



INDIAN COUNCIL OF AGRICULTURAL RESEARCH

**PROJECT DIRECTORATE ON FOOT AND MOUTH
DISEASE**

**ANNUAL REPORT
2008 – 2009**

**OF
FMD – NETWORK UNIT,
ORISSA**



**ANIMAL DISEASE RESEARCH INSTITUTE
PHULNAKHARA, CUTTACK**

**DIRECTORATE OF
ANIMAL HUSBANDRY & VETERINARY SERVICES
ORISSA, CUTTACK – 753001.**

ANNUAL REPORT- 2008 - 2009
CHAPTER - I

- 1. Name of the Project** : Project Directorate on Foot and Mouth Disease
- 2. Name and Address of the Center:** Net Work Unit, ORISSA.
ANIMAL DISEASE RESEARCH INSTITUTE,
PHULNAKHARA, CUTTACK – 754001.
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Email - prabhu_kalyan@yahoo.co.in
- 3. Date of Start** : The typing of samples by ELISA started from July 1997 but the Network unit was approved by ICAR vide letter no – F-4(2)/97-ASR-IV. Dt. 1.8.2000.
- 4. Report No** : 8 (Eight)
- 5. Objective of the Project** : Typing of FMD virus samples received/collected from the field outbreaks using ELISA so as to know the type virus involved and there by to develop a complete picture of the prevalence of the disease in Orissa.
- 6. Technical programme**
 1. Collection of epidemiological information along with suitable samples from FMD outbreaks.
 2. Serotyping of FMD samples using sandwich ELISA as per approved protocol.
 3. To continue to transmit all the field isolates along with the detailed data to the PD,FMD for detailed characterization and inclusion in the National Repository.
 4. collection and analysis of the epidemiological data of the field outbreaks. The details should include
 - * Number of distribution of various animals at risk, morbidity and mortality pattern of different age groups in different species, seasonal trend of the disease and the route of migration of animals.
 - * Meteorological data such as rainfall, temperature, relative humidity etc should be collected to determine the relationship of environmental factors with the incidence of FMD outbreaks.
 - * Analysis of economic losses due to FMD outbreak.
 5. Estimation of serum antibody level against the serotypes O,A and Asia-1 from randomly collected sera samples (100 sera samples from each district) by LPB-ELISA and also the determination of Herd Immunity against FMD virus serotypes in vaccinated animals.

6. Strengthening of FMD surveillance in the coastal areas and regular monitoring of the disease by attending outbreaks, collecting clinical samples and gathering epidemiological information.

7. Staff Position : Project Co-Coordinator

Sl. No.	Name of the officer	Designation	Date of joining	Date of leaving
1	Dr. Nihar Nandan Nayak	DD(DC)	1.4.2008	30.6.2008
2.	Dr Satchidananda Behera	LRVAS	1.07.2008	16.07.2008
3	Dr Amulya Kumar Das	Project Co-ordinator	17.07.2008	31.3.2009

:FMD laboratory, Virology Division

Sl. No.	Name of the officer/ Staffs	Designation	Date of joining	Date of leaving
1	Dr. Prabhu Kalyan Tripathy	L.R.V.A.S.	11.07.2004	Continuing
2.	Smt Renuka Devi	Sr. Lab. Asst.	1.07.2006	6.1.2009
3	Sri B.P. Mohanty	Sr. Lab. Asst	7.1.2009	continuing
3.	Sri Narendra Ku. Swain	Attendant	1.10.96	Continuing

: Supporting Officers of the Institute

Sl. No.	Name of the officer/ Staffs	Designation	Date of joining	Date of leaving
1	Dr Satchidananda Behera	L.R.V.A.S.	25.1.2007	Continuing
2.	Dr Bhagaban Dash	L.R.V.A.S.	1.12.2005	Continuing
3.	Dr Laxman Ku Nayak	LRVAS	4.7.2007	Continuing
4	Dr HareKrushna Sahoo	RA	1.12.2005	Continuing
5	Dr Sasanka.Samantaray	RO	17.8.2007	Continuing
6	Dr Amlan Ku Mishra	LRVAS	20.7.2007	Continuing
7	Dr Debananda Patro	LRVAS	18.9.2001	Continuing
8	Dr Manaswini Dehury	JVO	6.1.2009	continuing

- 8. Financial Out Lay** : An amount of Rs 4.65 lacs was received from the Project Directorate on FMD, Mukteswar, Uttarakhand in 2 installments through the Directorate of Animal Husbandry & Veterinary Services, Orissa, Cuttack during the year 2008-09

ORISSA

Orissa is the ninth largest state of the Indian union situated in the north-eastern part of the Indian peninsula extending from 17.49' N to 22.34 'N latitude and from 81.29' E to 87.29' longitude. It is bounded by the Bay of Bengal on the east, West Bengal on the north-east, Jharkhand on the north, Chhatishgarh on the west and Andhrapradesh on the south. The state of Orissa has spread in an area of 1,55,707 sq kms and have 30 districts. The total human population of the state is 3,68,04,660 and the density of population is 236 per sq km. The state has a total of 5813 thousand hectares of forest land and 443 thousand hectares of pastures and other grazing land. The net area irrigated in the state is 2892.46 thousand hectares.

The state has divided in to 4 distinct geographical regions (i) The northern plateau or low land (25.5%) (ii) The central table land (24.1%) (iii) The eastern ghat region or up lands (29.2%) (iv) The coastal tract (21.2%).

The climate of the state is hot and moist.(Average temperature is 20 degree Celsius to 25 degree Celsius in January and July temp is above 30 degree Celsius). Average annual rainfall is about 1451.2mm (150cms). Towards the west the climate gets extreme. The month wise distribution of rainfall is detailed in table-1.

Table-1. Month wise Distribution of Rainfall.

MONTH	RAINFALL (mm)	MONTH	RAINFALL (mm)
January	11.4	July	339.9
February	22.9	August	356.0
March	25.5	September	231.9
April	33.1	October	114.7
May	63.3	November	31.5
June	216.5	December	4.5

LIVESTOCK POPULATION SUSCEPTIBLE FOR FOOT & MOUTH DISEASE

The State livestock census 2003 reveals Cattle-142.80 lakhs, Buffalo-14.39 lakhs, Sheep- 17.58 lakhs, Goat 59.74 lakhs and Pig- 5.69 lakhs . It constitutes 5% of the Indian livestock population.It provides 7.25% of SNDP and 80 % of rural households keep livestock.The detailed district wise susceptible population is in table-2.

Table-2. DISTRICT WISE LIVESTOCK POPULATION OF ORISSA.

Sl No.	District	Cattle	Buffaloes	Sheep	Goats	Pigs
1	Anugul	505197	35095	58769	222868	5153
2	Bolangir	527843	119841	134034	299176	2608
3	Balasore	896921	4385	9558	344604	18235
4	Baragarh	483345	37783	44212	148990	6184
5	Bhadrak	617593	15514	10193	162923	8396
6	Boudh	236462	43581	76664	112486	1294
7	Cuttack	633959	44908	88338	278108	2165
8	Deogarh	178510	11764	5373	100729	5477
9	Dhenkanal	474949	49378	46661	182683	2457
10	Gajapati	232742	25093	12139	104700	24824
11	Ganjam	837254	128342	142611	216070	9895
12	Jagatsinghpur	327940	13185	27161	143314	5601
13	Jajpur	653741	11061	67412	255642	5826
14	Jharsuguda	167263	11164	7445	45937	5676
15	Kalahandi	462935	85258	86946	223723	6396
16	Kandhamal	336200	63262	5666	214805	46308
17	Kendrapara	453697	17002	38886	134590	2099
18	Keonjhar	787227	35269	148558	437132	26310
19	Khurda	403579	19630	50356	92956	2713
20	Koraput	525883	175993	125251	158084	51382
21	Malkangiri	434655	46890	36344	144961	60173
22	Mayurbhanj	936149	26280	166636	686785	80902
23	Nuapada	266261	41209	35535	103267	1575
24	Nawarangapur	454578	81376	79882	85964	29202
25	Nayagarh	286440	47703	36211	102946	54
26	Puri	492326	31521	70555	130831	2039
27	Rayagada	371877	107289	40233	162991	37643
28	Sambalpur	379410	26501	17085	181115	20065
29	Sonepur	234086	27512	38963	88540	963
30	Sundergarh.	681537	55086	51023	406999	97918
	State Total	14280559	1438875	1758700	5973919	569533
	Last yr Total	14002696	1388024	1779367	5879723	601917

VETERINARY INSTITUTIONS IN THE STATE.

In Orissa , there are 541 veterinary institutions that are catering to the health coverage and supports the FMD project of livestock of this state. Besides that other infrastructure available for disease diagnosis like 3 clinical Investigation laboratory located at Cuttack,Berhampur and Bhawanipatna , one state veterinary laboratory located at Chipilima and

30 district disease diagnostic laboratories also supports to the field level veterinarians and para-vets in connection with AICRP on FMD in the state.

The district wise details of which is given in table-3.

Table-3. District wise Distribution of Vety. Hospital / Vety. Dispensary & Livestock Aid Center along with Block/ G.P s/ Villages.

Districts	Sub-Divisions	No. of Blocks	No. of G.P.	No. of Vilages	No of VH/ VD.	No. of LAC.
Anugul	4	8	209	1910	16	81
Balasore	2	12	289	2952	21	124
Bhadrak	1	7	193	1311	13	98
Bolangir	3	14	285	1794	21	118
Boudh	1	3	63	1186	7	28
Baragarh	2	12	248	1207	19	119
Cuttack	3	14	342	1950	26	172
Deogarh	1	3	60	875	4	20
Dhenkanal	3	8	199	1215	18	86
Ganjam	3	22	475	3212	38	246
Gajapati	1	7	129	1619	11	54
Jagatsinghpur	1	8	194	1288	12	92
Jajpur	1	10	280	1778	18	102
Jharsuguda	1	5	78	348	9	35
Kendrapada	1	9	230	1540	14	88
Kalahandi	2	13	273	2236	21	129
Keonjhar	3	13	286	2122	22	113
Koraput	2	14	226	2028	25	129
Khurda	2	10	168	1551	20	98
Mayurbhanj	4	26	382	3950	42	167
Malkangiri	1	7	108	1045	13	50
Nayagarh	1	8	179	1695	16	72
Nawarangapur	1	10	169	901	17	72
Nuapada	1	5	109	663	8	47
Kandhamal	2	12	153	2546	20	87
Puri	1	11	230	1715	15	145
Rayagada	2	11	171	2667	16	101
Sonepur	2	6	96	959	10	38
Sambalpur	3	9	148	1322	18	113
Sundergarh	3	17	262	1764	30	115
TOTAL	58	314	6234	51349	541	2939

CHAPTER –II

VIROLOGICAL STUDIES

1. Number and Nature of samples

During the period from 1 st April 2007 to 31 st March 2008, A.I.C.R.P for Epidemiological studies on Foot and Mouth Disease (FMD), Orissa Network unit had received/collected 35 field samples from 23 reported FMD outbreaks, Of which 16 outbreaks attended (Table-4) and from 2 outbreaks samples were received, from various parts of the districts of Orissa.(Table-5 & 6)

Out of 35 samples received/collected from FMD affected animals,33 were in form of Tongue Epithelium(TE) and 2 nasal lesion(NL). Since collection of samples from tongue is convenient as well as dependable, most of the field staff preferred this procedure.(Table-7).All samples were from cattle(male -12 ,female -23).

Table-4:Details of Tours Undertaken for Attending FMD Outbreak for the year 2008-09.

Sl no	District	Date of collection	Place of collection	No. of samples		Touring Officers
				Clinical	Serum	
1	Jagatsinghpur	24.7.2008	Balikuda,Erasama	4	22	Dr P.K.Tripathy/ Dr L.K.Nayak
2	Balesore	26.7.2008	Basta	-	18	Dr P.K.Tripathy/ Dr L.K.Nayak
3	Cuttack	22.8.2008	Baranga	-	21	Dr P.K.Tripathy/ Dr L.K.Nayak
4	Sundergarh	29.8.2008	LBD farm,kuanrmunda	-	18	Dr A.K.Mishra/ Dr L.K.Nayak
5	Jajpur	25.9.2008	Badchana	-	12	Flood expert team
6	Jagatsinghpur	27.9.2008	Biridi	-	11	Dr A.K.Mishra/ Dr L.K.Nayak
7	Cuttack	15.10.2008	Nischintakoili	9	10	Dr P.K.Tripathy/ Dr H.K.Sahoo
8	Cuttack	18.10.2008	Mahanga	6	14	Dr A.K.Mishra/ Dr L.K.Nayak
9	Kendrapada	25.10.2008	Sanabetara & Garadpur	-	12	Dr P.K.Tripathy /Dr H.K.Sahoo
10	Khurda	31.10.2008	Chilika,Dangua	-	12	Dr H.K.Sahoo/ Sri Ganeswar Sahoo
11	Dhenkanal	31.10.2008	kamakhyanagar	1	10	Dr P.K.Tripathy/ Sri B.P.Mohanty
12	Koraput	9.11.2008	semiliguda	-	5	Dr A.K. Das/ Dr P.K.Tripathy/Dr B.Dash
13	Cuttack	11.2.2009	Chowdar & Niali	7	16	Dr P.K.Tripathy/ Dr L.K.Nayak
14	Puri	28.3.2009	Puri	-	12	Dr A.K. Das/Dr B.Dash
			TOTAL	27	193	

Table-5:Details of Post Outbreak samples submitted/Recollected for the year 2008-09.

Sl no	District	Date of collection	Place of collection	No. of samples		Officers
				Clinical	Serum	
1	Kalahandi	27.8.2008	FSB,Bhawanipatna	8	14	RIO ,CIL, Bhawanipatna
2	Ganjam	22.11.2008	Kukudakhandi	-	16	RIO,CIL,Berhampur

3	Sambalpur	28.11.2008	Sambalpur town	-	8	Dr P.K.Tripathy/ Sri B.P.Mohanty
4	Kalahandi	21.10.2008	FSB,Bhawanipatna	-	13	Dr P.K.Tripathy/ Sri B.P.Mohanty
			TOTAL	8	51	
			All total	35	244	

Table-6. Districtwise FMD Virus Type Distribution During 2008-09 in Orissa (From Investigated Outbreaks & Samples Received)

District	No . of OB	Type Virus Involved				No of Samples	Type Virus Involved				Remarks		
		O	A	Asia-1	NV D		O	A	Asia-1	NVD	Attd OB	RecOB	Only Reported
Anugul	1	-	-	-	-	0	-	-	-	-	0	-	1
Balesore	1	-	-	-	1	serum	-	-	-	-	1	-	0
Cuttack	6	5	-	-	-	22	9	-	-	13	5	-	1
Deogarh	1	-	-	-	-	0	-	-	-	-	0	-	1
Dhenkanal	1	1	-	-	-	1	1	-	-	-	1	-	0
Ganjam	1	1	-	-	-	serum	-	-	-	-	-	1	0
Jajpur	1	1	-	-	-	serum	-	-	-	-	1	-	0
Jagatsinghpur	2	2	-	-	-	4	3	-	-	1	2	-	0
Kalahandi	1	-	-	-	1	8	-	-	-	8	-	1	0
Kendrapada	2	2	-	-	-	serum	-	-	-	-	2	0	0
Keonjhar	2	-	-	-	-	0	-	-	-	-	-	-	2
Khurda	1	1	-	-	-	serum	-	-	-	-	1	-	0
Koraput	1	1	-	-	-	serum	-	-	-	-	1	0	0
Puri	1	1	-	-	-	serum	-	-	-	-	1	0	0
Sundergarh	1	-	-	-	1	serum	-	-	-	-	1	0	0
TOTAL	23	15	0	0	3	35	13	0	0	22	16	2	5

Table-7. Material wise Classification.

