1.1	Commercial Broilers	2153	Coccidiosis, IBD, Colibacillosis, Mycotoxicity, Salmonellosis, CRD, ND, Omphalitis, Enteritis, Ascites, CCRD	Diagnosed based on history, Post-Mortem Examination, rapid diagnostic test (RDT), culture and ELISA
1.2	Commercial Layers	129	ND, Mycotoxicity, IBH, IB, ALC, Salmonellosis, Colibacillosis,	
1.3	Backyard Chicken	231	Enteritis, Mycotoxicity, Colibacillosis, Histomoniasis, Ascariasis	
2.	Caprine	34	Parasitic infestation, Pneumonia, Urolithiasis, Rabies	
3.	Swine	12	Helminth Infestation, ASF	
Total no of PM		3389		

4.5.1 Poultry disease based on Postmortem

On PM examination of Poultry, different bacterial, viral, fungal, protozoal and managemental disease were diagnosed. Out of 2513 PM examination of birds, bacterial disease was found to be most prominent and accounted for about 50.54% followed by viral, protozoal, fungal and managemental disease. Colibacillosis (23.16%) was found to be most prominent bacterial disease followed by CRD, CCRD, Omphalitis, Salmonellosis and Necrotic Enteritis. Among the viral diseases, Infectious bursal disease (IBD) was diagnosed in 12.46% of cases followed by avian influenza and Ranikhet. Coccidiosis was second most diagnosed poultry disease in

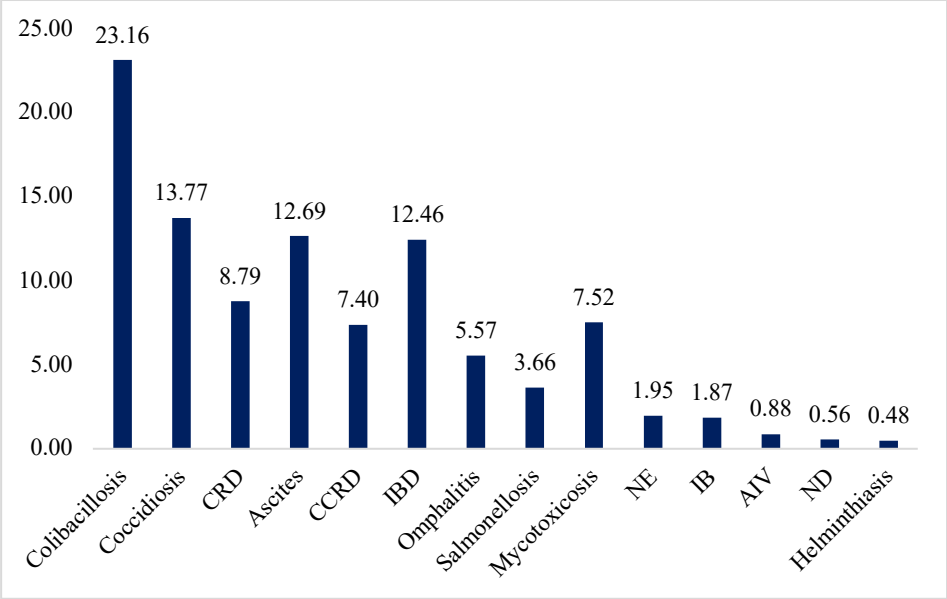


Figure 5: Diseases of Poultry based on PM findings

laboratory with 13.77% cases followed by Ascites 12.69%. Other diseases diagnosed were Myotoxicity, and Parasitic infestation as shown in figure 5.

4.6 Hematological Test:

In this fiscal year VL Pokhara tested 216 blood samples for blood count and parasites. The result of the test is shown in table below.

Table 3: Hematological Test F/Y 2080/081

S.N.	Species	Total Hematological Test	Total Blood Smear Test
1	Buffalo	11	4
2	Cow	23	4
3	Dog	159	88
4	Goat	22	6
5	Cat	1	0
Total		**216**	**102**

4.6.1 Summary of Blood Smear Test

Table 4: Summary of Blood Smear Test (Positive)

Species	Dog	Cow	Buffalo	Goat
Blood Parasites				
Anaplasma spp.		4		
E canis	14			
Trypanosoma spp.	1	1		
Babesia spp.	1	1	3	1

4.7 Mastitis Test

In F/Y 2080/081, a total of 1014 milk samples were tested by CMT. Out of 1014 samples received, 596 were from cattle and 418 were from buffalo. 65% (388) of the milk samples from cattle were tested positive for mastitis while 67% (280) of the milk samples from buffalo were positive. Almost half of the samples received could not be sent for Culture and AST as samples were collected in non-sterile bottles. This means that most of the farmers are still unaware of the milk sample collection and dispatch techniques for CMT, culture, and AST. Out of 428 samples cultured, no growth was found in 59 samples, and bacterial growth was found in 369 samples. The predominant bacteria isolated in the milk sample were Staphylococcus (169), followed by E. coli (112), Streptococcus (37), Pseudomonas (30), Enterococcus (12), and Klebsiella (9).

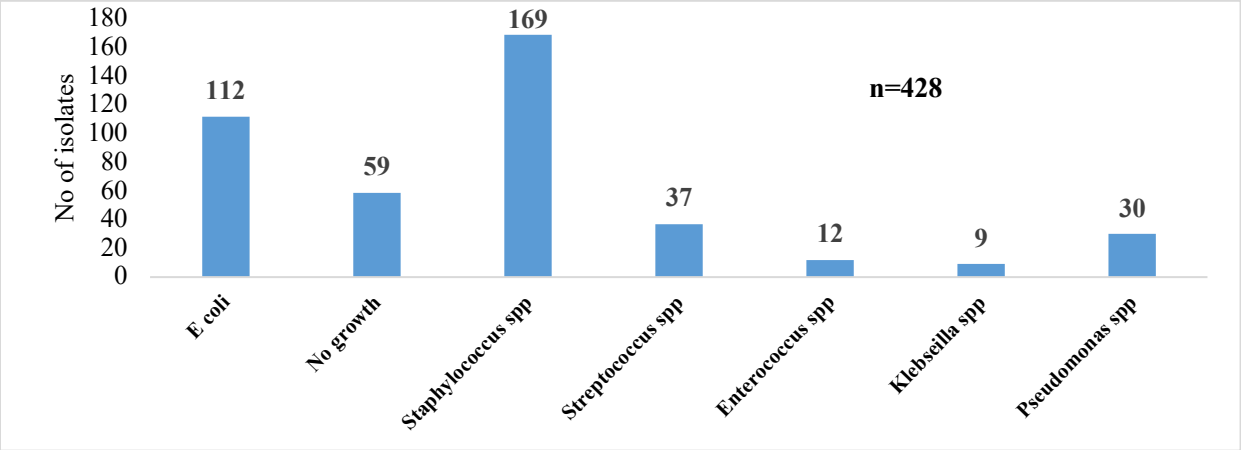


Figure 6: Mastitis Test Results

Antimicrobial Sensitivity test pattern

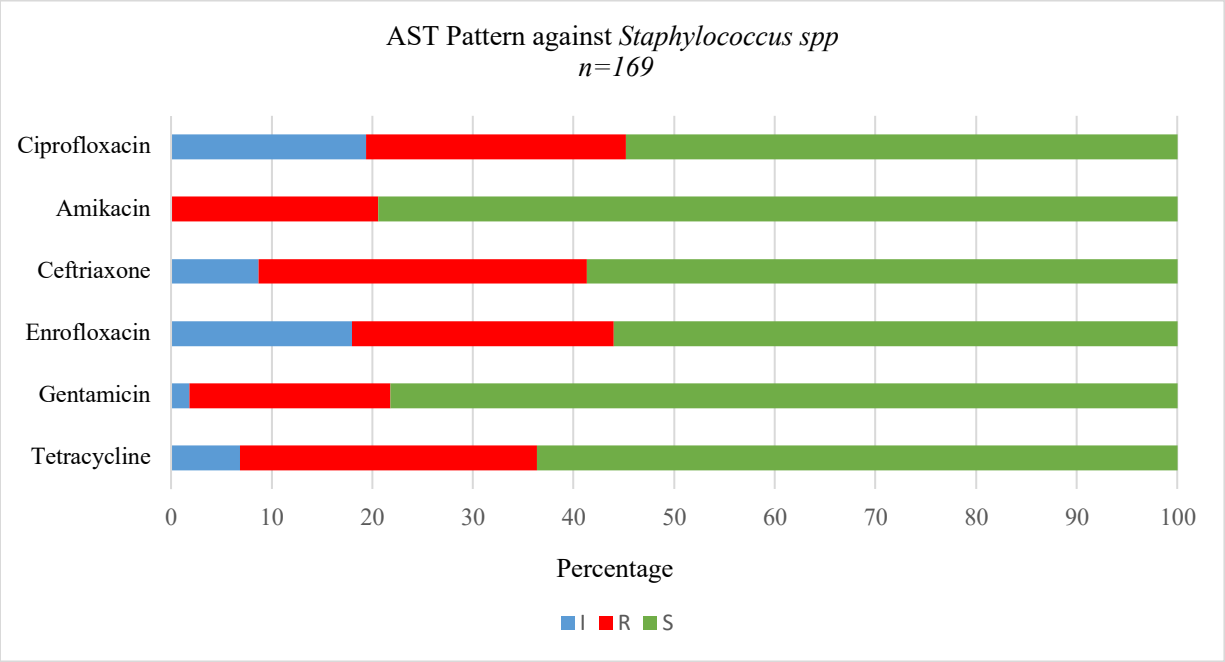


Figure 7: AST Pattern against Staphylococcus spp

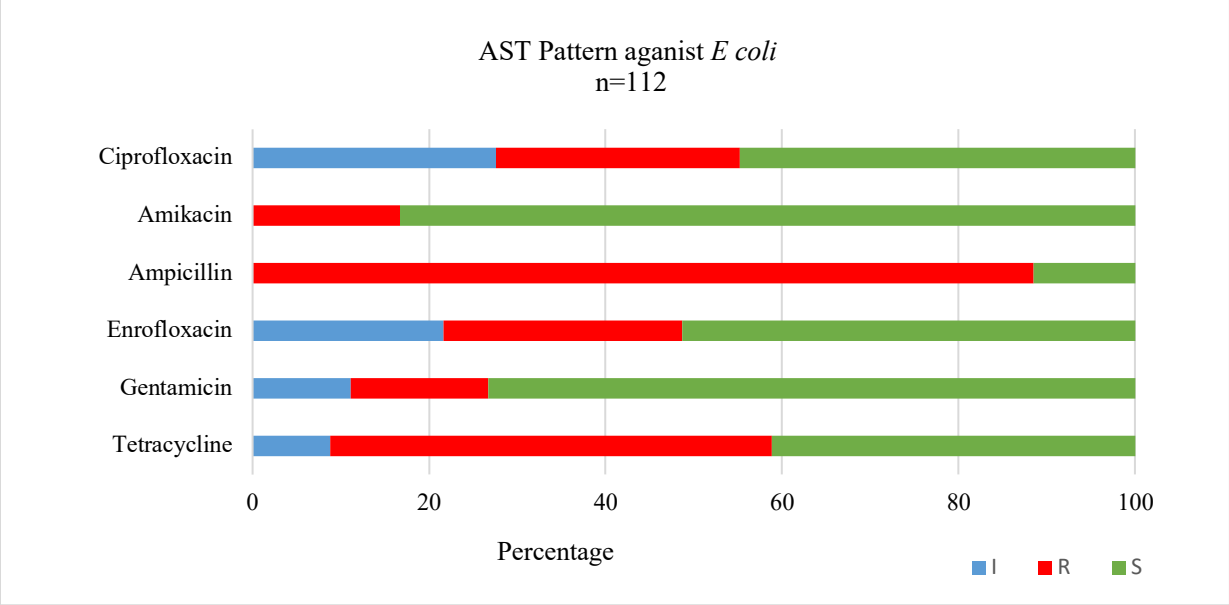


Figure 8: AST Pattern of E coli

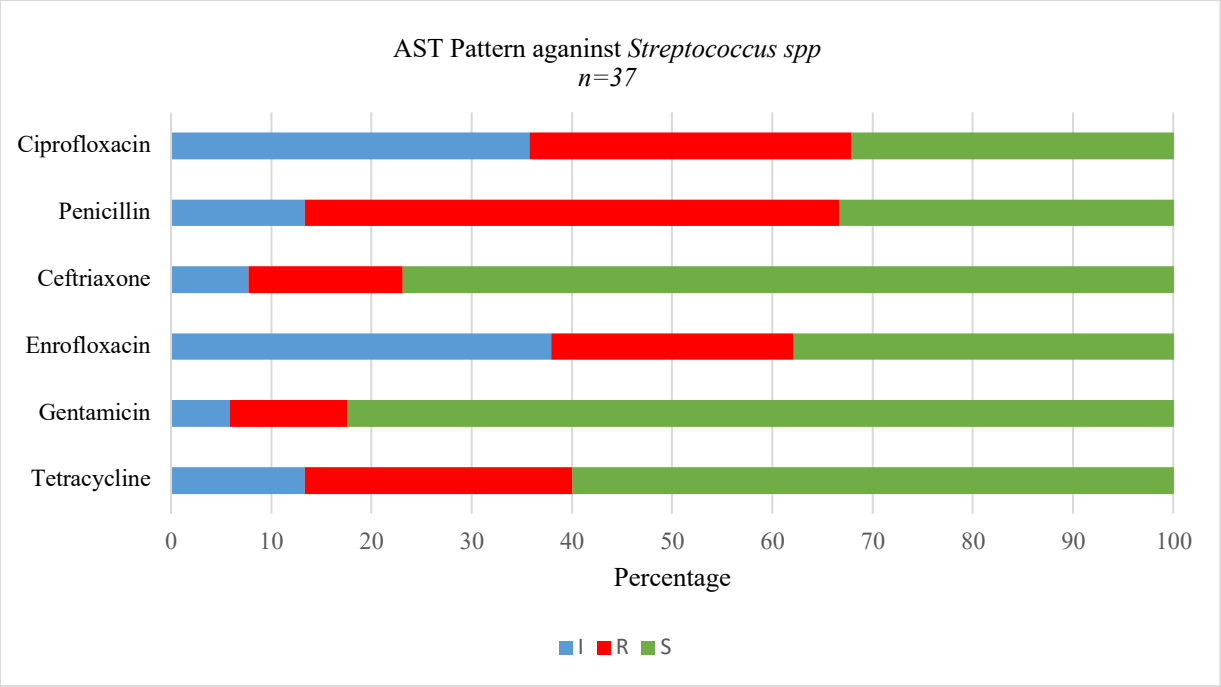


Figure 9: AST Pattern of Streptococcus spp

4. 8 Quantitative Fecal examination Test (EPG)

In Fiscal year 2080/81 a total of 418 fecal samples from goat and mountain goat (chyangra) were tested at Veterinary Laboratory Pokhara to quantify eggs per gram of feces. 290(69.37%) samples were positive for helminths infestation with egg per gram(epg) ranging from 100- 29600. Modified Mc-master technique was employed for egg counting and saturated zinc sulphate flotation was used for floating helminths eggs.

Table 5: Details of Fecal examination (EPG)

S. N	Species	Total sample	Positive	Major Findings	Remarks
1	Goat	261	167	Strongyles, Strongyloides, Trichuris, Monezia, Hemonchus	Upto 29600 eggs per gram of feces in single animal
2	Mountain Goat (Chyangra)	157	123	Nematodirus, Strongyles	
	Total	418	290		

5. Major Infectious disease outbreaks in F/Y 2080/081

5.1 Lumpy Skin Disease (LSD)

In comparison to fiscal year 2079/80 there was marked decrease in the incidence of Lumpy skin disease in fiscal year 2080/81. Only three skin scab samples from chauri were tested and all three samples were positive for LSD.

Where as in fiscal year 2079/80 out of 126 samples tested, 73 samples (57.93%) were positive for Lumpy Skin disease.

Figure 10: LSD Affected cattle

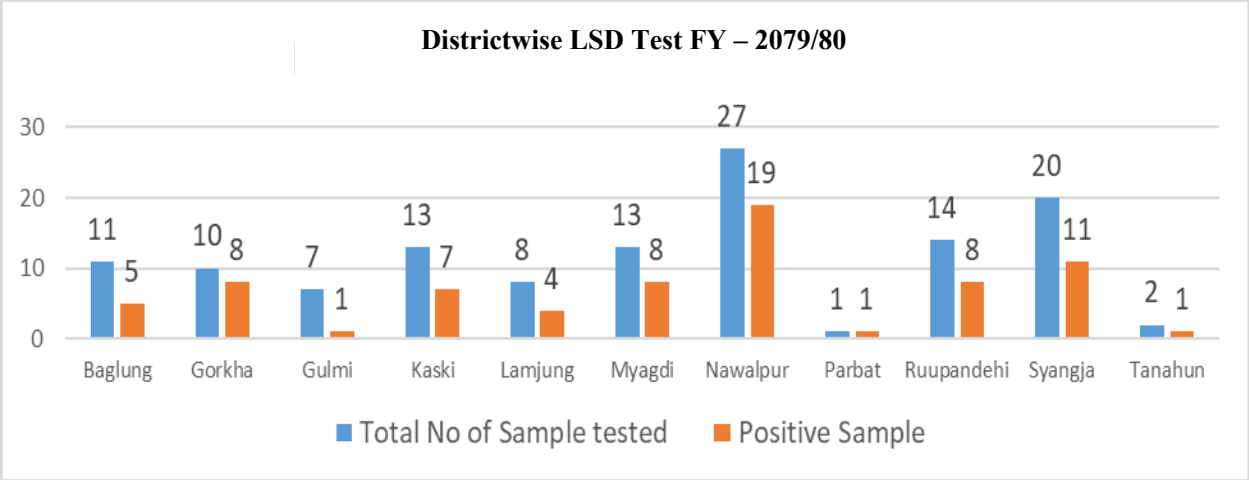


Figure 4 District wise sample received and test result of LSD in F/Y 2079.80

5.2 African Swine Fever (ASF)

Rapid diagnostic techniques and PCR method were used for ASF diagnosis. Whole blood sample from orbital sinus was collected from affected pigs. Rapid test followed by PCR was done at CVL for confirmation of ASF. A total of 48 samples were tested for ASF where 33 samples were positive as shown in table below.

Table 6: ASF cases in last two fiscal year

District	2079/80		2080/81	
	Total test	Positive	Total test	Positive
Kaski	93	52	10	8
Syangja	6	1	2	1
Tanahun	3	2	25	16
Baglung	10	6	1	0
Myagdi	7	7	2	0

Parbat	2	1	1	1
Gorkha	0	0	3	3
Lamjung	0	0	4	4
Total	121	69	48	33

In comparison, in fiscal year 2079/80 a total of 121 blood samples were collected from Kaski, Myagdi, Baglung, Tanahun, Syangja, and Parbat districts. 69 (57.02%) samples were positive for ASF, with Kaski having the greatest number of positives (52) followed by Myagdi(7), Baglung (6), Tanahun (2), Syangja (1), and Parbat (1). The first case was reported in 2079 (Shrawan 29) from Pokhara-14, Kaski.

5.3 Peste des Petits Ruminants (PPR)

In F/Y 2080/81 a total of 156 nasal swabs of goat and sheep were received with a sign of nasal discharge, depression, diarrhea, and death for PPR test. PPR was tested at VL Pokhara by using Rapid lateral flow assay. Out of 156 samples tested, 35 samples were positive for PPR. Details of the PPR outbreak are shown in table below.