Place of collection	District	TE	NL	BM	FL	Total	Remark
Balikuda	Jagatsinghpur	4	-	-	-	4	Collected
FSB Bhawanipatna	Kalahandi	8	-	-	-	8	Received
Nischintakoili	Cuttack	8	1	-	-	9	Collected
Mahanga	Cuttack	6	-	-	-	6	Collected
Kamakhyanagar	Dhenkanal	1	-	-	-	1	Collected
Chowdar	Cuttack	5	-	-	-	5	Collected
Niali	Cuttack	1	1	-	-	2	Collected
TOTAL		33	2	-	-	35	

TE – Tongue Epithelium, FL – Feet Lesion, NL – Nasal Lesion, BM – Buccal Mucosa

2. Serotyping Results

Out of 35 samples received / collected from different outbreak spots of Orissa (Table-6), all samples were found suitable for typing at our laboratory. The samples were processed and used for typing of FMD virus by indirect sandwich ELISA using standard

antisera and protocols of the PD_FMD central FMD virus typing laboratory, Mukteswar. Of the typed samples FMD virus could be identified in 13(37.15%) samples and virus couldn't be identified in 22(62.85%) samples either due to collection of materials in latter stage of infection and delayed sending or due to poor quality of field materials. From the 13 positive samples FMD virus type 'O' was detected in all samples. The percentage of typability of the samples was found to be 37.15 % (Table-8, Fig-1 & Fig-2). During this period no 'A' type, 'Asia-1' type and 'C' type FMD virus was detected from 35 samples serotyped. Material wise typing results is given in Table-9.

Table-8. Distribution of FMD Virus Types

Virus type	No of Samples Positive	Percentage
O	13	37.15%
A	0	0
C	0	0
Asia-1	0	0
NVD	22	62.85%
TOTAL	35	100%

Table-9. Material wise Serotyping Results.

Nature of Material	No of Samples	No of Samples Processed	NVD	No of Samples Positive to			
				O	A	C	Asia-1
TE	33	33	20	13	-	-	-
FL	-	-	-	-	-	-	-
NL	2	2	2	-	-	-	-
BM	-	-	-	-	-	-	-
TOTAL	35	35	22	13	0	0	0

Fig-1. FMD VIRUS SEROTYPE DISTRIBUTION IN ORISSA DURING THE YEAR 2008-2009

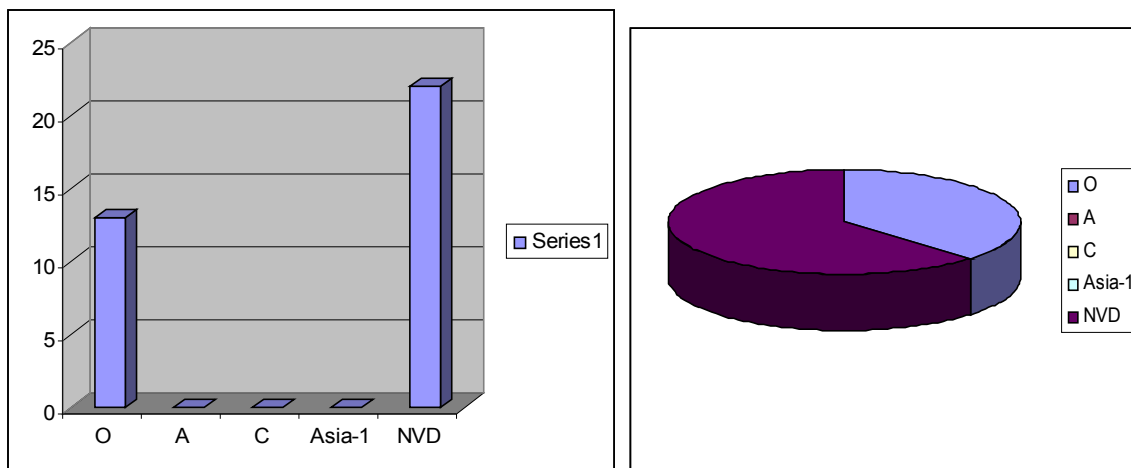
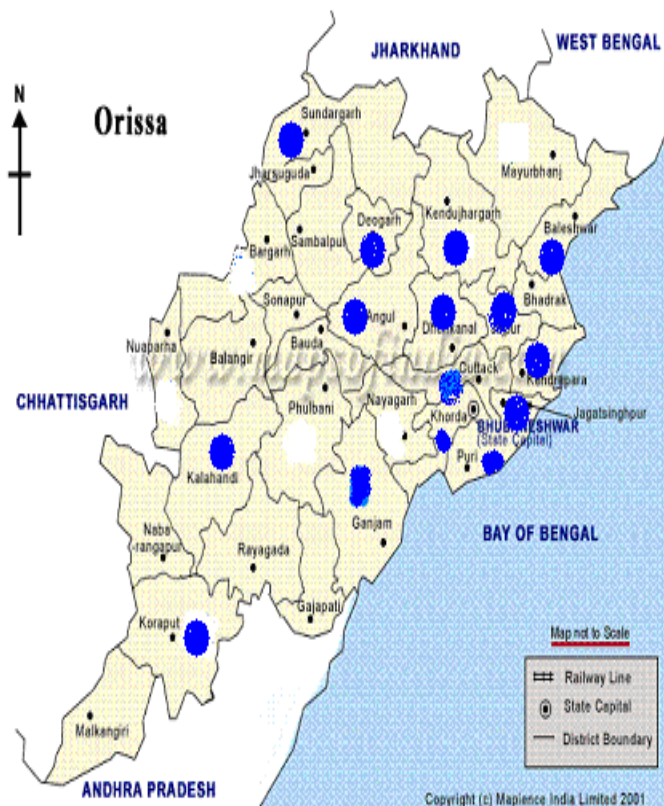


Fig-2. FMD VIRUS SEROTYPE DISTRIBUTION IN ORISSA DURING THE YEAR 2008-2009



3. Submission of Clinical samples to the PD_FMD,central Laboratory Mukteswar.

During the year under report, a total of 35 samples were sent to the PD_FMD, central laboratory, Mukteswar for confirmation of Virus type identified by Network unit, Orissa. The typing results were mostly in conformity with the results of the unit (Table-10).

Table-10. Result of Field samples sent to the PD_FMD, Central Laboratory, Mukteswar during 2008-2009.

Total No. of samples sent to Central Lab.	Virus Type Identified				
	O	A	C	Asia-1	NVD
35	13	-	-	-	22

4. Receipt of Reagents/Chemical/equipments from PD_FMD, central Laboratory Mukteswar.

During the period under report the following chemicals and reagents received during the year 2007-08 were utilized as given below

SI No	Particulars of Item	Quantity
1	Typing ELISA reagents	
	Coating Serum (Serotype O,A,C,Asia-1)	100 & 115 ul each vials
	Tracing Serum (Serotype O,A,C,Asia-1)	100 ul each vials
	Positive antigen (Serotype O,A,C,Asia-1)	1.5 ml each vials
2	Conjugate	200 ul
3	OPD	2 gm
4	PBS	20 tablets
5	Coating buffer capsule	15 caps
6	Phosphate citrate buffer	15 tabs
7	ELISA plates	30 nos.
8	LAH	15 gm
9	Tween-20	30 ml
10	NaH ₂ PO ₄ , 2H ₂ O	500 gm
11	Na ₂ HPO ₄ , 2H ₂ O	500 gm

5. Sero-Monitoring Study (Retrospective diagnostic Studies)

A total of 137 serum samples collected / received from FMD affected / convalescing animals from 11 outbreaks where no suitable Tongue Epithelium samples were available for collection. Similarly 86 serum samples collected / received from FMD affected / convalescing animals from 7 outbreaks along with Tongue Epithelium samples. Also as per guidelines received from PD_FMD 8 nos. of one year post OB sera samples and 13 nos of Post OB sera

samples were collected. So all together a total of 244 serum samples were forwarded to the central laboratory, Mukteswar for retrospective diagnosis by LPB ELISA test. The results are presented in Table-11. By LPB ELISA test it was observed that 173(70.90%) samples showed protective antibodies against 'O' type, 149(61.06%) against 'A' type and 92 (37.70%) against 'Asia-1' type.

6. Random Sero-Monitoring for study of Herd Immunity for FMD during the year 2008-09.

A total of 3000 bovine sera samples were collected from 3000 animals (Cattle & Buffalo together) covering 30 district of the state randomly to study the level of serum antibody against the serotypes O,A and Asia-1 by Liquid Phase Blocking (LPB) ELISA. All the samples were dispatched to the Central laboratory, PD_FMD, Mukteswar, Nainital, Uttarakhand in 6 phases (Table-12) for estimation of level of virus neutralizing antibody in the samples to assess the herd immunity for FMD (Table-13).

Out of 3000 serum samples, 1758 samples from 19 districts were subjected to LPB-ELISA to determine the serum antibody titer (\log_{10}) against FMDV. The results of sero-conversion of the sera samples are expressed in the standard \log_{10} values of ≤ 1.5 , $1.5 - 1.8$, $1.8 - 2.09$ and ≥ 2.1 . The number of samples having serum antibody titer (\log_{10}) of 1.8 & above against FMDV serotypes found to be 389(22.12%) against "O", 630(35.83%) against "A" and 349 (19.85%) against "Asia-1"(Table-14).

Table-11. Retrospective diagnosis of FMD Outbreaks for the year 2008-09.

Place of Outbreak	District	No. of serum samples	Percentage of animals showing Log ₁₀ titre 1.8 and above against serotypes			Remarks
			O	A	Asia-1	
Balikuda,Erasama	Jagatsinghpur	22	8	7	2	'O' type
Basta	Balesore	18	2	2	2	NVD
Baranga	Cuttack	21	9	5	3	'O' type
LBD farm,kuanrunda	Sundergarh	18	18	16	15	NVD
Badchana	Jajpur	12	12	7	2	'O' type
Biridi	Jagatsinghpur	11	8	7	2	'O' type
Nischintakoili	Cuttack	10	10	10	8	'O' type
Mahanga	Cuttack	14	8	6	5	'O' type
Sanabetara & Garadpur	Kendrapada	12	12	10	0	'O' type
Chilika,Dangua	Khurda	12	10	7	1	'O' type
kamakhyanagar	Dhenkanal	10	5	8	1	'O' type
semiliguda	Koraput	5	3	2	0	'O' type
Chowdar	Cuttack	10	4	5	4	'O' type
Niali	Cuttack	6	6	5	6	
Puri	Puri	12	12	9	12	'O' type
FSB,Bhawanipatna	Kalahandi	14	12	12	12	NVD
Kukudakhandi,Ganjam	Ganjam	16	16	13	9	'O' type
sambalpur	Sambalpur	08	6	7	7	Post 1 yr OB
FSB,Bhawanipatna	Kalahandi	13	12	11	1	NVD
TOTAL		244	173 (70.90)	149 (61.06)	92 (37.70)	

Table-12:Details of Tours Undertaken for FMD Surveillance Sample collection and Despatch to PD_FMD , Mukteswar.

District	Date of collection	Touring Officers	No. of samples despatched with date
Puri	27.2.08	Dr P.K.Tripathy/Dr S.N.Behera	400 samples/17.3.08
Kendrapara	28 -29.2.08	Dr H.K.Sahoo/Dr L.K.Nayak/ Dr S.Samantaray	
Anugul	2.3.08	Dr P.K.Tripathy/Dr B.Dash	
Nayagarh	4.3.08	Dr P.K.Tripathy	
Sundergarh	29.3.08	Dr P.K.Tripathy/Dr B.Dash	
Jharsuguda	30.3.08	Dr P.K.Tripathy/Dr B.Dash	
Sambalpur	30.3.08	Dr P.K.Tripathy/Dr B.Dash	

Bargarh	31.3.08	Dr P.K.Tripathy/Dr B.Dash	500 samples/15.4.08
Khurda	31.3.08	Dr A.K.Mishra/Dr L.K.Nayak	
Jajpur	8.4.08	Dr L.K.Nayak	
Jagatsinghpur	9.4.08	Dr L.K.Nayak	
Koraput	8.4.08	Dr H.K.Sahoo/Dr S.Samantaray	700 samples/25.4.08
Malkangir	9.4.08	Dr H.K.Sahoo/Dr S.Samantaray	
Nawarangpur	10.4.08	Dr H.K.Sahoo/Dr S.Samantaray	
Keonjhar	17.4.08	Dr P.K.Tripathy	
Deogarh	18.4.08	Dr P.K.Tripathy	300 samples/26.4.08
Kandhamal	22.4.08	Dr P.K.Tripathy/Dr B.Dash	
Boudh	23.4.08	Dr P.K.Tripathy/Dr B.Dash	
Sonepur	23-24.4.08	Dr P.K.Tripathy/Dr B.Dash	
Dhenkanal	29.4.08	Dr A.K.Mishra/Dr S.N.Behera/ Dr L.K.Nayak/Dr B.Dash	800 samples/9.5.08
Ganjam	30.4.08	Dr H.K.Sahoo/Dr S.Samantaray	
Gajapati	1.5.08	Dr H.K.Sahoo/Dr S.Samantaray	
Rayagada	2.5.08	Dr H.K.Sahoo/Dr S.Samantaray	
Mayurbhanj	2.5.08	Dr N.N.Nayak/Dr L.K.Nayak	
Kalahandi	2.5.08	Dr P.K.Tripathy/Dr B.Dash	
Nuapada	3.5.08	Dr P.K.Tripathy/Dr B.Dash	
Bolangir	3-4.5.08	Dr P.K.Tripathy/Dr B.Dash	
Cuttack	8.5.08	Dr A.K.Mishra/Dr S.N.Behera/ Dr L.K.Nayak	
Bhadrak	10.5.08	Dr A.K.Mishra/Dr L.K.Nayak	
Balesore	11.5.08	Dr A.K.Mishra/Dr L.K.Nayak	300 samples/20.5.08
TOTAL			3000 serum samples

Table-13.Sero-Monitoring by LPB-ELISA in Random Sera samples of Orissa during 2008-09

Sl no	District	Tested	O				A				Asia-1			
			≤1.5	1.5 – 7.9	1.8 – 1.79	≥2.1	≤1.5	1.5 – 1.79	1.8 – 2.09	≥2.1	≤1.5	1.5 – 1.79	1.8 – 2.09	≥2.1
1	Angul	100	80	10	4	6	85	7	4	4	95	4	0	1
2	Balesore	48	30 (62.5%)	3(6.25%)	12(25.0%)	3(6.25%)	32(66.5%)	3(6.25%)	10(21.00%)	3(6.25%)	22(45.8%)	3(6.25%)	7(14.5%)	16(33.25%)
3	Bargarh	97	72 (74.25%)	17(17.5%)	8(8.25%)	0	39(40.25%)	20(20.5%)	17(17.5%)	21(21.75%)	79(81.44%)	12(12.37%)	6(6.19%)	0
4	Boudh	100	65	23	5	7	21	12	19	48	41	27	10	22
5	Bolangir	91	62(68.14%)	15(16.48%)	7(7.69%)	7(7.69%)	31(34.07%)	18(19.78%)	12(13.18%)	30(32.97%)	44(48.36%)	16(17.58%)	17(18.68%)	14(15.38%)

			%))	%)				%)	%)		%)
6	Bhadrak	35	14(40.0%)	6(17.14%)	2(5.71%)	13(37.15%)	21(60.0%)	5(14.29%)	2(5.71%)	7(20%)	28(80.0%)	3(8.57%)	1(2.85%)	3(8.57%)
7	Dhenkanal	93	88(94.62%)	5(5.38%)	0	0	46	22(23.65%)	10(10.75%)	15(16.13%)	88(94.62%)	2(2.15%)	3(3.23%)	0
8	Ganjam	100	60	24	12	4	29	15	20	36	72	17	9	2
9	Jharsuguda	100	4	9	19	68	45	28	18	9	42	2	6	32
10	Kendrapada	100	84	8	4	4	86	10	1	3	89	5	2	4
11	Khurda	100	79	8	9	4	75	8	14	3	91	4	1	4
12	Kandhamal	100	32	13	9	46	20	13	13	54	28	17	14	41
13	Kalahandi	100	77	19	3	1	23	12	22	43	82	12	6	0
14	Mayurbhanj	100	31	20	13	36	37	20	14	29	55	15	8	22
15	Nuapada	100	84	10	4	2	76	7	10	7	82	11	4	3
16	Nayagarh	100	77	11	6	6	95	3	2	0	79	7	5	9
17	Puri	100	68	16	14	2	52	33	9	6	72	23	4	1
18	Rayagada	94	34(36.17%)	31(32.97%)	21(22.34%)	8(8.52%)	5(5.32%)	6(6.38%)	17(18.08%)	66(70.22%)	15(15.95%)	15(15.95%)	27(28.73%)	37(39.37%)
19	Sonepur	100	62	18	6	14	46	22	12	20	81	11	5	3
	TOTAL	1758	1103(62.74%)	266(15.13%)	158(8.98%)	231(13.13%)	864(49.14%)	264(15.01%)	226(12.85%)	404(22.98%)	1185(67.40%)	224(12.74%)	135(7.67%)	214(12.17%)

Table : 14. Serum Antibody Titer (log₁₀) of 1.8 & above by LPB – ELISA Test

SI no	District	Tested	O	A	Asia-1
1	Angul	100	10	8	1
2	Balesore	48	15 (31.25%)	13 (17.25%)	23 (47.75%)
3	Bargarh	97	8 (8.25%)	38 (39.25%)	6 (6.19%)
4	Boudh	100	12	67	32
5	Bolangir	91	14 (15.3%)	42 (46.1%)	31 (35.1%)

6	Bhadrak	35	15 (42.86%)	9 (25.71%)	49 (11.43%)
7	Dhenkanal	93	0	25 (26.88%)	3 (3.23%)
8	Ganjam	100	16	56	11
9	Jharsuguda	100	87	27	38
10	Kendrapada	100	8	4	6
11	Khurda	100	13	17	5
12	Kandhamal	100	55	67	55
13	Kalahandi	100	4	65	6
14	Mayurbhanj	100	49	43	30
15	Nuapada	100	6	17	7
16	Nayagarh	100	12	2	14
17	Puri	100	16	15	5
18	Rayagada	94	29 (30.8%)	83 (88.30%)	64 (68.10%)
19	Sonepur	100	20	32	8
	TOTAL	1758	389 (22.12%)	630 (35.83%)	349 (19.85%)

Fig-3 : Serum antibody titer (\log_{10}) against FMDV Type “O” in Orissa during 2008-09

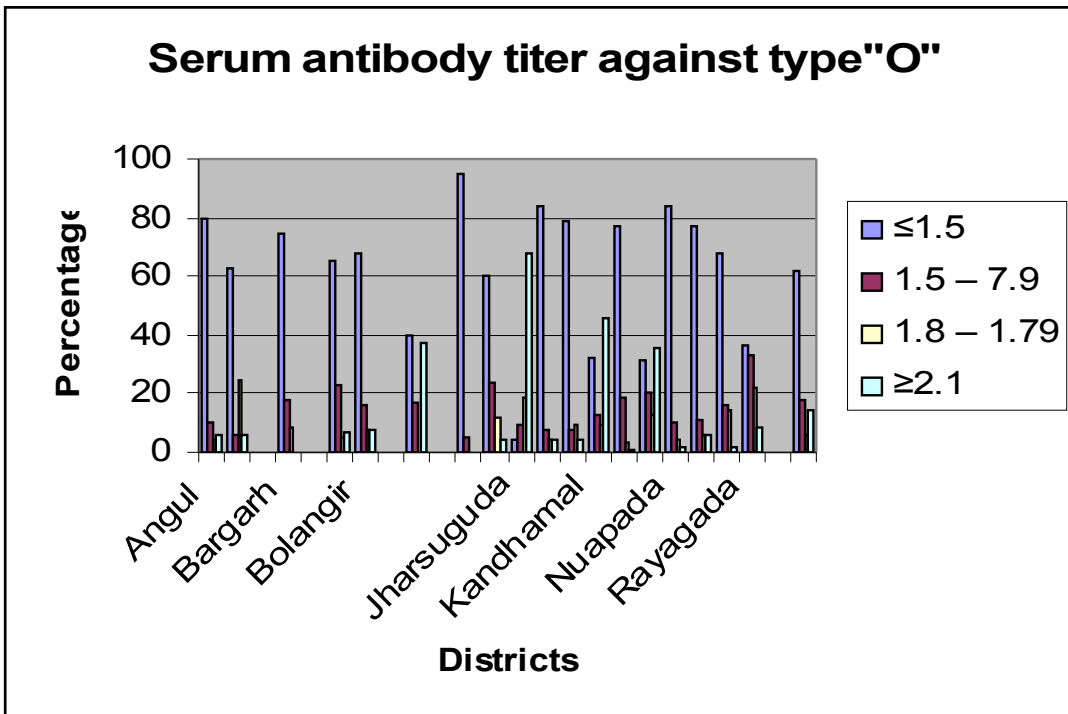


Fig-4 : Serum antibody titer (\log_{10}) against FMDV Type "A" in Orissa during 2008-09

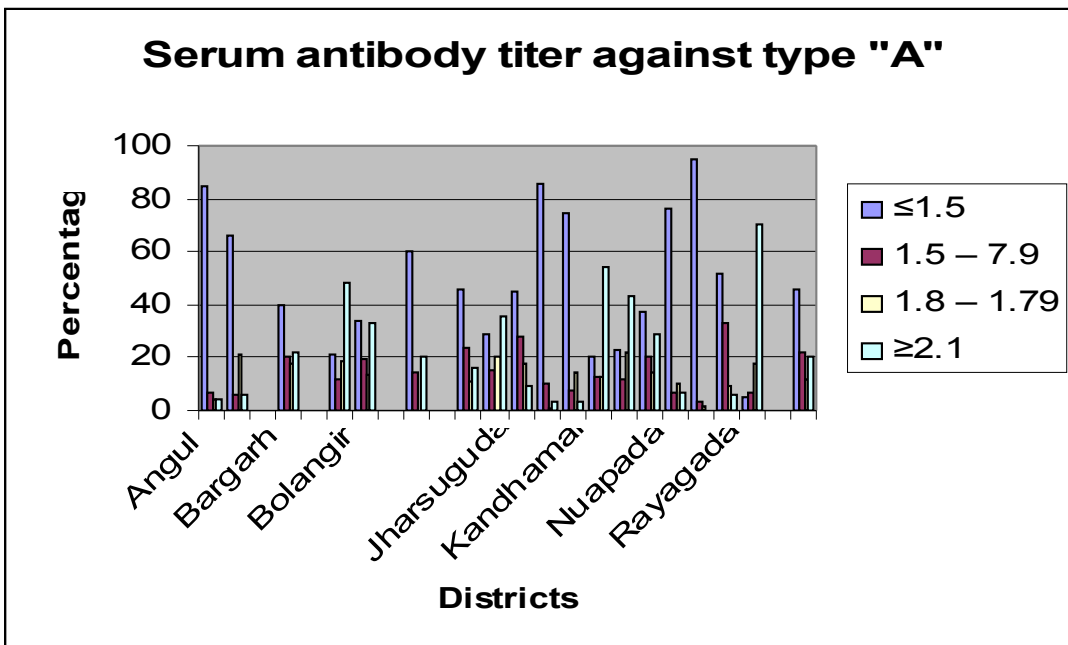


Fig-5 : Serum antibody titer (\log_{10}) against FMDV Type "Asia 1" in Orissa during 2008-09

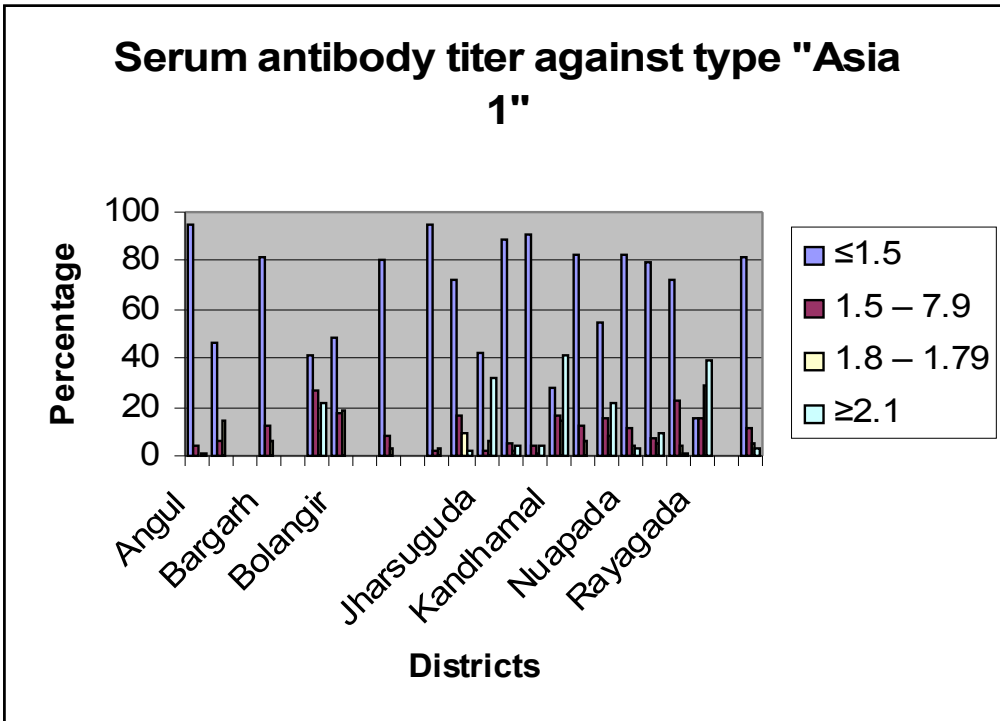


Fig-6 : Serum antibody titer (\log_{10}) of 1.8 & above against FMDV Serotypes in Orissa during 2008-09