Table 7: PPR Antigen Test results

District	Local level	No. Sample tested	No. of Sample Positive	Species	Breed
Kaski	Pokhara Metropolitan	43	13	Goat, sheep	Boer Cross, lampuchhre sheep
Arghakhanchi	Bhumikasthan RM	54	10	Goat	Khari
Gorkha	Gorkha Municipality	17	6	Goat	Boer Cross
Gulmi	Kaligandaki RM	28	3	Goat	Khari
Lamjung	Madhyanepal Municipality	11	2	Goat	Khari
Tanahun	Myagde Municipality	3	1	Goat	Khari
Total		156	35		

5.4 Rabies

In F/Y 2080/81 a total of 78 brain samples from suspected rabid animals were received from different districts of our working areas for rabies diagnosis. All the samples were tested by rapid test methods followed by confirmation with fluorescent antibody test (FAT). Out of 78 samples, 54 samples were tested positive for Rabies. District and specise wise rabies outbreak in FY 2080/81 is shown in figures below. Out of 54 positive samples , 68 % of the samples were from dogs.

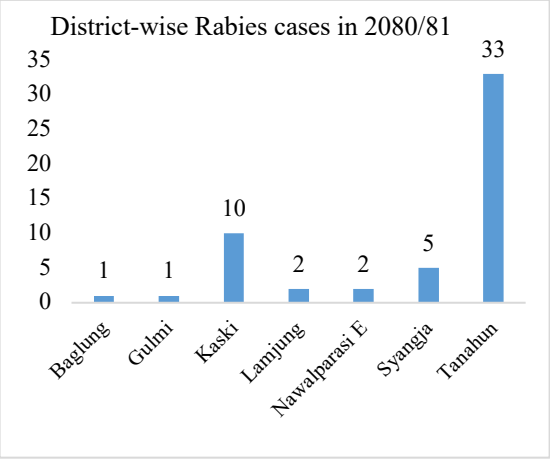


Figure 8: District wise Rabies outbreak in 2080/81

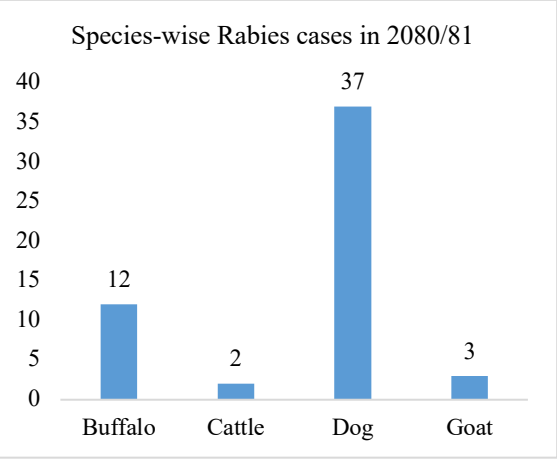


Figure 5 Species Wise Rabies outbreak in 2080/81

5.5 Foot and Mouth Disease (FMD)

In F/Y 2080/81 a total of nine outbreaks of FMD occurred in cattle from six districts of Gandaki and Lumbini Provinces. Vesicle fluid and mucus membrane from oral and foot lesions were sent to National FMD and Tads laboratory Kathmandu. Detail of FMD test results is shown in table below.

Table 10: Details of FMD test result (PCR)

District	Local level affected	No. Sample tested	No. of Sample Positive	Species	FMD Serotype
Kaski	Pokhara Metropolitan, Annapurna RM, Machhapuchchre Rm	10	6	Cattle	Type O
Gorkha	Palungtar Municipality	4	4	Cattle	Type O
Nawalparasi E	Gaidakot Municipality	2	2	Cattle	Type O
Gulmi	Kaligandaki RM	2	2	Cattle	Type O
Lamjung	Madhyanepal Municipality	1	1	Cattle	Type O
Tanahun	Shuklagandaki and Vyas Municipality	6	6	Cattle	Type O
Total		25	21		

5.6 Avian Influenza Virus (Type A H_9)

In F/Y 2080/81, tracheal samples were collected from 373 poultry birds with signs of anorexia, respiratory distress, high mortality and decreased egg production. All 373 samples were tested using Rapid test methods. Out of 373 samples tested, 22 samples (5.89%) were positive for avian influenza virus. All the 22 samples positive in Rapid test kit were dispatched to CVL for differentiation of H_5 or H_9. All the 22 samples were found to be positive for H_9 in PCR examinations. Out of 22 positive samples for H_9, 9 samples were from Broiler, 9 samples were from Layers and 4 from Backyard poultry.

Table 11: Avian Influenza Virus (Type A H9) Test result

District	Total Samples	Positive for AI(H_9)
Kaski	291	18
Tanahun	51	1
Baglung	7	1
Myagdi	9	1
Parbat	15	1
Total	373	22

5.7 Brucellosis

Samples were received from Tanahu, Kaski and Rupandehi district for Brucella testing. Test result obtained is presented in table below.

Table 12: Brucellosis test detail

Sample type	Total sample tested	Total Positive	Test methods	Remarks
Serum	119	0	RBPT and ELISA	Cattle and Goat of Tanahun and Kaski district
Milk	92	2	ELISA	Cattle (Positive from Rupandehi,Tillotamma)
Total	211	2		

5.8 Toxoplasmosis

A total of 420 serum samples were collected from goat farm for the detection of Toxoplasma gondii infection. Result obtained from the test is shown in table below.

Table 13: Toxoplasmosis test details

District	Total sample tested	Total Positive	Test Method	Remarks
Kaski	190	84	ELISA	Goat Serum Samples
Tanahun	230	113		
Total	420	197 (46%)		

6. Summary report of Rapid Test 2080/081

VL Pokhara provides rapid diagnostic tests for various animal and poultry diseases. The results obtained from RDTs are confirmed by other tests such as culture, ELISA, PCR and other suitable tests. The samples that could not be tested in the laboratory due to lack of resources or that are to be confirmed as per standard are dispatched to Central Veterinary Laboratory, Tripureshwor, Kathmandu and tested there.

In fiscal year 2080/81, VL Pokhara performed the RDTs of following diseases.

Table 14: Rapid test result

Name of Disease/ Virus/ Bacteria/ Protozoa	Total number of samples tested	Positive	Negative	Positive (%)
Avian Influenza virus (AIV)	373	22	351	5.89
Infectious Bursal Disease virus (IBDV)	145	81	64	55.86
Infectious Bronchitis virus (IBV)	40	3	37	7.5
Rabies virus	78	54	24	69.23
PPR virus	156	35	121	22.43
African Swine Fever virus (ASFV)	48	33	15	68.75
Salmonella Pullorum	562	185	377	32.91
Mycoplasma gallisepticum	555	180	375	32.43
Rose Bengal Plate Test (RBPT)	119	0	119	0
Ehrlichia canis	21	14	7	66.66

7. Microbial culture summary report

Samples collected for cultural examination were cultured using Nutrient Agar, Mac Conkey Agar and Blood Agar media as per need. They were incubated at 37º C for 24 hours. Cultural isolates were identified based on colony characteristics, Gram's staining, and different biochemical tests; IMViC, Oxidase, Catalase and TSI.

Table 15: Different bacterial isolates on microbial culture examination.

Type of sample	No. of sample tested	Organism isolated	No growth	Type of Bacteria isolated
Milk	428	369	59	*E. coli, Streptococcus spp, staphylococcus spp, Pseudomonas*
Poultry liver/caeca/spleen	146	119	27	*E coli, Salmonella spp, Enterococcus spp*
Whole blood	2	0	2	
Fresh tissue	4	4	0	*E coli*
Total	580	502	88	

Table 16: Anti-microbial resistant patterns for E. coli from poultry liver sample

SN	Antibiotic Name	Sensitivity %	Intermediate %	Resistance %
1	Ceftriaxone	48	16	36
2	Ciprofloxacin	34	29	37
3	Enrofloxacin	52	21	27
4	Amikacin	72	13	15
5	Gentamicin	59	14	27
6	Tetracycline	25	63	12

8. Summary report on Sero-monitoring 2080/081

A cross-sectional study was carried out from April 2023 to July 2023 in 15 districts of laboratory working area. A Multistage sampling technique was used. Three local level from each district was selected based on history of vaccination. Wards and livestock farms were randomly selected from respective local levels. Based on number of animals vaccinated 1.5% sheep and goat were sampled. Similarly, 0.5% of vaccinated cattle and buffalo were sampled.

While selecting study area the reference was taken from secondary data of VHLSEC of respective districts and Livestock Service Section (LSS) of respective local levels and other details were obtained from farmers of study area.

8.1 Samples and data collection

A total of 3372 serum samples were collected for seromonitoring from vaccinates animals, of these 541 samples were collected from cattles & buffaloes for FMD seromonitoring and 2831 samples were collected from sheeps and goats for PPR seromonitoring.

8.2 Laboratory Investigation

Laboratory work was performed at Veterinary Laboratory, Pokhara. ID-Screen® FMD Type O Competition ELISA kit manufactured by "ID.vet Innovative Diagnostics, France" was used for the detection of antibodies in individual serum for Sero-monitoring of FMD and ID-Screen® PPR Competition ELISA kit manufactured by "ID.vet Innovative Diagnostics, France" was used for the detection of antibodies in individual serum for Sero-monitoring of PPR. They both result within 4 hours. The test procedure was done in accordance with the procedure detailed in the manufacturer's protocol.

8.3 RESULTS

8.3.1 Test result and Seropositivity of FMD Vaccine:

The ID-Screen® FMD Type O Competition ELISA kit was used for the detection of antibodies in individual serum. Out of 541 samples tested for antibodies against the Foot and Mouth Disease Virus (FMDV) serotype O by competitive ELISA, 430 samples (79%) were found to be positive while 111 samples (21%) were found to be negative as shown in table below.

Table 17:Summary of FMD Sero monitoring test

Total number of samples	Test result		Seropositivity (%)
	Number of positive samples	Number of negative samples	
541	430	111	79 %

Table 18: Test result of seropositivity of FMD vaccine in different districts

District	Total number of samples	Number of positive samples	Seropositivity (%) (2080/81)	Seropositivity (%) (2079/80)	Seropositivity (%) (2078/79)
Kaski	0	0	0	54.17	76.50
Tanahun	55	48	87.27	91.58	98.39
Nawalpur	27	22	81.48	96.86	97.00
Gorkha	0	0	0	83.08	37.50
Lamjung	118	100	84.75	86.96	96.15
Myagdi	0	0	0	87.84	98.00
Parbat	43	33	81.40	96.15	94.44
Baglung	125	115	92.00	77.38	96.15
Syangja	60	47	78.33	65.28	99.00
Gulmi	37	16	43.24		
Palpa	21	16	76.19		
Kapilvastu	50	28	56.36		
Total	541	430	79	85	88.36

8.3.2 Test result and Seropositivity of PPR Vaccine:

The ID-Screen® PPR Competition ELISA kit was used for the detection of antibodies in individual serum. Out of 2831 samples tested for antibodies against the Peste des Petits Ruminants (PPR) virus by competitive ELISA, 2085 samples (74%) samples were found to be positive while 746 samples (26%) tested were found to be negative as shown in table below.

Table 19: Test result and Seropositivity of PPR Vaccine

Total number of samples	Test result		Seropositivity (%)
	Number of positive samples	Number of negative samples	
2841	2085	746	74 %

Table 20: Test result of seropositivity of PPR vaccine in different districts

District	Total number of samples	Number of positive samples	Seropositivity (%) (2080/81)	Seropositivity (%) (2079/80)	Seropositivity (%) (2078/79)
Kaski	292	147	50.34	38.04	67.50
Tanahun	268	203	75.75	81.39	91.94
Nawalparasi E	72	52	72.22	95.56	75.31
Gorkha	300	257	85.67	88.27	87.78
Lamjung	101	77	76.24	83.65	83.70
Myagdi	256	214	83.59	91	86.96
Parbat	119	46	38.66	83.18	81.70
Baglung	157	134	85.35	40.21	80.77
Syangja	116	82	70.69	61.16	78.01
Nawalparasi W	193	173	89.64		
Kapilvastu	113	71	62.83		
Rupandehi	226	190	84.07		
Palpa	263	192	73		
Gulmi	119	99	83.19		
Mustang	236	148	62.71		
Total	**2841**	**2085**	**74**	**79.06**	**80.30**

8.4 Limitations of Study

The Sero-surveillance of vaccines from Manang and Arghakhanchi districts could not be completed. The sample needs to be collected at least after 21 days of vaccination and considering this criterion there was difficulty in collecting the individual serum samples in rainy season. The Sero-monitoring of ND and CSF could not be completed due to inadequate samples and time because tracing of vaccinated local birds was difficult and time consuming and the risk of ASF in pigs. Due to lack of animal identification and traceability system and poor recording system in farm there is problem in identification of vaccinated and unvaccinated animals.

8.5 Conclusion

The study was a Sero-monitoring of FMD vaccines Serotype O in the cattle and buffaloes and Sero-monitoring of PPR vaccine in the goat and sheep reared by farmers in different 15 districts of Gandaki and Lumbini Province. The overall seropositivity of FMD vaccine was found to be 79%. About (92%) animals were found seropositive in Baglung district followed by 87% in Tanahun district. The least number of seropositive cattle and buffalo (43%) were found in Gulmi followed by Kapilvastu (56.36) district.

Similarly, the overall seropositivity of PPR vaccine was found to be 74%. 89.64 % were found seropositive in Nawalparasi-W district followed by 85.67% in Gorkha district and 85.35% in Baglung district. The least number of seropositive goats and sheep (38.66%) were found in Parbat district followed by Kaski 50.34%. The seroconversion of both FMD and PPR vaccine is constantly decreasing compared to previous two fiscal year. Constant decrease in conversion and relatively low seroconversion in certain districts due to various factors. Inadequate vaccine cold chain maintenance, errors in vaccine transportation, high ratio of animal replacement in a herd and difficulty in identification of vaccinated animals due to lack of animal traceability and poor recording system could be the possible reason for low Sero conversion in testing.

Veterinary Laboratory Surkhet

1. Introduction

VL, Surkhet is located at Birendranagar Municipality-7, of the Karnali Province. Since its establishment in F/Y 1988/1989 AD, it has been providing diagnostic services in ten districts of Karnali Province and six districts of Lumbini province. The mission of the VL, Surkhet is to promote the health of livestock, poultry and ensure safe animal products for consumer by assisting Veterinary Hospital and Livestock Service Centers (VHLSC), VHLSEC, veterinarians, animal health workers, and others who are responsible for animal health in detection and prevention of animal diseases.

2. Human Resource

Table 1: List of staffs working at VL, Surkhet

S.N.	Name of staff	Designation
1.	Dr. Rakesh Parjapati	Senior Veterinary officer
2.	Dr. Prativa Shrestha	Veterinary Officer
3.	Dr. Lokendra Neupane	Veterinary Officer
4.	Bishnu Parsad Dhakal	Veterinary Officer
5.	Krishna Parsad Adhikari	Accountant
6.	Shamsher Bd. G.C.	Animal Health Technician
7.	Deviram Kandel	Animal Health Technician
8.	Manraj Sunar	Animal Health Technician
9.	Rama Kumari Bhandari	Assistant Animal Health Technician
10.	Chet Kumari Rana	Kharidar
11.	Mim G.C. Gharti	Assistant Animal Health Technician
12.	Dal Bahadur Shrestha	Light Vehicle Driver
13.	Puskarlal Gyawali	Office attendant

3. Laboratory Services

3.1 Pathology section

3.1.1 Parasitological examination

A total of 921 fecal samples were analyzed, out of which 680 samples tested positive for internal parasites. The primary parasites identified included Fasciola, Coccidia, Haemonchus, Strongylus, Paramphistomum, and Trichuris.

The following chart illustrates number of different parasites seen in fecal examination

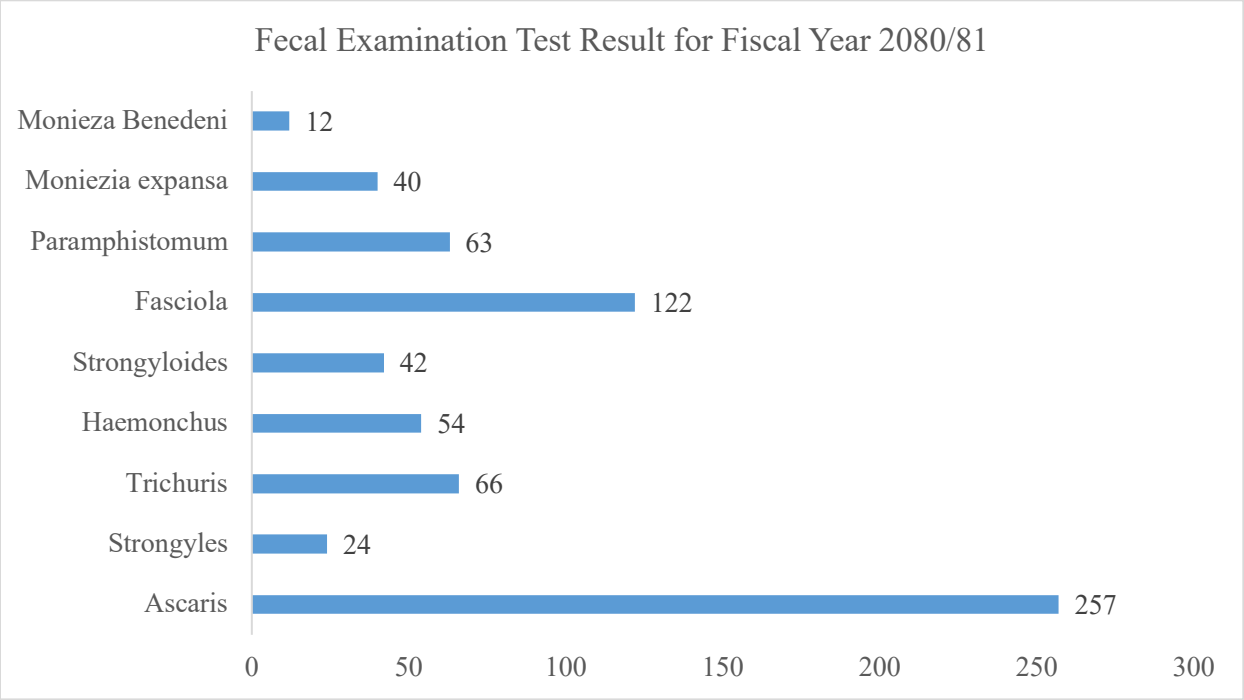


Figure 1: Fecal examination result of different animal conducted at VL, Surkhet

The following chart illustrates the number of fecal samples received in FY 2080/81 from different species.

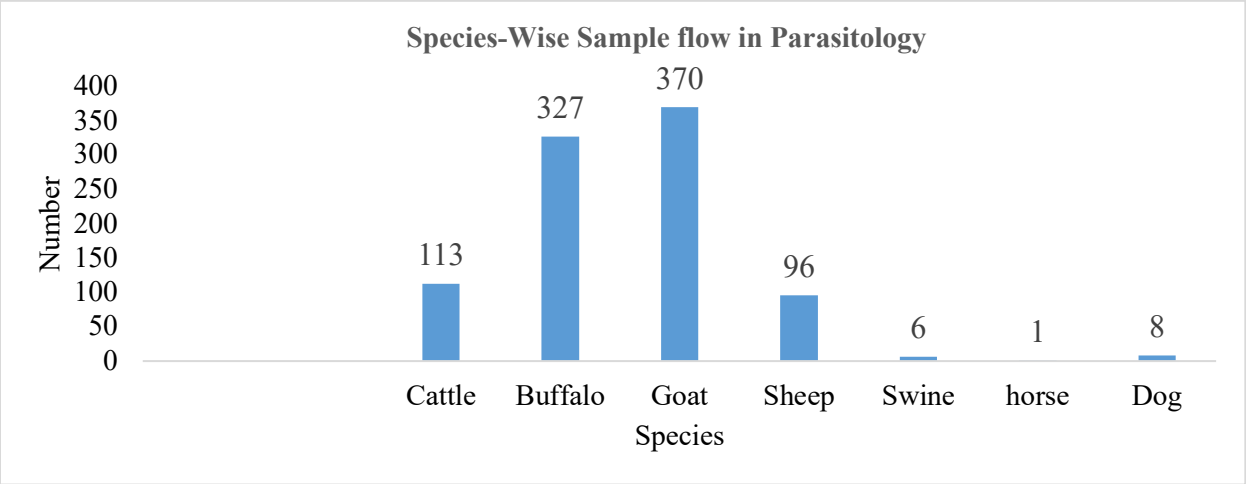


Figure 2: No. of fecal samples received from different species at VL, Surkhet

In the fiscal year 2080/81, a total of 680 samples tested positive for parasitic infections. Goats accounted for 370 number of cases, followed by buffaloes (327), cattle (113), sheep (96), dogs (8), swine (6), and horses (1).