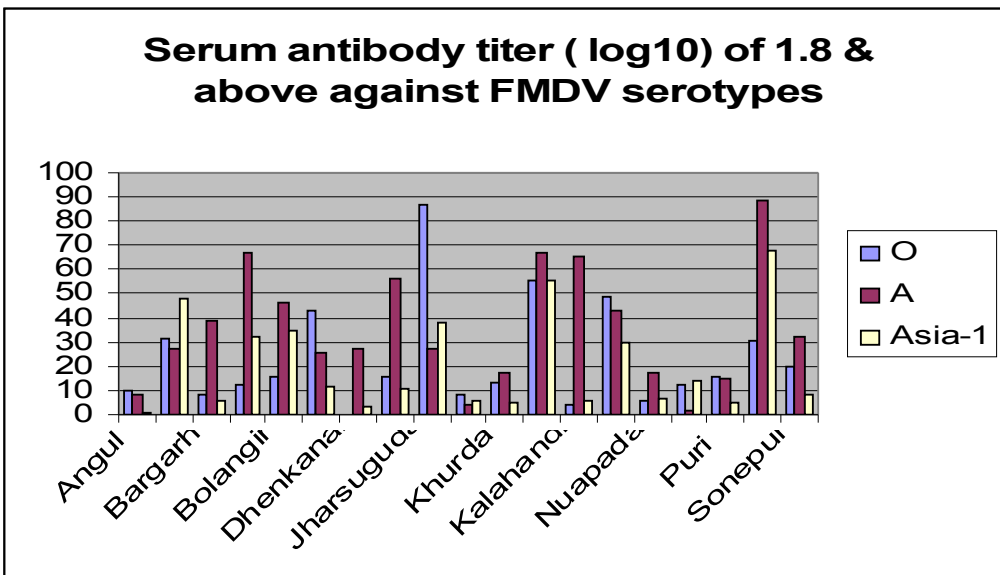
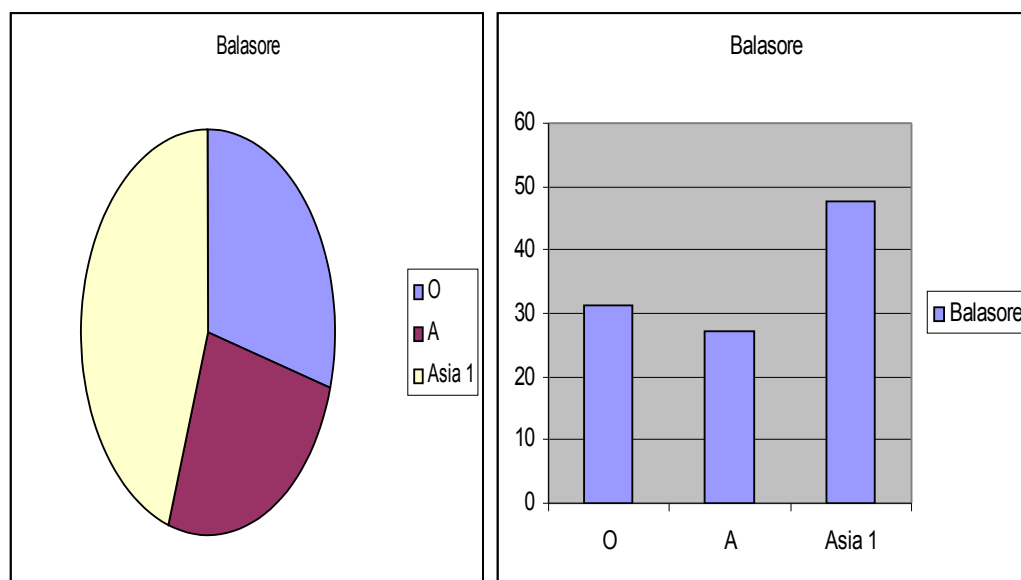
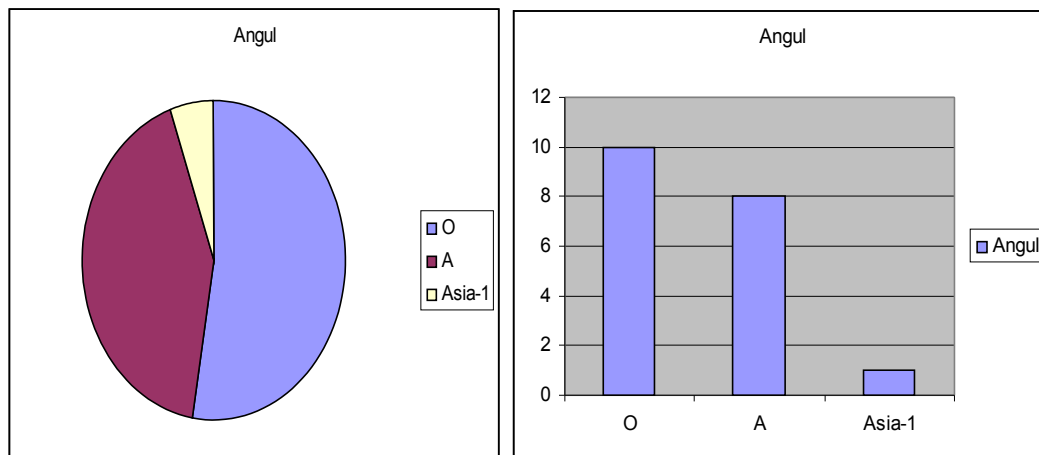
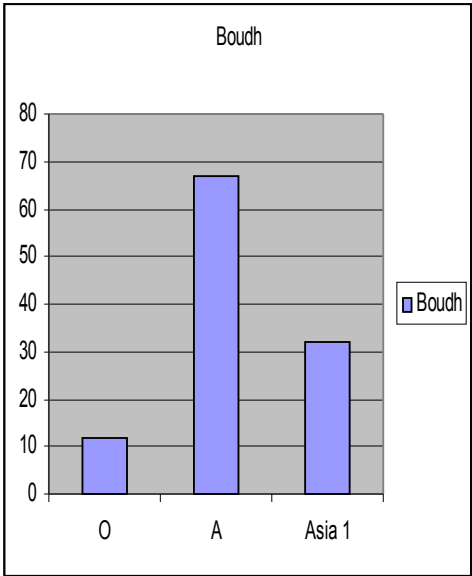
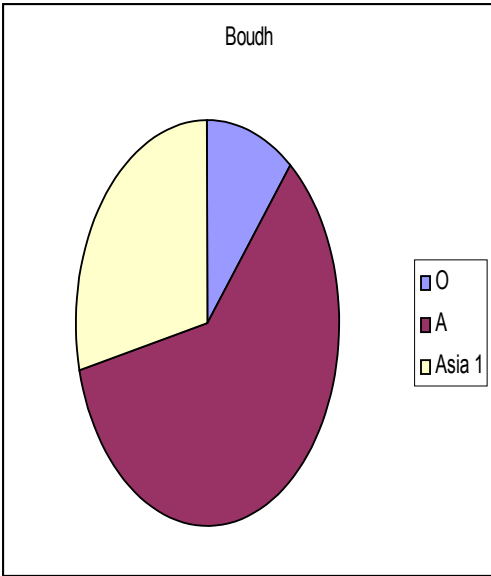
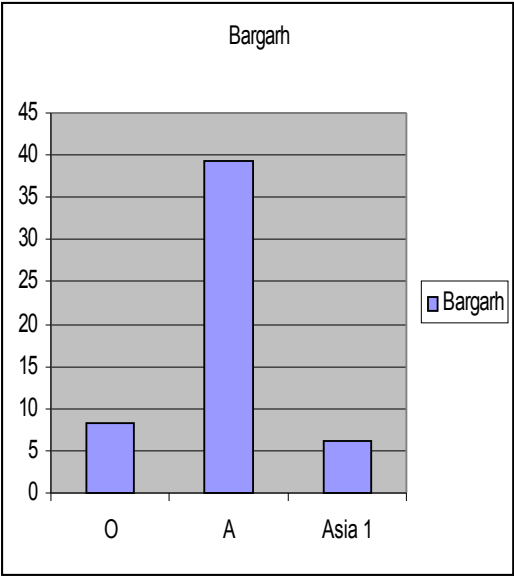
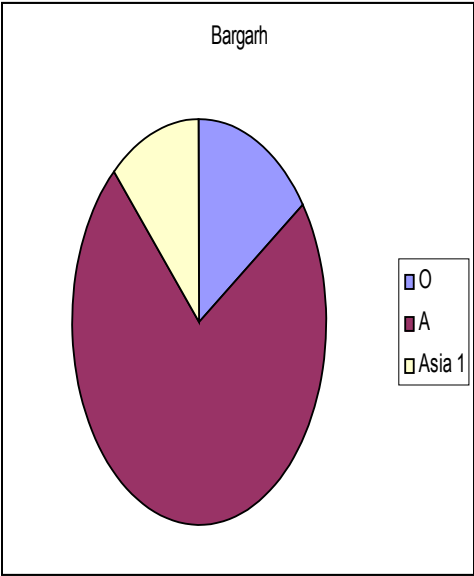
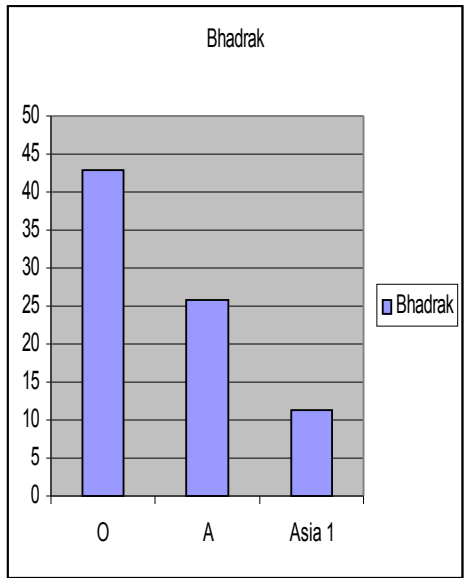
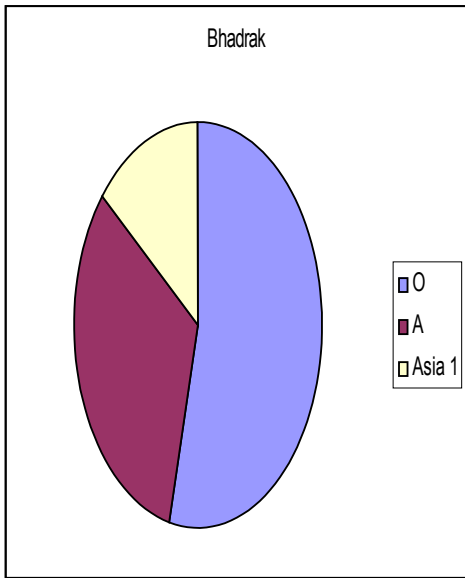
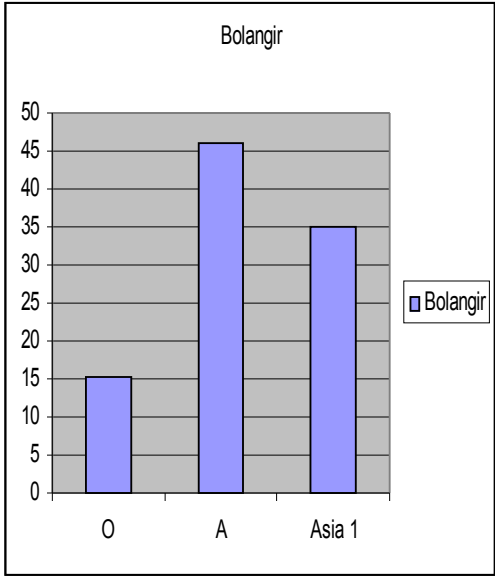
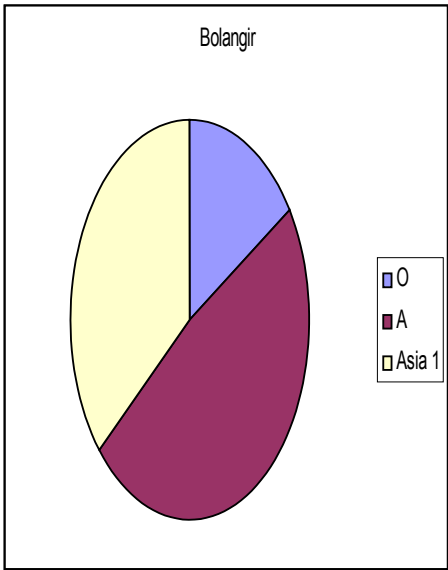
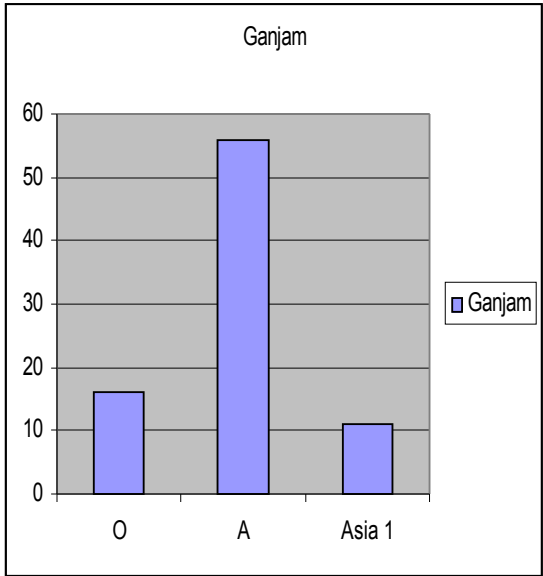
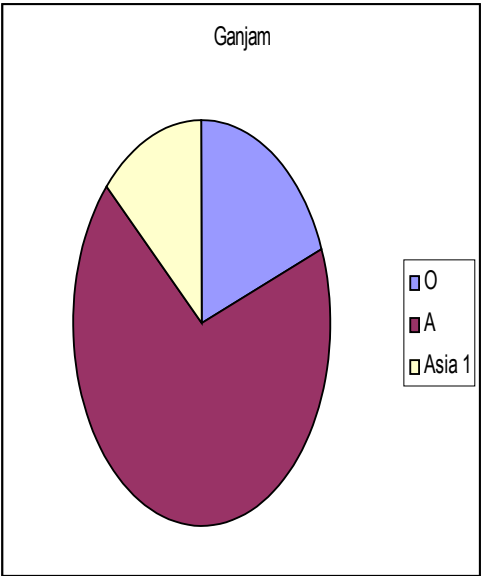
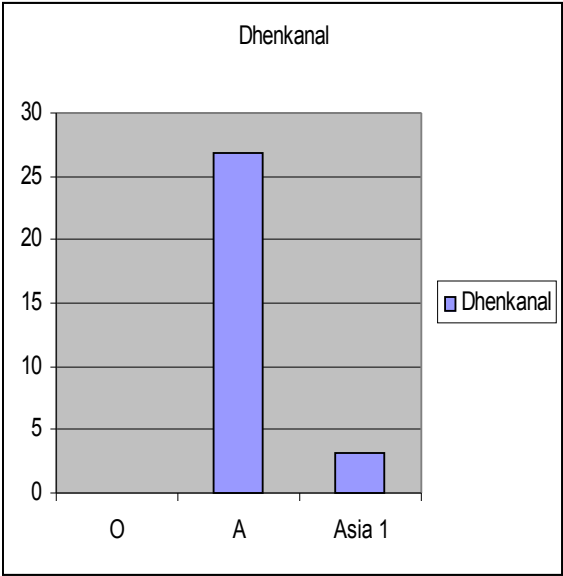
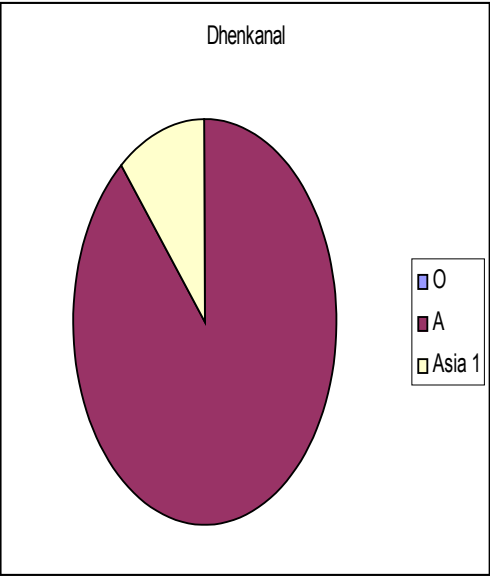


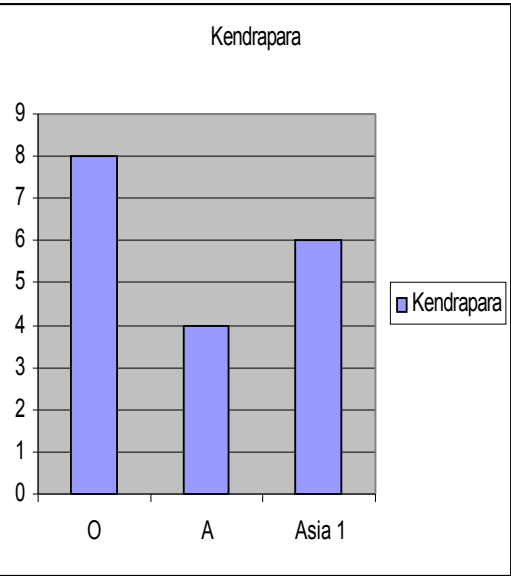
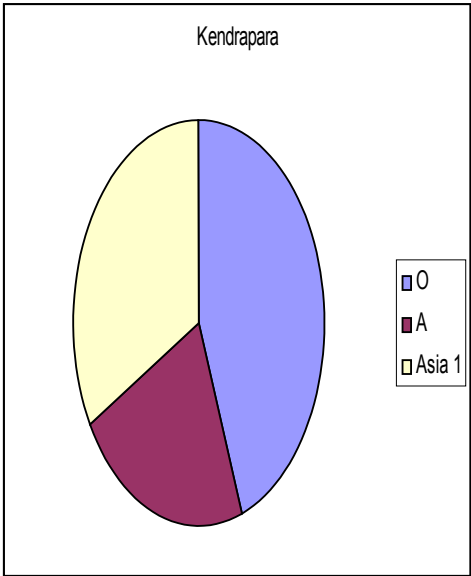
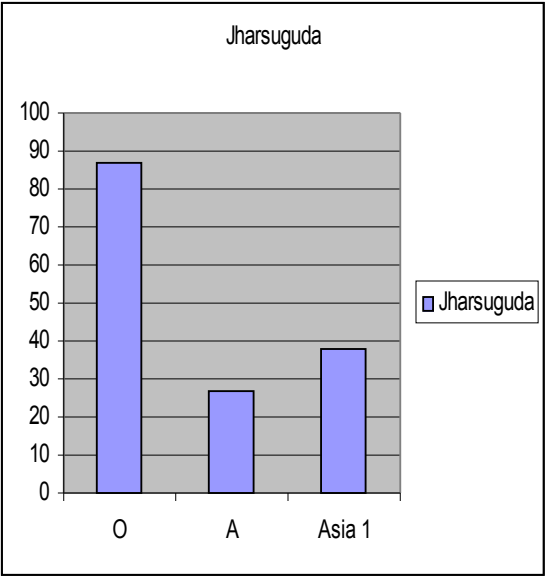
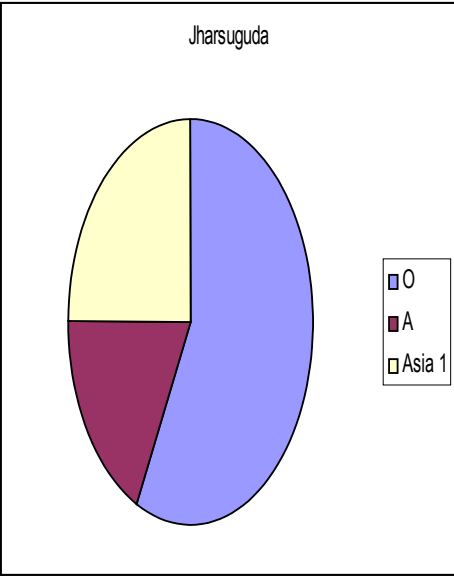
Fig-7 :District wise Serum antibody titer (\log_{10}) against FMDV Serotypes in Orissa during 2008-09