3.1.2 Blood Parasite Examination

A total of 243 blood samples analyzed, 15 samples tested positive for blood parasites. Among the positive cases, *Babesia* spp. was identified in seven samples, affecting three cattle and four buffalo. Additionally, the laboratory identified *Trypanosome* infections in blood samples from horses. Out of 10 samples that tested positive for trypanosomes, eight were from horses in the Banke district, while two were from Bardiya.

3.1.3 Skin Scraping Test

Among 58 skin scrapings tested at the VL Surkhet, 9 samples showed positive results for various skin infections. Specifically, *Sarcoptic* mites were identified in 4 goat samples, indicating sarcoptic mange, a common parasitic skin condition that can cause severe itching and skin damage. Additionally, *Demodex* mites were found in 4 dog samples, often leading to demodectic mange, which can result in hair loss and secondary infections in affected animals. A single case of a fungal infection was detected in a buffalo sample, highlighting the diverse range of dermatological issues faced by different species.

3.1.4 PM examination

A total of 613 birds and animals were submitted to the VL Surkhet for postmortem examination to determine the cause of mortality. Through detailed pathological analysis, the lab diagnosed various diseases affecting these animals, providing crucial insights into regional disease patterns and mortality factors. The breakdown of diagnosed diseases is presented in the accompanying table and figure, highlighting the most common and severe conditions affecting livestock and poultry populations.

Table 2: Animal species brought at VL for PM examination

S.N.	Species	Number	Disease
1	Broiler	361	IBD, Colibacillosis, Mycotoxicity, Ascitis, LPAI
2	Local	91	Salmonellosis, Colibacillosis, IBD
3	Parents	5	Colibacillosis, Mycotoxicity
4	Duck	6	Colibacillosis, Mycotoxicity
5	Goat	13	Pneumonia, Enteritis, Tape worm, PPR
6	Layers	31	Salmonellosis, Colibacillosis, IBD
7	Giriraj	27	Colibacillosis, Mycotoxicity
8	Sheep	1	Urolithiasis
9	Quail	3	Mycotoxicity, Colibacillosis
10	Kaliz	5	Colibacillosis, Mycotoxicity
11	Dog	46	Pneumonia, Enteritis
12	Pig	12	Pneumonia, Enteritis
13	Turkey	3	Colibacillosis, Fowl Pox
14	Koiler	8	Colibacillosis, IBD, Fowl Pox
15	Buffalo	1	Hepatitis
Total		**613**	

The chart below illustrates the postmortem findings in poultry for fiscal year 2080/81.

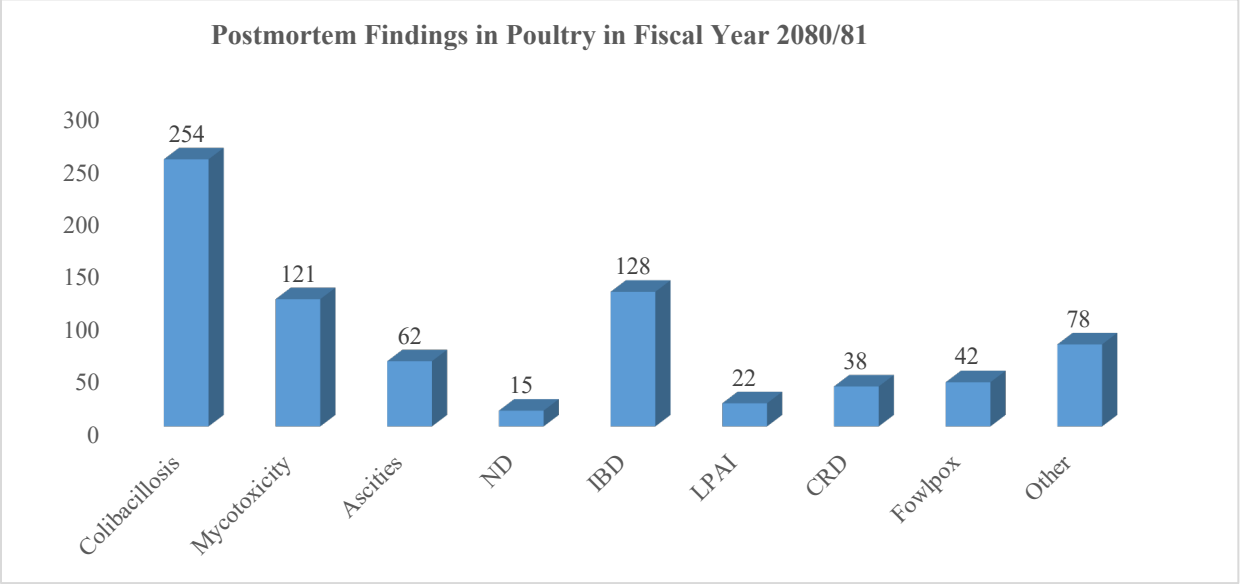


Figure 3: Result of Post-mortem finding in poultry

Colibacillosis was the most frequently observed condition, with 254 cases, followed by Infectious Bursal Disease (IBD) with 128 cases, and Mycotoxicity with 121 cases. Other notable findings included Ascites (62 cases), Fowlpox (42 cases), and Chronic Respiratory Disease (CRD) (38 cases). The least number of cases were reported for Newcastle Disease (ND), with only 15 cases recorded.

3.1.5 Clinico-Hematological Test

The Hematology Unit at the VL Surkhet offers comprehensive routine hematological testing for various animals and poultry, aiding in the early detection and management of blood-related disorders and infections. Key hematological parameters measured include Total Erythrocyte Count (TEC), Total Leukocyte Count (TLC), Differential Leukocyte Count (DLC), hemoglobin (Hb) levels, and Packed Cell Volume (PCV). Additionally, the unit performs blood smear staining to identify blood protozoa. In recent assessments, *Anaplasma* and *Babesia* species were prevalent among blood samples collected from improved breeds of cattle in the Bardiya and Surkhet districts. A total of 221 samples were processed in the Hematology unit, providing veterinarians with essential diagnostic insights to guide treatment and improve animal health outcomes.

3.1.6 Urine Test

Out of 103 urine samples tested, 5 samples were found abnormal.

3.2 Microbiological examination

The major samples submitted for the microbiological examinations were milk, water, tissues etc. In a total 511 samples were received at VL for culture and AST. Similarly, 58 samples were received for identification of fungus by culture method.

3.2.1 Bacteria isolation

511 samples were submitted for bacterial culture and identification. Of these, 288 samples revealed gram-negative bacteria, while 160 samples contained gram-positive bacteria. In the remaining 63 samples, bacterial growth did not occur, potentially due to prior treatment or unsuitable conditions for bacterial proliferation. The

primary bacterial isolates included *Escherichia coli*, *Salmonella*, *Staphylococcus*, and *Streptococcus* species, representing the main pathogens affecting livestock and poultry health.

3.2.2 California Mastitis Test Result

California mastitis test was used to diagnose clinical and sub clinical mastitis of animal in laboratory as well as in field level. Total milk sample were tested. The result of CMT test is given below.

Table 3: CMT test result

Type of Surveillance	CMT Results	
	Positive	Negative
Active Surveillance	87	60
Passive Surveillance	61	13
Total	148	73

3.2.3 Campylobacter AMR Active Surveillance of poultry

In a study conducted to assess antibiotic resistance patterns in *Campylobacter* species, 65 cloacal swab samples were collected from various areas of Birendranagar Municipality. These samples were tested for susceptibility to commonly used antibiotics, including Ampicillin, Ciprofloxacin, Tetracycline, Azithromycin, Chloramphenicol, and Imipenem. Out of the 65 samples, bacterial growth was observed in 50 samples, while 15 samples showed no bacterial growth.

The table below shows number of samples from different types of chickens for campylobacter AMR surveillance.

Table 4: AMR Surveillance for *Campylobacter*

Types of Chicken	Number of samples
Local	20
Layer	10
Broiler	35

3.2.3.1 Resistance pattern

The chart illustrates the resistance patterns of Campylobacter against various groups of antibiotics.

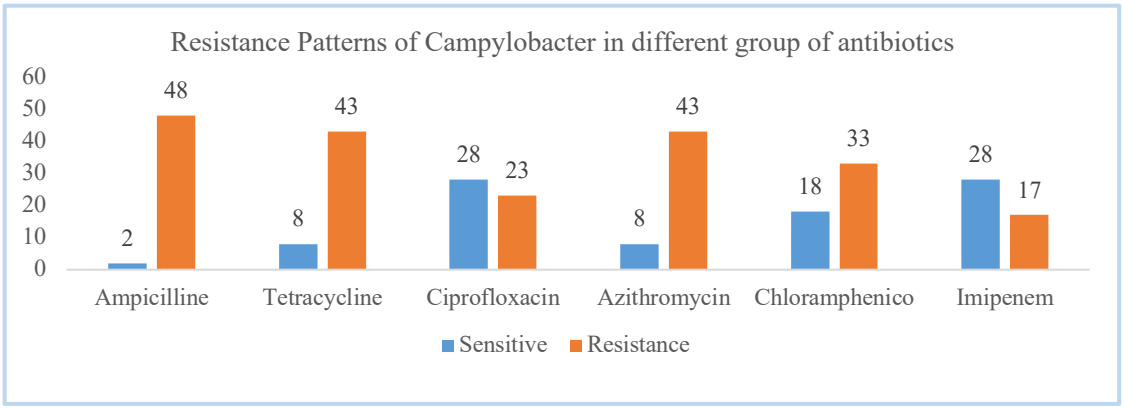


Figure 4: Resistance Patterns of Campylobacter in different group of antibiotics

The highest resistance was observed to Ampicillin (48 cases) and Azithromycin (43 cases), followed closely by Tetracycline (43 cases). In contrast, Ciprofloxacin showed a more balanced profile, with 28 sensitive and 23

resistant cases. Chloramphenicol and Imipenem also demonstrated comparatively better sensitivity, with 18 and 28 sensitive cases, respectively.