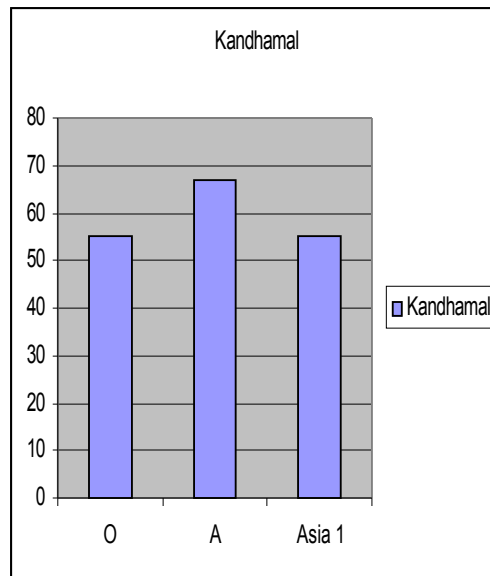
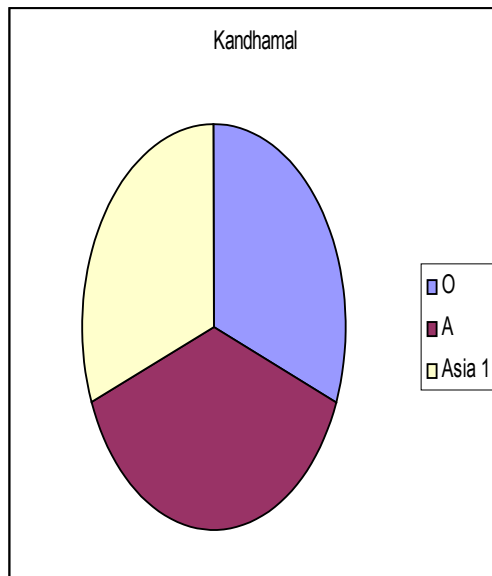
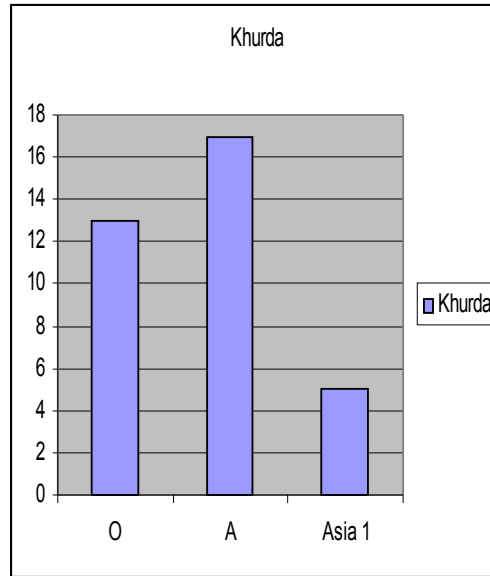
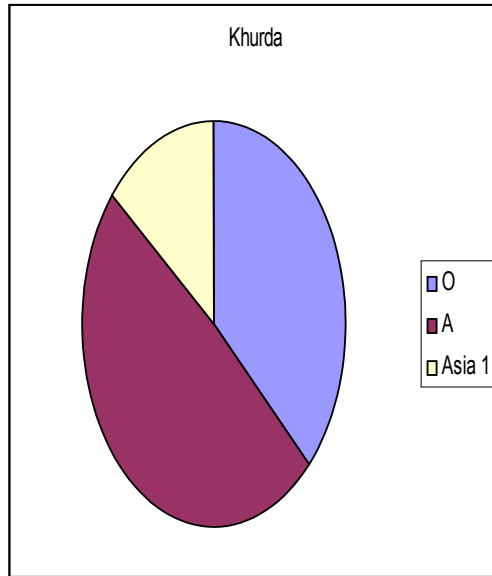


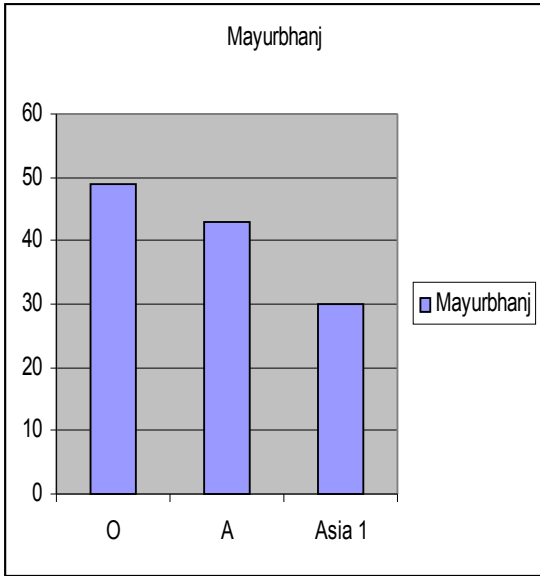
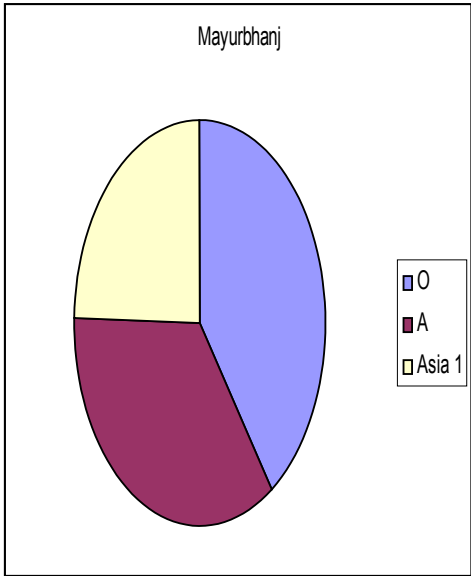
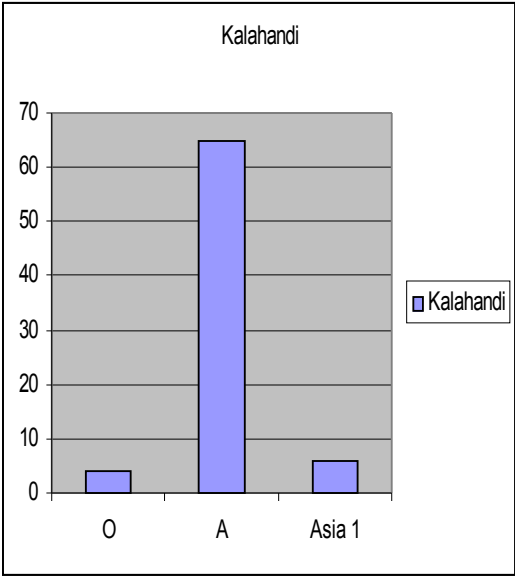
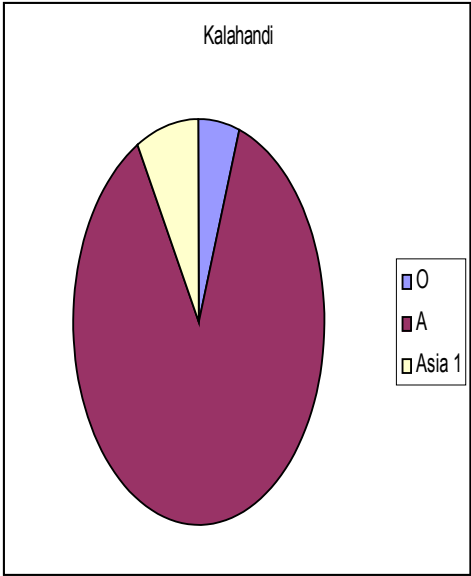


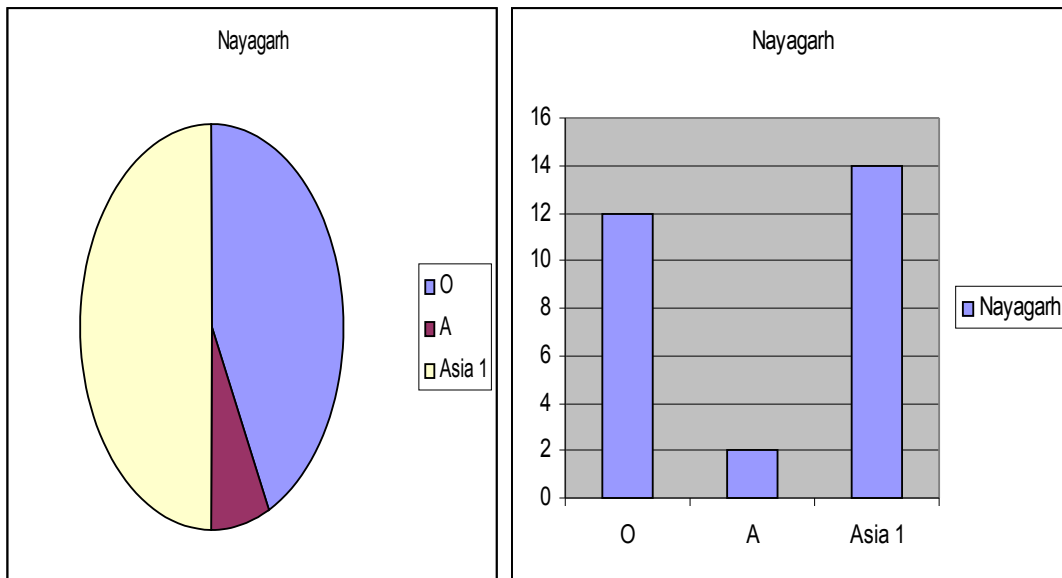
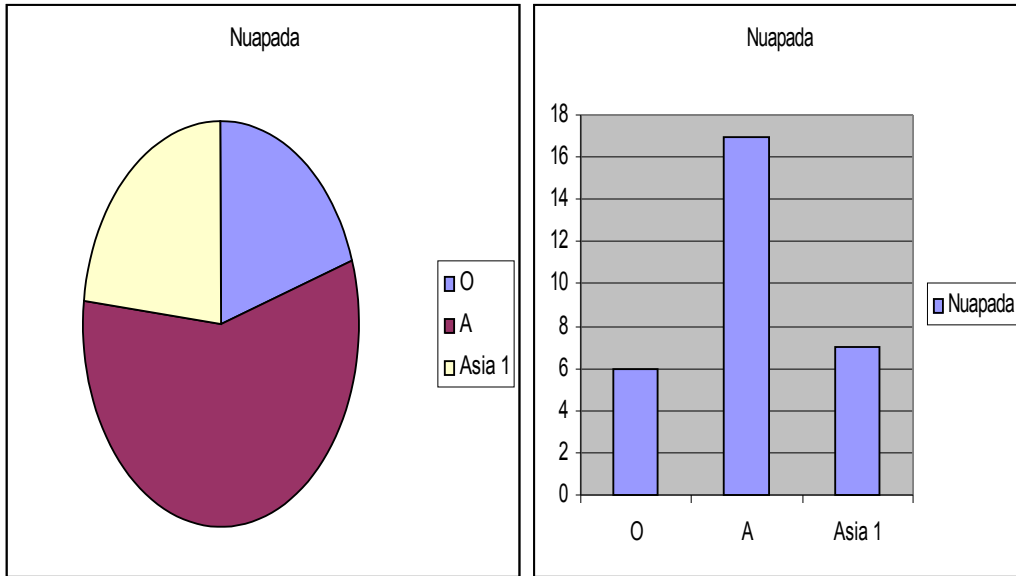


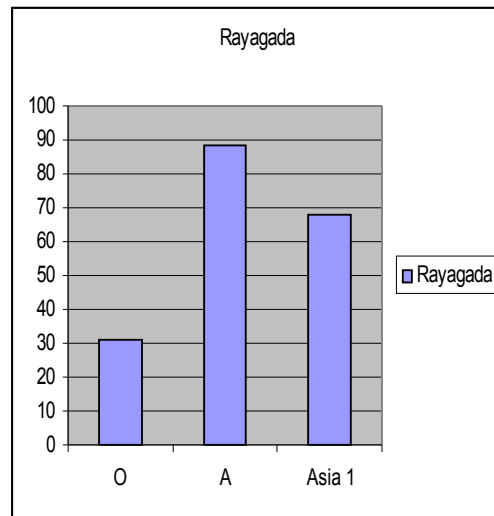
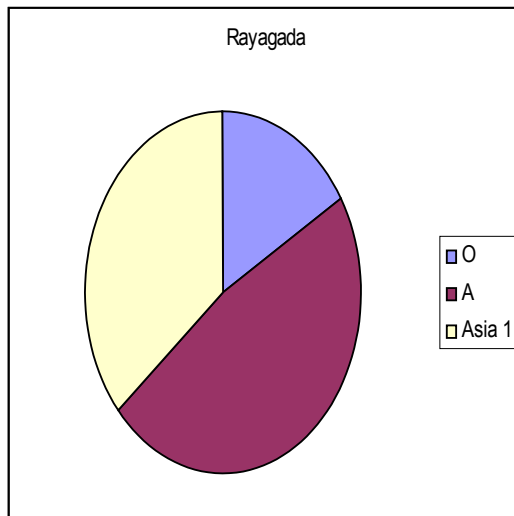
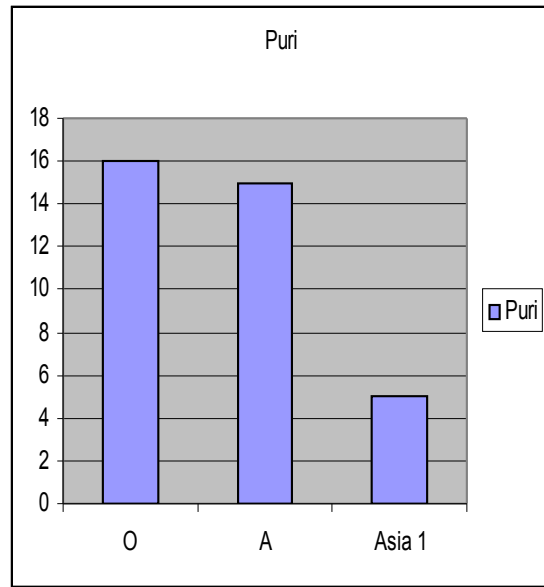
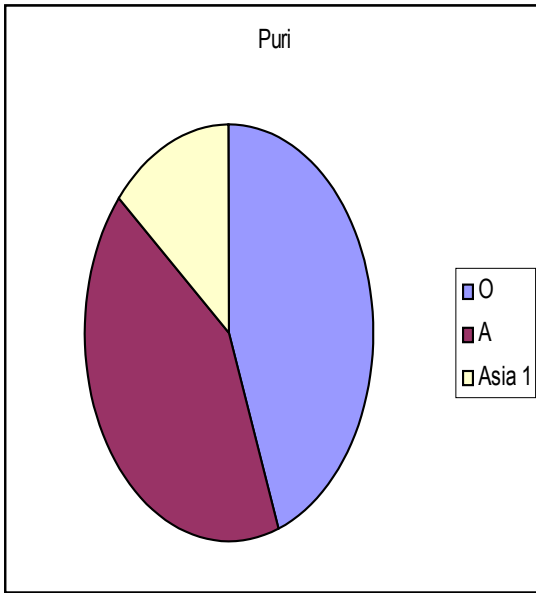