3.3 Virological examination

A total of 1058 samples of different domestic animal were collected at field level for virological analysis through rapid test kit. The results of the test are presented in the table below.

Table 5: Test result of Virological examination

S. N	RAPID Test	Target	Positive	Negative	Total
1	AI	200	5	202	207
2	IBD	70	21	86	107
3	ND		6	75	81
4	IB	40	0	36	36
5	Rabies	50	19	34	53
6	PPR	100	14	110	124
7	SF	40	1	48	49
8	Parvoenteritis		2	8	10
9	Canine Distemper	20	2	20	22

3.4 Serological examination

A total of 542 serum samples of different domestic animal were collected and tested at VL, Surkhet. The results of the test are presented in the table below.

Table 6: Result of plate agglutination test different Diseases (FY 2080/81)

S.N.	Conducted Test	Total Sample Tested	No of Positive Sample
1	Rose Bengal Plate	204	3
2	Salmonella Plate	140	21
3	Mycoplasma Plate	74	15
4	PPR Penside Test	124	14
Total		**542**	**53**

3.5 Rapid test report

Table 7: Result of rapid test

Species	Sample Tested	ND		IBD		AI		IB		PPR		Brucella		Mycoplama		Salmonella		Rabies		Swine fever	
		Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg
Goat/Sheep	297	0	0	0	0	0	0	0	0	14	106	2	167	0	0	0	0	1	7	0	0
Pig	49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	48
Poultry	462	6	75	21	86	5	153	0	36	0	0	0	0	9	30	5	36	0	0	0	0
Dog	32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	20	0	0
Cattle	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	0	0
Buffalo	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0
Total	**849**	**6**	**75**	**21**	**86**	**5**	**202**	**0**	**36**	**14**	**110**	**2**	**167**	**9**	**30**	**5**	**36**	**16**	**33**	**1**	**48**

4. Sero-monitoring Program

4.1 National PPR Program

The National PPR Control Program plays a vital role in controlling and preventing Peste des Petits Ruminants (PPR) in livestock, particularly in sheep and goats. The provision of 1,636,000 doses of PPR vaccine across 16 districts is a significant effort. VL Surkhet's role in sero-monitoring ensures the effectiveness of vaccination campaigns and helps track the immune response in the animal population. This data is crucial for assessing the success of the vaccination program and for making future decisions about disease control in the region.

4.2 Swine Fever Sero-monitoring Program

Under the National Swine Fever Vaccine Program, the DLS distributed a total of 150,000 doses of swine fever vaccine across three districts in this region. VL Surkhet supported the program by conducting sero-monitoring. The table below provides the serum sample collection data.

4.3 FMD Sero-monitoring Program

The DLS, under its ongoing efforts to control Foot and Mouth Disease (FMD), distributed a total of 150,000 doses of the FMD vaccine as part of the FMD Vaccination Program across the designated regions. This initiative is aimed at preventing the spread of the disease among livestock, particularly in high-risk areas. In support of this program, VL Surkhet played a crucial role by providing sero-monitoring services. The laboratory's involvement ensures that the effectiveness of the vaccination campaign is closely monitored through the collection and analysis of serum samples, helping to assess the immune response in the vaccinated animal population. This collaborative effort between the DLS and VL Surkhet is integral to maintaining the health of livestock and mitigating the risk of FMD outbreaks in the region.

4.4 ND Sero-monitoring Program

The total number of ND Vaccines of poultry distributed from DLS was 195000 doses under national ND control program for 9 districts for this region. VL, Surkhet supported the program by sero-monitoring.

Table 8: Sero-monitoring test result

S. N.	District	Collecting Sample of				Result											
		FMD	PPR	ND	CSF	FMD			PPR			ND			CSF		
						Sample Test	Pos	Neg	Sample Test	Pos	Neg	Sample Test	Pos	Neg	Sample Test	Pos	Neg
Annual Target		**470**	**1878**	**470**	**150**												
Karnali Province																	
1	Surkhet	50	350	63		49	42	7	347	278	69						
2	Dailekh		305	50					112	192	20	16	13	3			
3	Salyan	50	150		79												
4	West Rukum	49	187														
5	Jajarkot		215						184	125	59						
6	Kalikot	48	214	80		48	23	25	184	100	84	80	51	29			
7	Jumla																
8	Mugu																
9	Dolpa		50														
10	Humla		50														
Karnali Province Total		197	1521	193	79	97	65	32	827	695	232	96	64	32	0	0	0
Lumbini Province																	
1	Banke	160		120	76	80	42	38				16	15	1			
2	Barkiya			30								25	22	3			
3	Dang	200	200	50		95	82	13	184	164	20	35	22	13	76	60	16
4	Rolpa		134						103	84	19		0				
5	Pyuthan		81	80					81	60	21	80	51	29			
6	Est Rukum																
Total		**360**	**415**	**280**	**76**	**175**	**124**	**51**	**368**	**308**	**60**	**156**	**110**	**46**	**76**	**60**	**16**
Net Total		**557**	**1936**	**473**	**155**	**272**	**189**	**83**	**1195**	**1003**	**292**	**252**	**174**	**78**	**76**	**60**	**16**

5. Regional Vaccine Bank

In FY 2080/81, vaccines of PPR and ND were distributed in different districts as the part of animal disease control program. A detail of the distribution is mentioned in table below.

Table 9: Distrubution of vaccines

S. N	District	PPR	ND	Rabies	FMD	CSF	LSD
1	Surkhet	315000		1500	54500		21000
2	Dailekh	120100	36000	2500	32100	800	18000
3	Salyan	167000	10000		14500	2000	21500
4	Jajarkot	139000		1400	5000	500	
5	Jumla	60000	2700	150	19500		
6	Kalikot	105000	40000		20000		
7	Humla	75000	7000		22000		500
8	Dolpa	50000	5000		2000		3000
9	Mugu	70000	100		5000		
10	West Rukum		2100			900	
11	Dang			800			
12	Banke				70000		
13	Bardiya	13000					
14	Rolpa			300	10000		
15	Pyuthan						
16	East Rukum						

6. Epidemic Investigation:

Various animal and poultry disease outbreaks were investigated during FY 2080/81. Upon receiving outbreak investigation requests from districts, veterinarians or technicians visited the affected sites with sampling kits, collected epidemiological data and pathological samples. These samples were processed in the laboratory to identify the cause of the outbreak. The field information guided laboratory testing and aided in disease confirmation. Samples that could not be processed locally were referred to the CVL, Kathmandu.

Table 10: outbreak investigation

SN	Program	Target	Progress	Remarks
1	Rabies disease outbreak investigation	2	2	Surkhet, Jajarkot, Banke, Bardiya
2	Epidemic disease investigation and control	4	5	Surkhet, Jajarkot, Banke, Bardiya
3	Mastitis investigation in milking cattle	2	3	Surkhet, Dailekh, Salyan, Dang, Banke, Bardiya

6.1 Status of PPR outbreaks

During FY 2080/81, a total of five suspected PPR (Peste des Petits Ruminants) outbreaks were investigated in different locations including Surkhet, Bardiya, West Rukum, Dang, and Lekbesi Municipality. Samples were collected on-site and tested using LFA test kits, with further confirmation by qPCR at CVL, Kathmandu.

Table 11: PPR outbreaks in different local level

SN	Date of Outbreak	Location	Remarks
1	2080/05/06	Birendranagar, Surkhet	PPR RAPID TEST AND qPCR (CVL)
2	2080/06/14	Mainapokhari, Bardiya	
3	2080/12/08	Lekbesi Municipality	
4	2081/01/24	Sanibheri Rural Municipality, West Rukum	
5	2081/02/17	Rapti Rural Municipality, Dang	

6.2 Status of LSD outbreaks

A total of 18 cattle samples were collected from Rukum Paschim, Jumla, and Kalikot districts and tested using the PCR method. All 18 samples tested negative, indicating no detection of the targeted pathogen in the tested cattle.

Table 12: LSD test result

Name & Address of farmer	Species	Sample tested	Test Method	Result	
				Pos	Neg
Chaurjhari, Rukum paschim	Cattle	6	PCR	0	6
Kankasundari, Jumla	Cattle	7	PCR	0	7
Khadachakra-5, Kalikot	Cattle	5	PCR	0	5
Total		**18**		**0**	**18**

VETERINARY LABORATORY DHANGADI

1. Introduction:

Veterinary Laboratory is situated in Dhangadhi Sub Metropolitan city of Far-Western Province of Nepal. This laboratory was established as the designated laboratory of the Far-Western development region with its service area covering nine districts. VL, Dhangadhi was established in 2049/050 as with the name of RVL, Dhangadhi. With the administrative reform of Nepal during the year 2074/75, the laboratory was renamed as VL, Dhangadhi, Kailali with working areas as before. Veterinary laboratory aims to protect the livestock with the provision of prompt diagnosis of diseases and is developing its capacity to function as referral laboratory of specific disease like rabies, which is frequently reported in the region.

2. Laboratory Services at VL, Dhangadhi

2.1 Pathology Section

Post-mortem examination, hematology and biochemistry are major areas under the pathology section. Mostly the section receives specimens from all over the province either directly or through the respective VHLEC or local level government. Besides this, veterinary practitioners, livestock and poultry farms as well as farmers deliver specimens for the purpose of disease diagnosis.

2.2 Microbiology Section

This section is responsible for isolation and identification of bacteria and fungus, which receives samples from various sources such as farmers, local level governments, referral samples from private clinics, VHLEC and directly from the field during the outbreaks.

Various samples like milk, urine, tissues, water, nasal swabs, ear swabs and skin swab are received in this unit for isolation, identification and AST of the organism.

2.3 Molecular Biology Section

Molecular tools are increasingly important in modern animal disease investigation. This section has biosafety level 2 facilities for handling infectious agents. Similarly, this section also has facility for ELISA and other serological tests. Most of the samples are submitted to this unit by the post mortem unit. LFA test are used for the initial screening of New Castle Disease, Infectious Bursal Disease, Avian Influenza, Infectious Bronchitis and Rabies. For the further confirmative diagnosis, the samples are sent to the CVL.