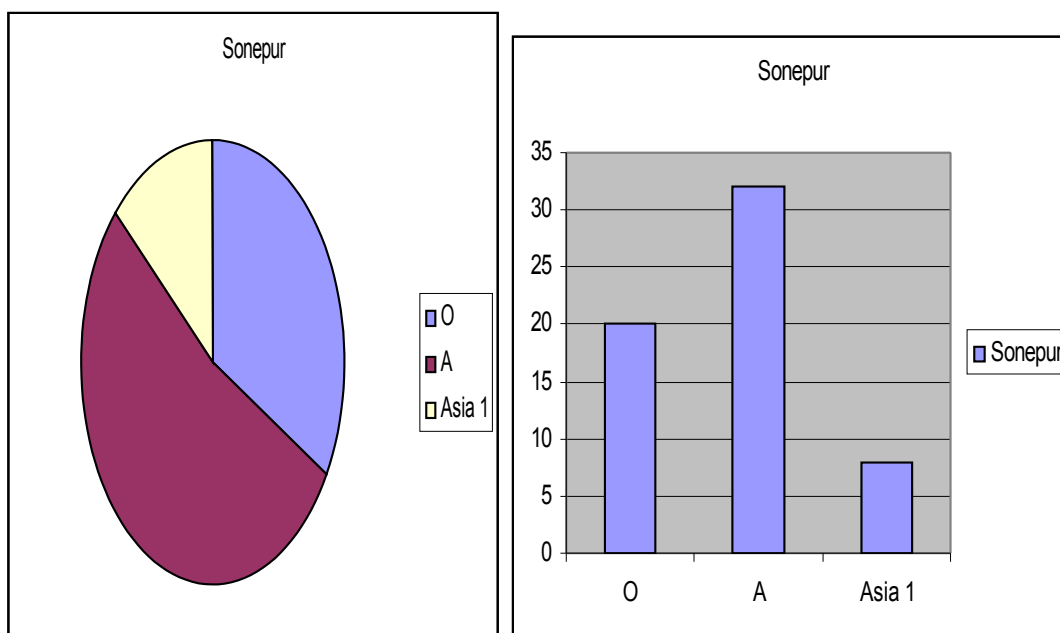












7. Basic Reproduction Number (Ro) for FMD Outbreaks during 2008-09

The basic reproduction number (Ro) and level of herd immunity for 5 FMD outbreaks were determined. The outbreaks were due to FMDV serotype "O" detected by s-ELISA test. The level of herd immunity found to be between 36% to 57%, which is not enough to protect the susceptible population. The details are given below in the table-15.

Table :- 15 Basic Reproduction Number (Ro) for FMD Outbreaks during 2008-09

Sl no	Place of outbreaks	No. of Positive sample size	% Sero-positive	% Sero-negative	Proportion Susceptible (X)	Ro(1/x) 1/Ro = x	H(1-1/Ro) Herd Immunity Threshold level in %
1	Balikuda, Jagatsinghpur	8/22	36.36	63.64	0.636	1.572	0.36(36%)
2	Barang, Cuttack	9/21	42.85	57.15	0.571	1.751	0.42(42%)
3	Chowdar, Cuttack	4/10	40.00	60.00	0.600	1.666	0.40(40%)
4	Mahanga, Cuttack	8/14	57.14	42.86	0.428	2.336	0.57(57%)
5	Kamakhyanagar, Dhenkanal	5/10	50.00	50.00	0.500	2.000	0.5(50%)

8. Assessment of Basic Reproduction Number (Ro) and Herd Immunity

Assessment of Herd Immunity in the cattle population of the State was determined by finding Ro value ($Ro = 1/X$, where x is the proportion of susceptible population or $1 - IP$, $IP =$ Incidence proportion) as per the model supplied by the Project Directorate on FMD, Mukteswar. The level of herd immunity (h) i.e., the threshold level of herd immunity were calculated from Ro values as $1 - 1/Ro$. At the very first trial above 70% of herd immunity against

‘O’ type could be observed in Jharsuguda district (87%) with Ro value of 7.69. The herd immunity against ‘A’ serotype above 70% could be deduced in Rayagada district (88%) with Ro value of 9.09. The herd immunity against ‘Asia-1’ serotype showed an average of 68% in Rayagada district with Ro value of 3.12. The details are given on the Table 16, 17, 18 & Fig-8 to 13.

Table: 16. Basic Reproduction Number (Ro) and Herd Immunity(H) Against Type “O” FMD Virus in Different Districts of Orissa during 2008-09

Sl no	Districts	No. of Positive sample size	% Sero-positive	% Sero-negative	Proportion Susceptible (X)	Ro(1/x) =x	H(1-1/Ro) Immunity Threshold in %	Herd level
1	Angul	10/100	10.00	90.00	0.90	1.11	0.10(10%)	
2	Balesore	15/48	31.25	68.75	0.68	1.47	0.31(31%)	
3	Bargarh	8/97	8.24	91.76	0.92	1.08	0.08(8%)	
4	Boudh	12/100	12.00	88.00	0.88	1.13	0.12(12%)	
5	Bolangir	14/91	15.38	84.62	0.85	1.17	0.15(15%)	
6	Bhadrak	15/35	42.85	57.15	0.57	1.75	0.43(43%)	
7	Dhenkanal	0/93	0	0	0	0	0	
8	Ganjam	16/100	16.00	84.00	0.84	1.19	0.16(16%)	
9	Jharsuguda	87/100	87.00	13.00	0.13	7.69	0.87(87%)	
10	Kendrapada	8/100	8.00	92.00	0.92	1.08	0.08(8%)	
11	Khurda	13/100	13.00	87.00	0.87	1.14	0.13(13%)	
12	Kandhamal	55/100	55.00	45.00	0.45	2.22	0.55(55%)	
13	Kalahandi	4/100	4.00	96.00	0.96	1.04	0.04(4%)	
14	Mayurbhanj	49/100	49.00	51.00	0.51	1.96	0.49(49%)	
15	Nuapada	6/100	6.00	94.00	0.94	1.06	0.06(6%)	
16	Nayagarh	12/100	12.00	88.00	0.88	1.13	0.12(12%)	
17	Puri	16/100	16.00	84.00	0.84	1.19	0.16(16%)	
18	Rayagada	29/94	30.85	69.15	0.69	1.44	0.31(31%)	
19	Sonepur	20/100	20.00	80.00	0.80	1.25	0.20(20%)	

Table: 17. Basic Reproduction Number (Ro) and Herd Immunity(H) Against Type “A” FMD Virus in Different Districts of Orissa during 2008-09

Sl no	Districts	No. of Positive sample size	% Sero-positive	% Sero-negative	Proportion Susceptible(X)	Ro(1/x) =x	H(1-1/Ro) Immunity Threshold in %	Herd level
1	Angul	8/100	8.00	92.00	0.92	1.08	0.08(8%)	
2	Balesore	13/48	27.08	72.92	0.73	1.36	0.27(27%)	
3	Bargarh	38/97	39.17	60.83	0.61	1.63	0.39(39%)	
4	Boudh	67/100	67.00	33.00	0.33	3.03	0.67(67%)	
5	Bolangir	42/91	46.15	53.85	0.54	1.85	0.46(46%)	
6	Bhadrak	9/35	25.71	74.29	0.74	1.35	0.26(26%)	
7	Dhenkanal	25/93	26.88	73.12	0.73	1.36	0.27(27%)	
8	Ganjam	56/100	56.00	44.00	0.44	2.27	0.56(56%)	
9	Jharsuguda	27/100	27.00	73.00	0.73	1.36	0.27(27%)	
10	Kendrapada	4/100	4.00	96.00	0.96	1.04	0.04(4%)	
11	Khurda	17/100	17.00	83.00	0.83	1.20	0.17(17%)	
12	Kandhamal	67/100	67.00	33.00	0.33	3.03	0.67(67%)	
13	Kalahandi	65/100	65.00	35.00	0.35	2.85	0.65(65%)	
14	Mayurbhanj	43/100	43.00	57.00	0.57	1.75	0.43(43%)	
15	Nuapada	17/100	17.00	83.00	0.83	1.20	0.17(17%)	
16	Nayagarh	2/100	2.00	98.00	0.98	1.02	0.02(2%)	
17	Puri	15/100	15.00	85.00	0.85	1.17	0.15(15%)	
18	Rayagada	83/94	88.29	11.71	0.11	9.09	0.88(88%)	
19	Sonepur	32/100	32.00	68.00	0.68	1.47	0.32(32%)	

Table: 18. Basic Reproduction Number (Ro) and Herd Immunity(H) Against Type “Asia-1” FMD Virus in Different Districts of Orissa during 2008-09

Sl no	Districts	No. of Positive sample size	% Sero-positive	% Sero-negative	Proportion Susceptible(X)	Ro(1/x) =x	H(1-1/Ro) Immunity Threshold in %	Herd level
1	Angul	1/100	1.00	99.00	0.99	1.01	0.01(1%)	
2	Balesore	23/48	47.91	52.09	0.52	1.92	0.48(48%)	
3	Bargarh	6/97	6.18	93.82	0.93	1.07	0.06(6%)	
4	Boudh	32/100	32.00	68.00	0.68	1.47	0.32(32%)	
5	Bolangir	31/91	34.06	65.94	0.65	1.53	0.34(34%)	
6	Bhadrak	4/35	11.42	88.58	0.88	1.13	0.12(12%)	
7	Dhenkanal	3/93	3.22	96.78	0.97	1.03	0.03(3%)	
8	Ganjam	11/100	11.00	89.00	0.89	1.12	0.11(11%)	
9	Jharsuguda	38/100	38.00	62.00	0.62	1.61	0.38(38%)	
10	Kendrapada	6/100	6.00	94.00	0.94	1.06	0.06(6%)	
11	Khurda	5/100	5.00	95.00	0.95	1.05	0.05(5%)	
12	Kandhamal	55/100	55.00	45.00	0.45	2.22	0.55(55%)	
13	Kalahandi	6/100	6.00	94.00	0.94	1.06	0.06(6%)	
14	Mayurbhanj	30/100	30.00	70.00	0.70	1.42	0.30(30%)	
15	Nuapada	7/100	7.00	93.00	0.93	1.07	0.07(7%)	
16	Nayagarh	14/100	14.00	86.00	0.86	1.16	0.14(14%)	
17	Puri	5/100	5.00	95.00	0.95	1.05	0.05(5%)	
18	Rayagada	64/94	68.08	31.92	0.32	3.12	0.68(68%)	
19	Sonepur	8/100	8.00	92.00	0.92	1.08	0.08(8%)	

Fig-8. Herd Immunity Level Percentage against FMDV type “O”

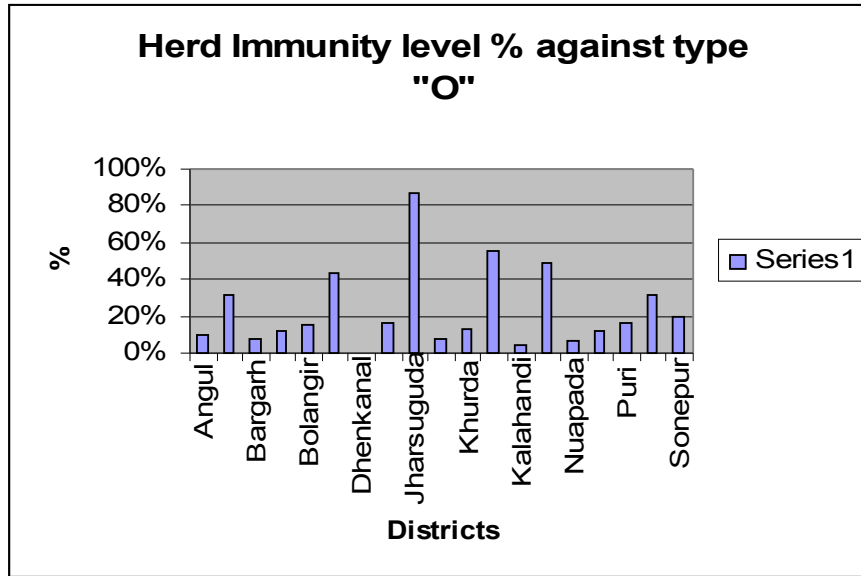


Fig-9:-Basic Reproduction Number (Ro) for FMDV type "O"

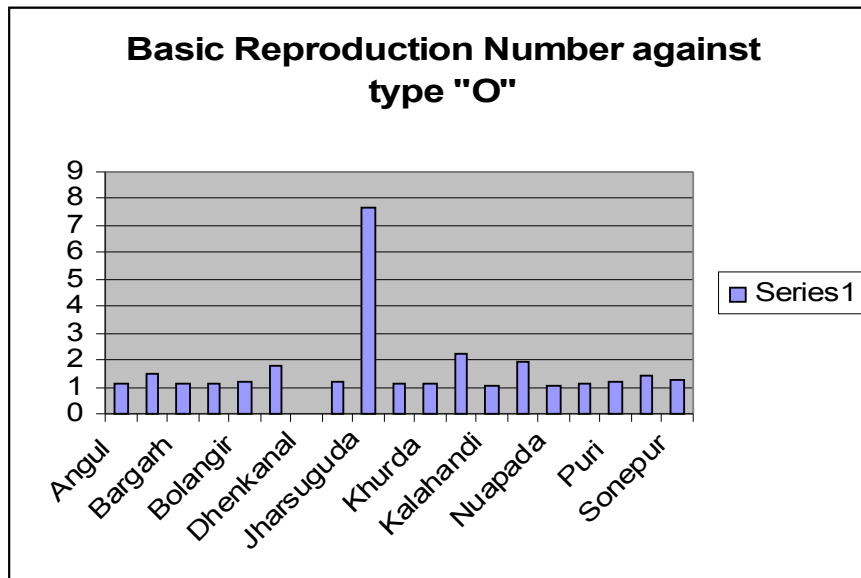


Fig-10. Herd Immunity Level Percentage against FMDV type "A"

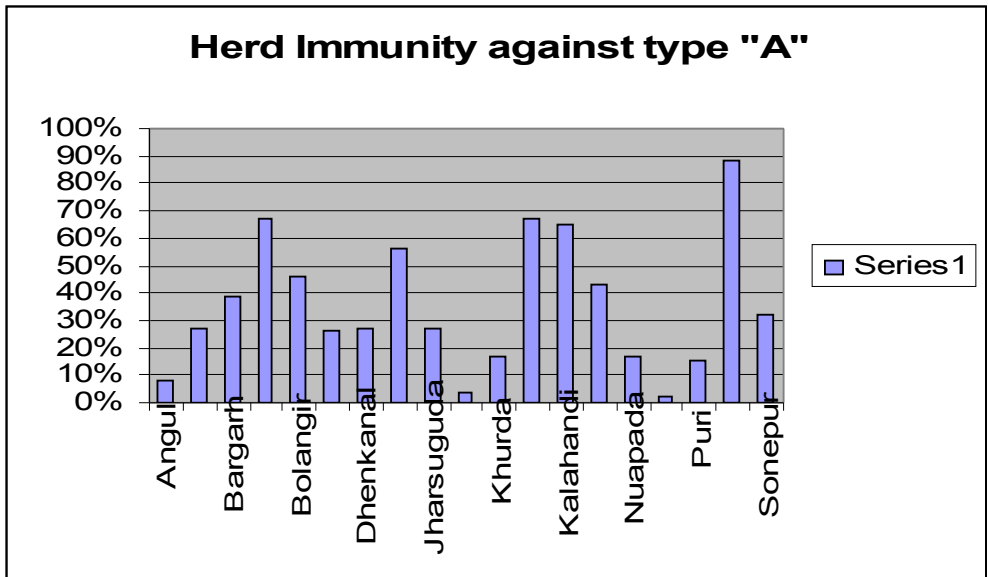


Fig-11:-Basic Reproduction Number (Ro) for FMDV type "A"