2.4 Administration Section

This section governs overall financial, logistic and administrative management of the laboratory. The section is responsible for revenue collection, maintenance of reagents and supplies, financial transaction, vehicle management etc.

3. Human Resource of VL, Dhangadhi

Table 1: List of staffs working at VL, Dhangadhi (FY 2080/81)

S.N.	Staffing of VL, Dhangaghi	Class	Number	Fulfilled	Remarks
1	Senior Veterinary Officer	Gazetted II	1	1	
2	Veterinary Officer	Gazetted III	3	3	
3	Animal Health Technician	Non-Gazetted I	3	3	
4	Junior Animal Health Technician	Non-Gazetted II	2	1	1 vacant
5	Accountant	Non-Gazetted I	1	1	
6	Kharidar (Clerk)	Non-Gazetted II	1	1	

S.N.	Staffing of VL, Dhangaghi	Class	Number	Fulfilled	Remarks
7	Driver	No Class	1	1	
8	Office helper	No Class	2	2	
	Total		14	13	

4. Laboratory services provided during the fiscal year 2080/81

4.1 Parasitology:

Altogether 374 fecal samples of goat were tested for different parasitic conditions of livestock populations. Samples were collected from field during epidemic disease investigation and the investigation program under annual program.

The most common helminths identified during fecal examination were *Haemonchus* spp., and *Tricostronglyus* spp. Out of 374 fecal samples tested for EPG, 206 (55.08%) samples were positive with high parasitic burden.

4.2 Molecular unit/Serology:

During the fiscal year 2080/81 most of the serum samples collected were from goats and cattle for various diseases like Toxoplasmosis, Brucellosis, Q Fever, Salmonella and Mycoplasma (Plate Agglutination Test-PAT).

LFA test was used to screen diseases like PPR and Rabies. The samples were further processed at CVL for the confirmation of the agent. Results of serological examination performed at the VL, Dhangadhi, Kailali is shown in the table below.

Table 2: Test Result of the Molecular Section

S.N.	Disease Name	Test method	Sample Tested	Result	Remarks
1.	Salmonellosis	PAT	51	12 positive	
	Mycoplasmosis	PAT	51	15 positive	
	Brucellosis	PAT	784	All negative	
3.	Peste des petits ruminants (PPR)	Penside test	46	36 positve	
4.	Rabies	Antigen test	147	128	LFA test at VL, Dhangadhi
5.	Avian Influenza type A	Antigen test (rapid method)	415	20 positive	
6.	New Castle Disease		332	20 positive	
7.	Infectious bursal disease		333	125 positive	
8.	Toxoplasmosis	ELISA	828	354 positive	Sample collected by VL Dhangadhi and Test was performed by CVL, Kathmandu
9.	African Swine Fever	Rapid Test	4	1 positive	PCR was performed in CVL, Kathmandu and all samples were negative
11	FMD	PCR	30	2 positive (Type O)	PCR was performed by FMD and TADs Laboratory
13	Enterotoxemia	ELISA	12	6 positive	Sample collected by VL Dhangadhi and Test was performed by CVL, Kathmandu
14	Q Fever	ELISA	828	317 positive	

4.3 Hematology:

- 40 samples of cattle were processed for blood protozoan using Giemsa stain. All the samples were negative for blood protozoa.
- 49 samples of dog from VHLSEC Kailali was tested for CBC and result showed Anaemia in 22, Thrombocytopenia in 14, Polycythemia in 4 and Leukocytosis in 9 animals.

4.4 Pathology:

This section of the laboratory mostly receives poultry, goat and pig carcasses for necropsy examination and disease diagnosis. However, dead bodies of other animal species are also received occasionally, especially during disease outbreak. Most of the pathological samples comprises of poultry. During the fiscal year 2080/81, altogether 1405 (1389 poultry, 12 goats and 4 pigs) carcasses were registered at VL, Dhangadhi for postmortem examination and PM was conducted for each dead bodies. The major conditions diagnosed in the pathology section are presented below.

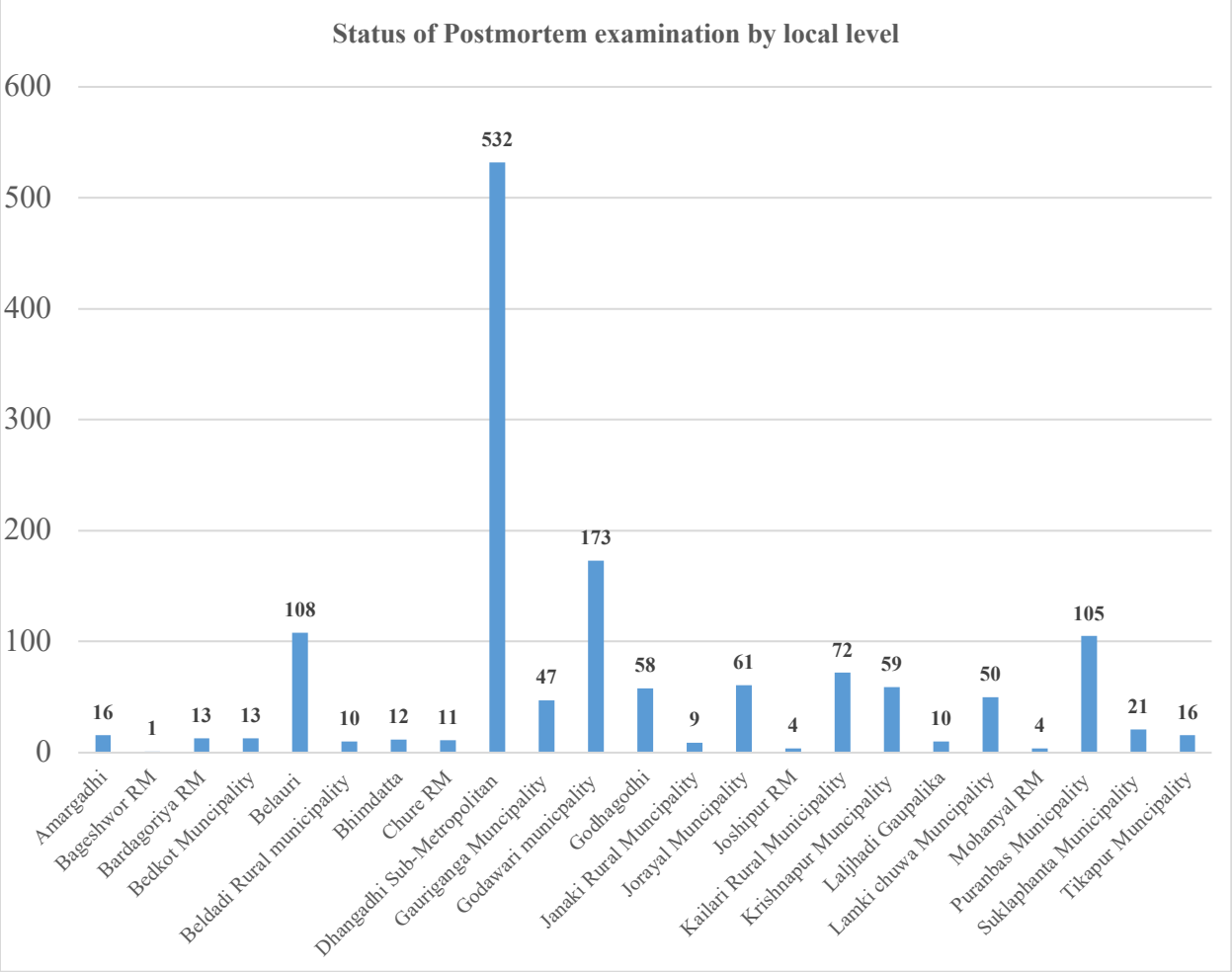


Figure 1: Local levelwise samples received for Postmortem examination

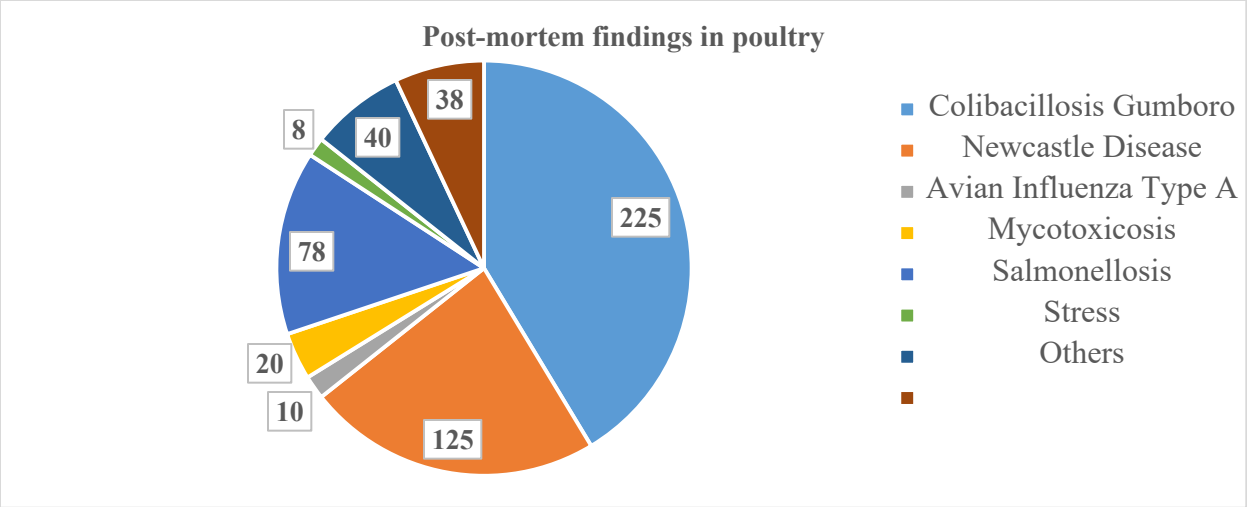


Figure 2: Post-mortem findings in poultry

4.5 Microbiology:

Samples received in the units were cultured using Nutrient agar, MacConkey agar, Blood agar, EMB Agar, XLD Agar, and MHA etc. Bacteria were identified on the basis of colony characteristics, Gram's staining and the Biochemical test. The result of microbiological test including the AST result is presented in the figures below:

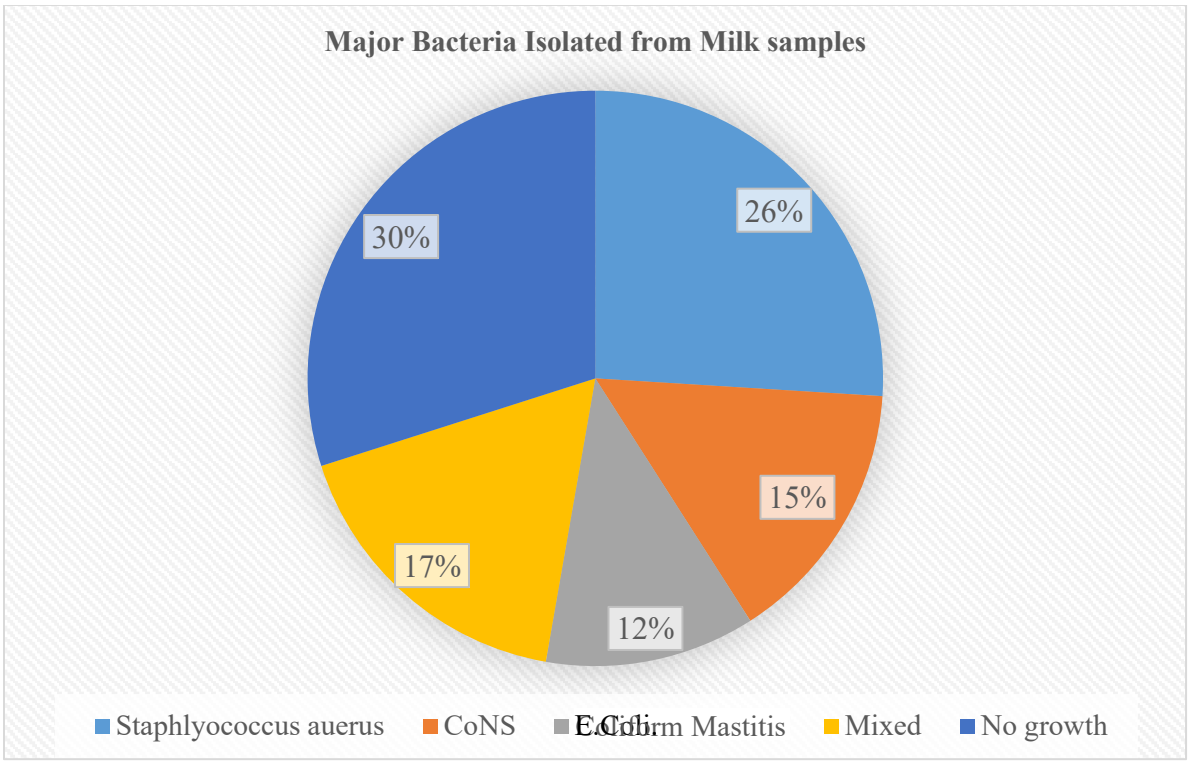


Figure 3: Bacteria Isolated from Milk samples

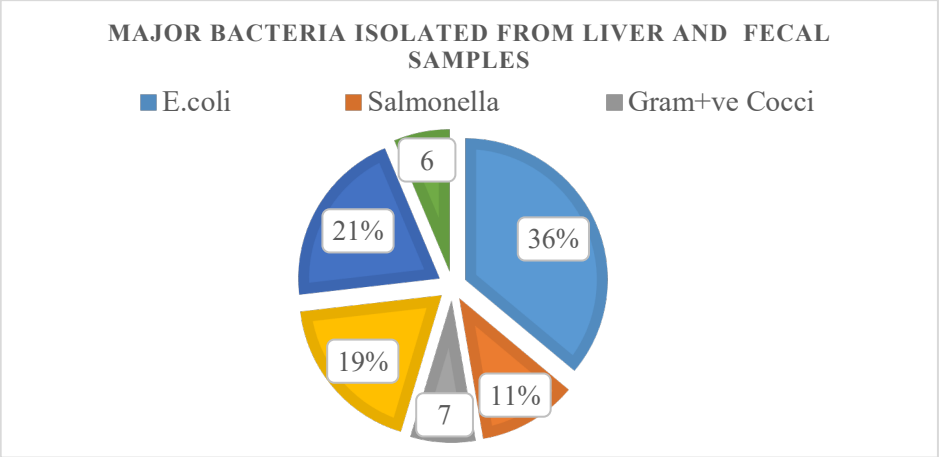


Figure 4: Bacteria Isolated from Liver and Fecal Samples

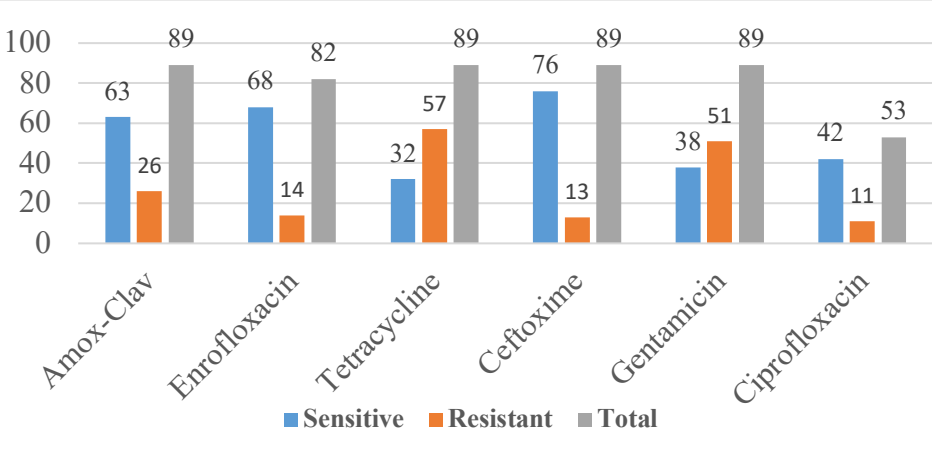


Figure 5: AST Results of Milk Samples

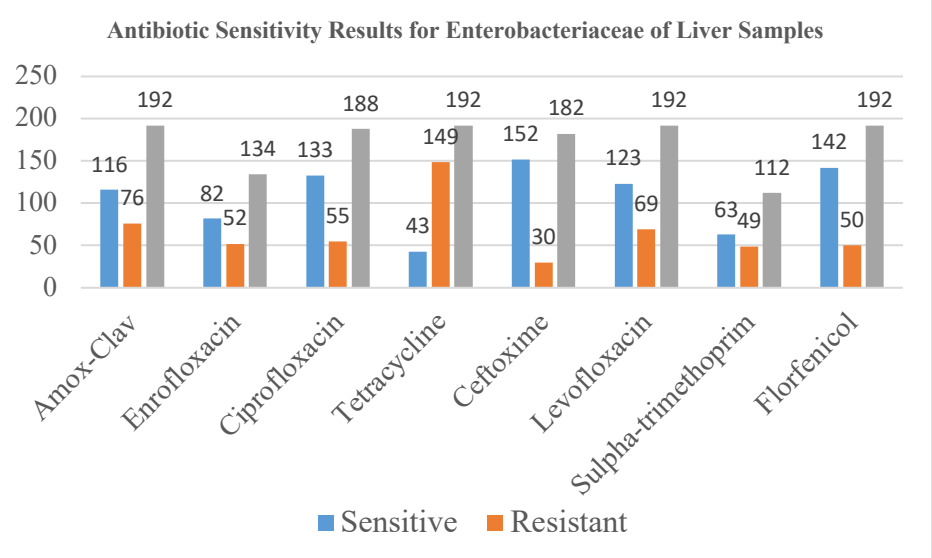


Figure 6: AST Results for Enterobacteriaceae of Liver Samples

5. Investigation of Kumri (*Seteria* spp.) in Goats

A part from above activities this laboratory has performed investigation work on Kumri in Goat in Kailali and Kanchanpur district. The main objective of study was to find the status of Kumri in goat, especially in Hilly area and Terai area of Kailali and Kanchanpur district. Surveillance was done through questionnaire survey and observing the symptoms in goats and also testing blood samples for the parasites. None of the goats were showing symptoms of Kumari (Setaria sp.) and blood samples did not show the presence of parasite at the time of investigation.

6. Sub clinical mastitis test in dairy animals

This program was conducted as a regular activity to find the cases of sub clinical mastitis in milking cattle and buffaloes especially in commercial herds of Kailali and Kanchanpur districts. Fresh milk samples were collected from lactating animals from the farms and tested by California Mastitis test (CMT) immediately. The CMT positive samples were brought to the laboratory to proceed with culture in microbiology unit.

7. Status of major disease outbreak

Table 3: PPR in Fiscal year 2080/81

District	No. of outbreaks	Location	Animal type
Doti	1	Dipayal Silgadhi Municipality	Goat
Kailali	1	Gauriganga Municipality	Goat

Table 4: FMD in Fiscal year 2080/81

District	No. of Outbreaks	Location	Animal type
Bajhang	1	Bungal Municipality	Cattle

8. Sero-monitoring

Sero Monitoring for PPR, FMD, CSF and Rabies was conducted by collecting serum samples from vaccinated animals.

Summary of the sample colleted as shown in table below.

Table 5: Summary of Sero monitoring

S.N	Disease	Sample collected	Remarks
1	PPR	1984	Samples were collected by VL Dhangadhi and sent to CVL Tripureshwor (PPR and Rabies) and FMD & TADs Laboratory, Budhanilkantha (CSF and FMD) for further testing
2	FMD	272	
3	CSF	202	
4	Rabies	10	
	Total	**2468**	

Government of Nepal
Ministry of Agriculture and Livestock Development
Department of Livestock Services

Central Veterinary Laboratory

Tripureshwor, Kathmandu
Tel. No.: +977-1-5312143, 5361938
email: cvlgov01@gmail.com, website: www.cvl.gov.np