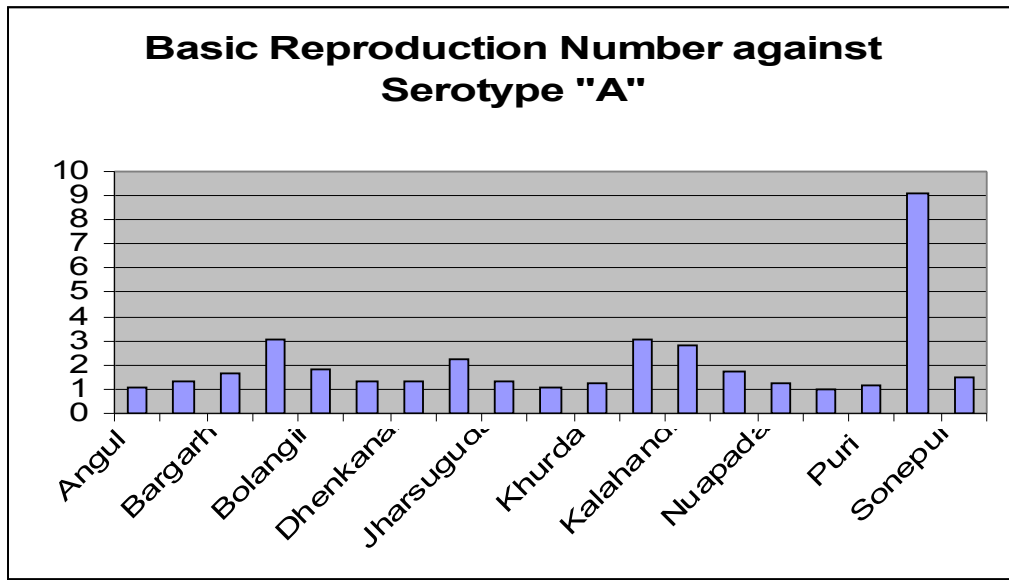


Fig-12. Herd Immunity Level Percentage against FMDV type "Asia 1"

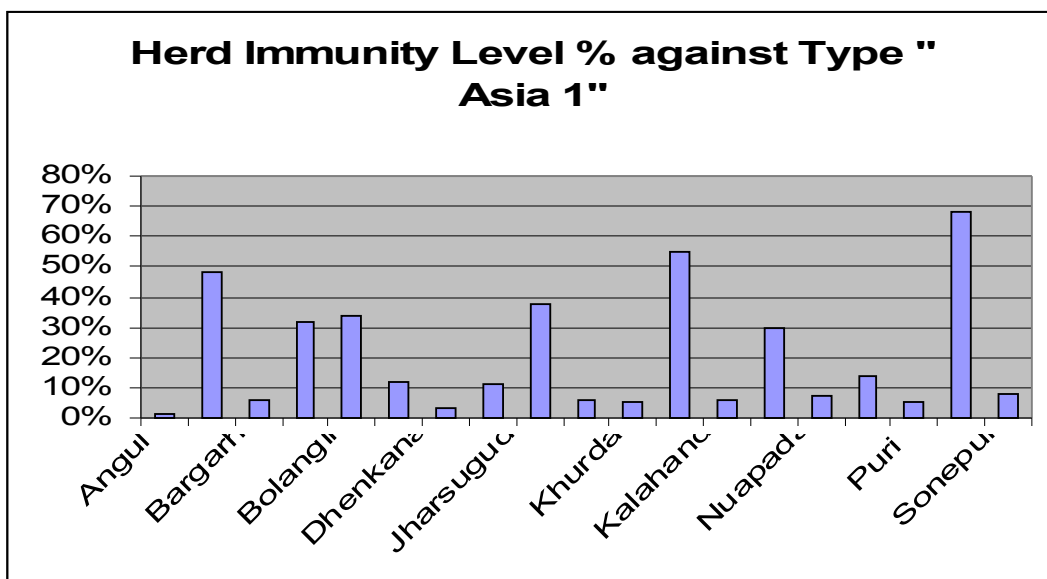
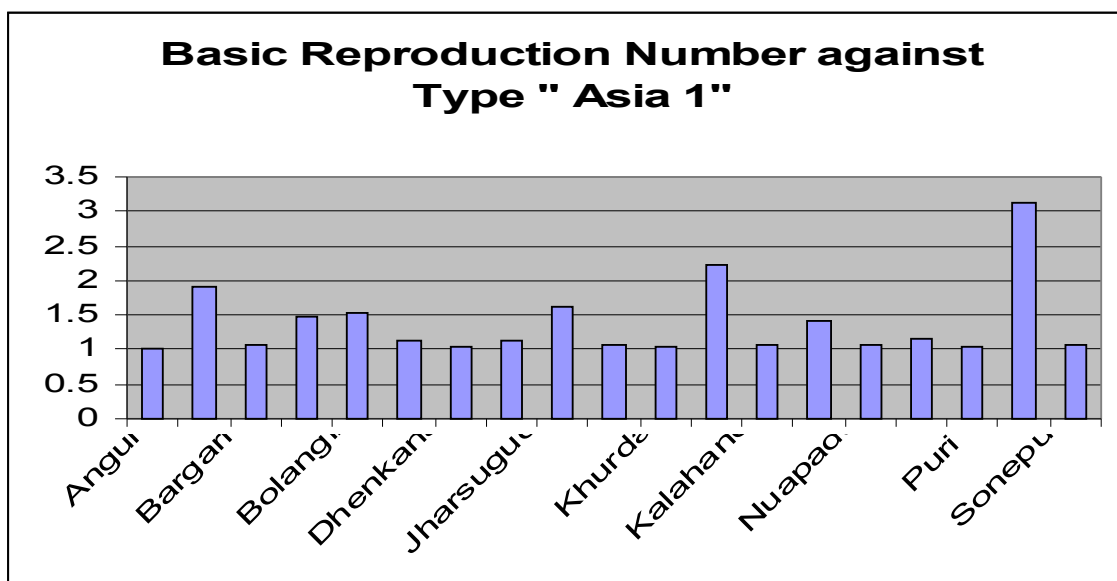


Fig-13:-Basic Reproduction Number (Ro) for FMDV type "Asia 1"



9. Prevalence of Foot and Mouth Disease in Orissa

The prevalence of FMD in different districts of the state was determined by subjecting the randomly collected serum samples in DIVA test. DIVA FMD test is used for differentiating vaccinated animals from FMDV-infected animals. Out of 2750 random serum samples tested by DIVA, the number of positive samples found to be 1191. The percentage of prevalence of FMD in Orissa found to be 42.84 % by DIVA test. The details are given on the Table 19.

Table :-19 The percentage of prevalence of FMD in Orissa during 2008-09

Sl no	Districts	Number of samples tested	No. of samples positive	Percentage of Positivity	Remarks
1	Anugul	96	51	53%	
2	Balasore	52	4	7.69%	
3	Bhadrak	36	6	16%	
4	Bolangir	100	47	47%	
5	Boudh	99	20	20.20%	
6	Baragarh	96	61	63.54%	
7	Cuttack	79	51	64.5%	
8	Dhenkanal	96	27	28%	
9	Ganjam	100	83	83%	
10	Gajapati	100	38	38%	
11	Jharsuguda	96	39	40.6%	
12	Kendrapada	100	21	21%	
13	Kalahandi	100	44	44%	
14	Khurda	99	59	59.6%	
15	Mayurbhanj	95	47	49.5%	
16	Nayagarh	100	31	31%	
17	Nuapada	53	42	79%	
18	Kandhamal	95	35	36.8%	
19	Puri	100	20	20%	
20	Rayagada	93	64	68.8%	
21	Sonepur	97	27	28%	
22	Sambalpur	200	120	60%	Mixed samples
23	Sundergarh				
24	Deogarh, Jagatsinghpur Jajpur Keonjhar Koraput Malkangiri Nabrangpur	697	254	36.44%	Mixed samples
	TOTAL	2780	1191	42.84%	

Fig-14:Map Showing the Prevalence % of Foot and Mouth Disease in Orissa during 2008-09

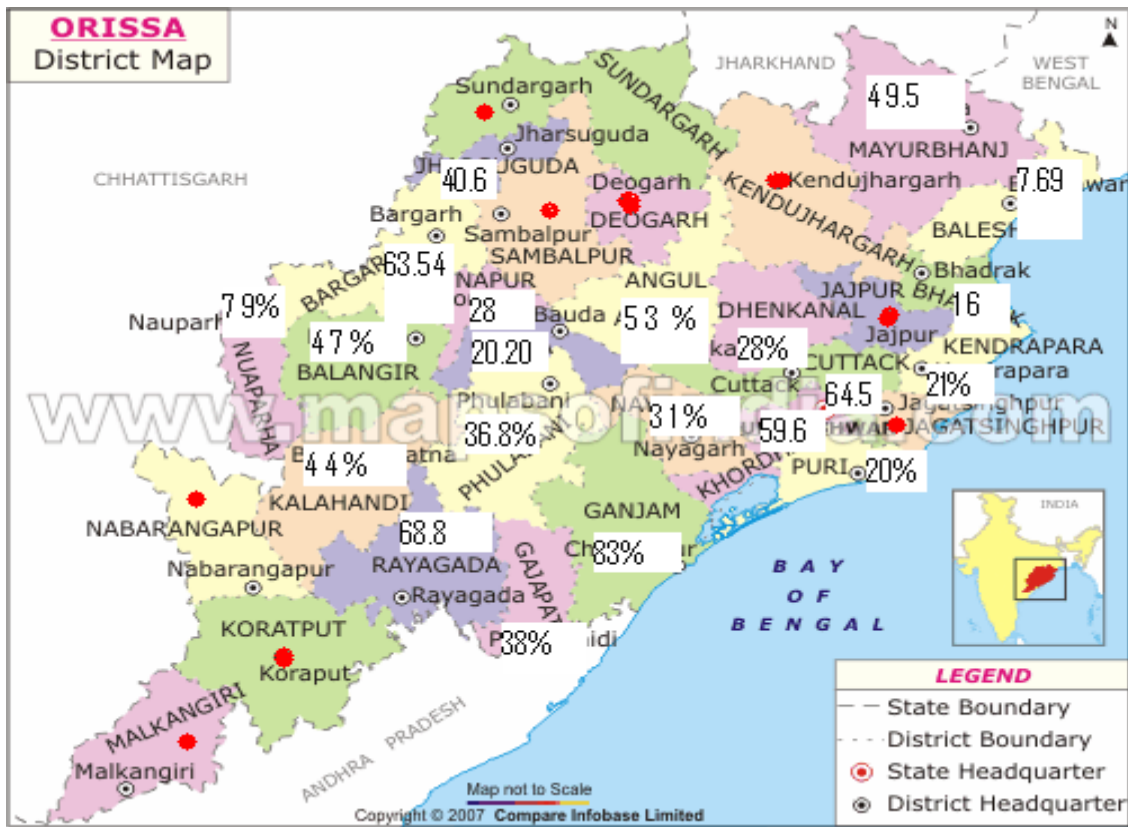
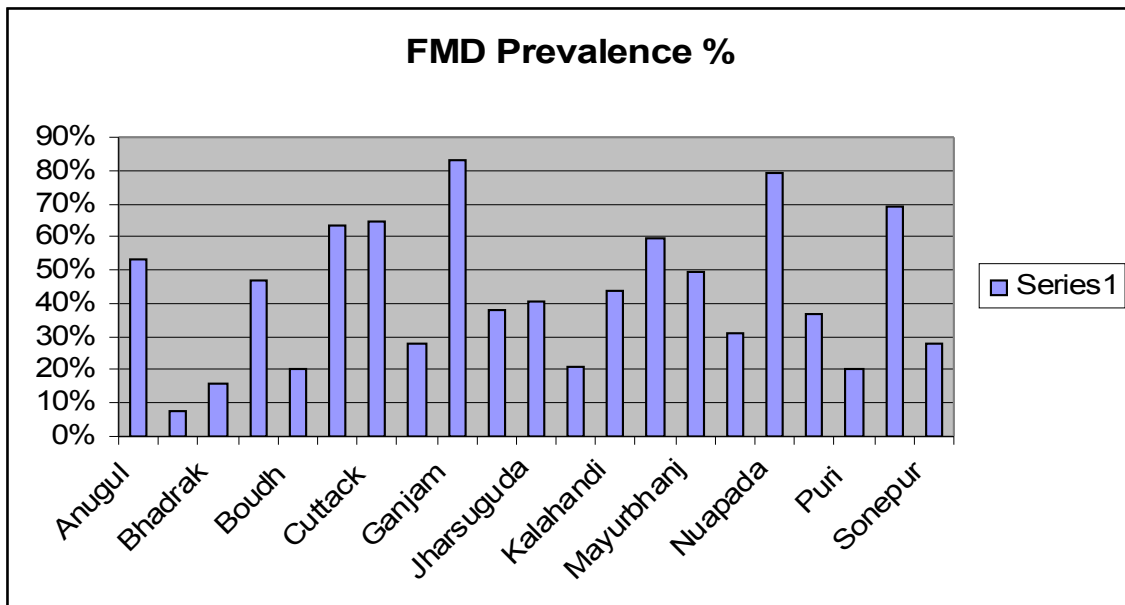


Fig-15: Graph Showing the Prevalence % of Foot and Mouth Disease in Orissa during 2008-09



EPIDEMIOLOGICAL STUDIES

1. Outbreaks of F.M.D.

During the year under report 23 outbreaks were recorded with 777 attacks and 12 deaths mostly in young calves as against 59 and 37 outbreaks during the year 2006-07 and 2007 -08 respectively (Table-20& Fig-16). Out of these 23 outbreaks 7 OB were diagnosed by Sero-typing and 11 OB retrospectively.(Table-20). A total of 23 bovine outbreaks were recorded ,of which 16 outbreaks were attended & investigated, from 2 OB samples received and rest 5 OB reported on the basis of clinical symptoms. No outbreak was reported in Sheep,Goats and Pigs. Further the field functionaries intimated 16 outbreaks for investigation in which clinical samples collected from 6 OB and serum samples collected from 10 OB, from 2 outbreaks samples were submitted in which clinical samples submitted from 1 OB and serum samples submitted from 1 OB to the network unit and 5 outbreaks were reported on the basis of clinical diagnosis at the month end in monthly South East FMD report. Serotyping result was found negative for FMD virus infection in two FMD outbreaks.

Most of the outbreaks under investigation appears to be due to migration of animals from affected areas to unaffected areas and also possibly due to poor sero-conversion and vaccination operation at the face of outbreaks while animals incubating the disease.

2. District wise Incidence of F.M.D. Outbreaks

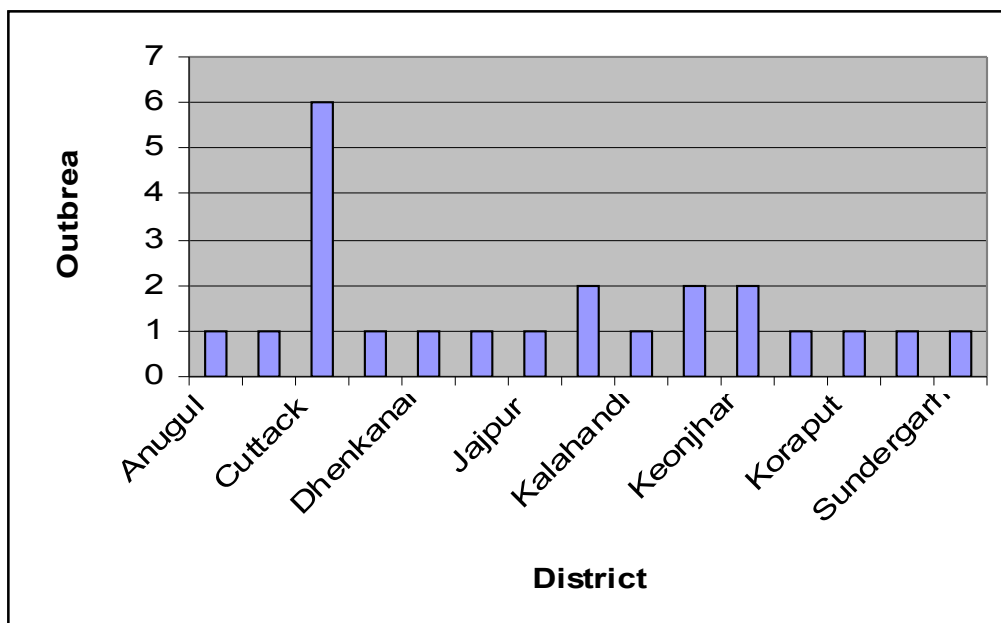
The disease was recorded in 15 out of 30 districts of the state as against 9 and 14 districts during the year 2006-07 and 2007 - 08. Maximun number of outbreaks were reported from Cuttack (6) district. The outbreaks were mostly limited to a particular area of town and village of the districts. Majority of the districts encountered 'O' Serotype.The samples collected/received from districts viz Kalahandi (1 OB), Jagatsinghpur(1 OB),Cuttack (4 OB) & Dhenkanal (1OB) were serotyped and due to non-availability of TE samples the serum samples collected/received from districts viz Cuttack (1 OB),Jagatsinghpur (1 OB),Ganjam(1 OB),Jajpur(1 OB),kendrapada(2 OB),Khurda(1 OB),Koraput(1 OB) and Puri(1 OB) were retrospectively diagnosed. The rest of the districts Deogarh((1 OB),Angul((1 OB),Cuttack((1 OB) & Keonjhar((2 OB) were clinically reported. The samples from districts viz. Balesore,Sundergarh and Kalahandi found to be negative for FMD virus infection (Table-20 & Fig-16).

Table-20 District wise Epidemiological Data in Orissa during the year 2008-09.

Sl	District	No. of Outbreaks	Attack	Death	No. of Samples	No of Positives	Remarks
1	Anugul	1	24	2	0	0	Reported OB

2	Balesore	1	24	0	0	0	Retrospectively diagnosed
3	Cuttack	6	206	4	22	9	serotyped
4	Deogarh	1	10	0	0	0	Reported OB
5	Dhenkanal	1	70	0	1	1	serotyped
6	Ganjam	1	20	0	0	0	Retrospectively diagnosed
7	Jajpur	1	41	0	0	0	Retrospectively diagnosed
8	Jagatsinghpur	2	234	4	4	3	serotyped
9	Kalahandi	1	14	0	8	NVD	serotyped
10	Kendrapada	2	29	2	0	0	Retrospectively diagnosed
11	Keonjhar	2	48	0		0	Reported OB
12	Khurda	1	23	0	0	0	Retrospectively diagnosed
13	Koraput	1	8	0	0	0	Retrospectively diagnosed
14	Puri	1	20	0	0	0	Retrospectively diagnosed
15	Sundergarh	1	6	0	0	0	Retrospectively diagnosed
	TOTAL	23	777	12	35	13	

Fig-16: District wise Outbreaks of FMD in Orissa during 2008-09



3. Monthwise Occurrence of F.M.D.

Highest numbers of outbreak was recorded in the month of August and October. No outbreaks were reported during the month of April, May, June & January (Table-21 & 22; Fig-17, 18 & 19).

Table-21: Month wise Outbreak Particulars in Orissa during the year 2008-09

SI No	Month	No of Outbreaks	Attack	Death	No of Samples	No of Positives
1	APR	0	0	0	0	0
2	MAY	0	0	0	0	0
3	JUN	0	0	0	0	0
4	JULY	2	233	4	4	3
5	AUG	6	206	4	8	NVD
6	SEPT	2	49	0	0	0
7	OCT	7	186	4	16	6
8	NOV	2	27	0	0	0
9	DEC	1	20	0	0	0
10	JAN	0	0	0	0	0
11	FEB	2	36	0	7	4
12	MAR	1	20	0	0	0
TOTAL		23	777	12	35	13

Table-22: Month wise Samples Typed.

SI No	Month	No of Outbreaks	No of Samples	No of Positives	O	A	C	Asia-1
1	APR	0	0	0	-	-	-	-
2	MAY	0	0	0	-	-	-	-
3	JUN	0	0	0	-	-	-	-
4	JULY	2	4	3	3	-	-	-
5	AUG	6	8	NVD	-	-	-	-
6	SEPT	2	0	0	-	-	-	-
7	OCT	7	16	6	6	-	-	-
8	NOV	2	0	0	0	-	-	-
9	DEC	1	0	0	0	-	-	-
10	JAN	0	0	0	-	-	-	-
11	FEB	2	7	4	4	-	-	-
12	MAR	1	0	0	-	-	-	-
TOTAL		23	35	13	13	0	0	0

Fig-17: Month wise FMD Outbreaks in Orissa during 2008-09

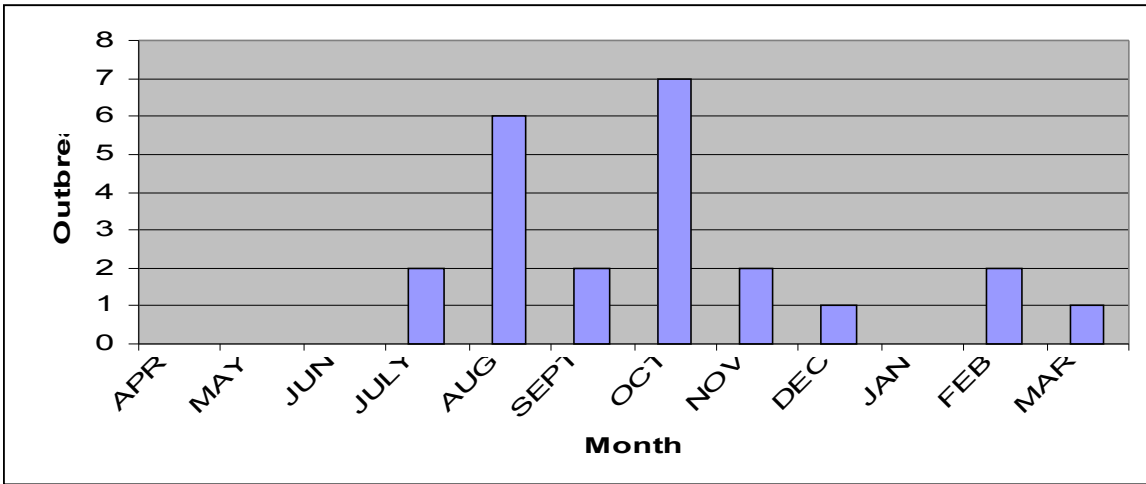


Fig-18: Month wise FMD Outbreaks in Orissa during 2008-09

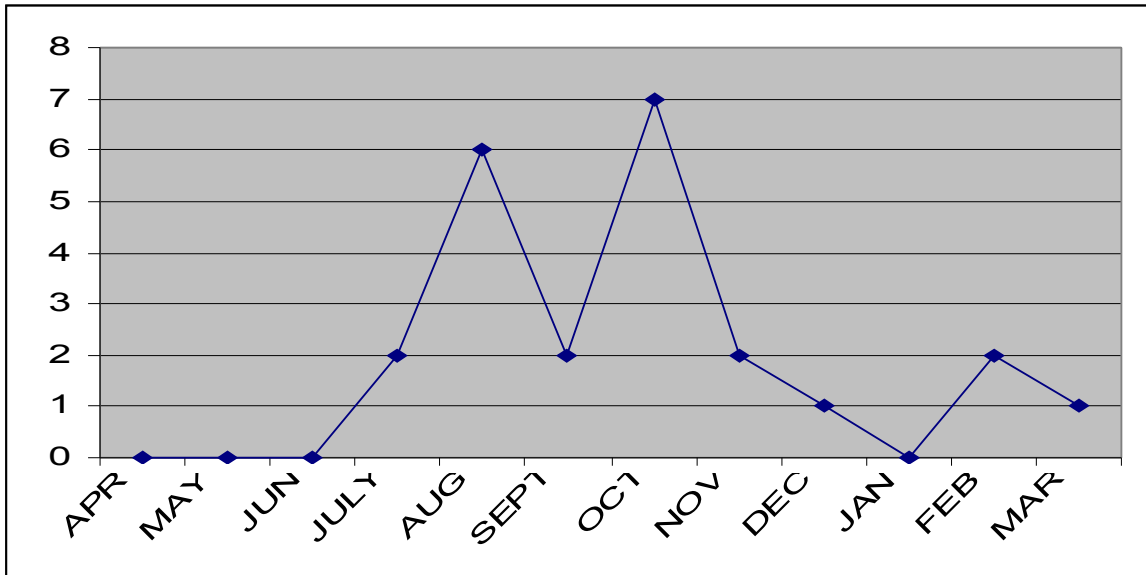
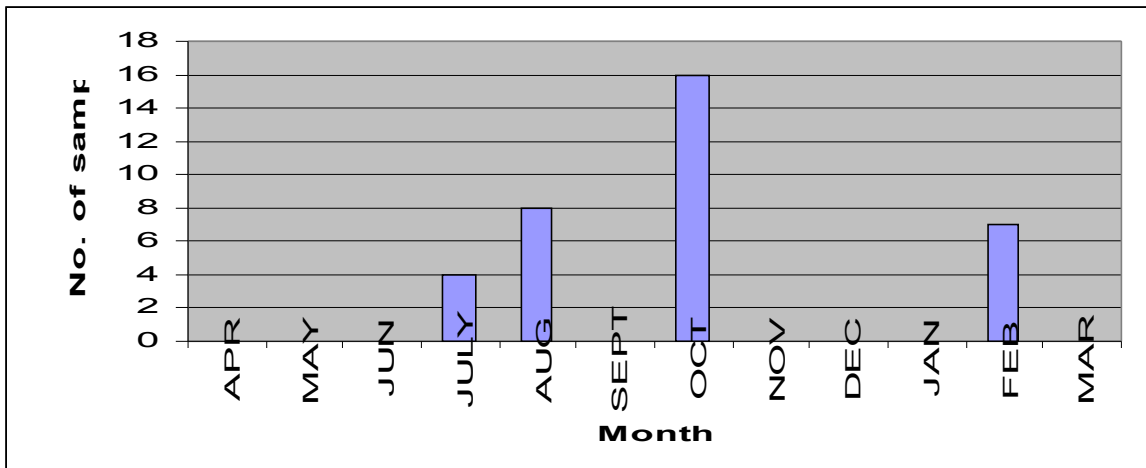


Fig-19: Month wise Samples Typed during 2008-09



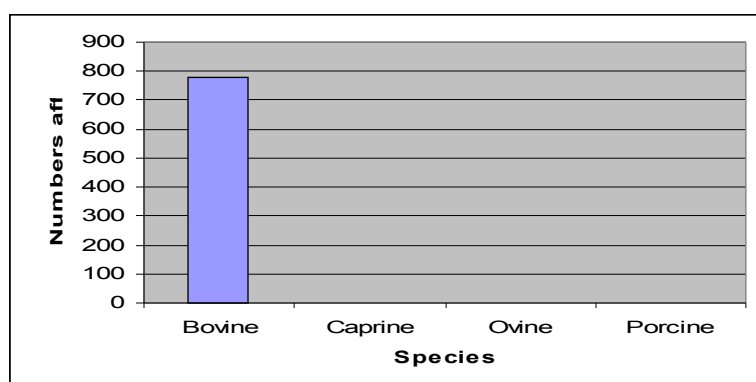
4. Species of Animals Affected.

Mostly Cattle consisting of local non-descript, Crossbred Jersey and Hariana were affected. of F.M.D. No outbreaks in Caprine ,Porcine and Ovine species was reported during the period under report (Table- 23 & Fig-20).

Table-23: Species wise Occurrence of FMD in Orissa during 2008-09

Year	Species of Animals Affected				Total
	Bovine	Caprine	Ovine	Porcine	
2008-09	777	0	0	0	777

Fig-20 : Species wise Occurrence of FMD in Orissa during 2008-09



5. Economic loss due to FMD.

A rough calculation of economic loss due to FMD outbreaks is accounted to an approximate amount of Rs.14,79,000/- (Rupees fourteen lakhs seventy nine thousand only) (Table-24). Basing on the following assumptions economic loss was calculated.

(i) Treatment @ Rs.500/- per affected animal

(ii) Loss of milk

Taking 45% of affected animals are milkers and loss of 5 kg of milk/day per animal for 30 days @ Rs. 20/kg.

(iii) Dead

Taking average b.w. 75 kg @ Rs.45/kg

Table-24: Economic Loss due to FMD in Orissa during the Year 2007-08

Sl no	Loss due to	Calculation of loss	Amount in Rs
1	Treatment @ Rs 500/- per affected animal	777 x 500	3,88,500/-
2	Loss of milk Taking 45% (350) of affected animals as milkers and loss of 5 kg milk/day per animal for 30 days @ Rs 20/- kg	5 x 20 x 30 x 350	10,50,000/-
3	Dead Taking average B.W. 75 kg @ Rs 45/kg	75 x 45 x 12	40,500/-
G.Total			14,79,000/-

6. Transmission of Virus and Source of Infection

Analysis of epidemiological data, collected from outbreaks investigated has revealed that the virus transmission and source of infection is mainly due to the

- (i) Large scale migration and movement of animals from place to place, for the purpose of marketing (Cattle fairs & slaughter houses).
- (ii) Introduction of animals purchased from the above cattle markets, fairs into the unaffected villages.
- (iii) Movement of personnel and vehicles from affected areas to the unaffected areas.
- (iv) Movement of feed and fodder from affected areas to the unaffected areas.
- (v) In some of the outbreaks the affected and the susceptible animals were fed with the same feed and in most of the cases they were housed at the same place due to lack of extra shed.
- (vi) In some of the outbreaks, the vaccinated animals were also affected due to introduction of new animals to the village and might be vaccination conducted at the time while incubating stage.
- (vii) Intermixing of healthy and infected indigenous animals at pasture land for grazing.

7. ACTION TAKEN.

Attending the cases of FMD outbreaks, the following measures had been advocated to restrict the spread of disease in the affected areas.

- ☞ Epifocal FMD vaccination in the affected areas was recommended.

- ☞ FMD vaccination as per schedule for protection of susceptible animal population was recommended.
- ☞ Segregation of affected ailing animals from healthy population in case of organized farm.
- ☞ Restriction imposed on any new entry of animals in the affected areas or exit of animals from the affected spot.
- ☞ Restriction of movement of man, materials as well as vehicles imposed in the affected areas to prevent further spread of infection.
- ☞ Avoid common grazing of affected and healthy animals at pasture land.
- ☞ Attendant should attend the healthy herd first and then the ailing animals.
- ☞ Use of foot deep with 4 % (w/v) washing soda in the entry and exit point of each shed/byre.
- ☞ Abundant use of 4% washing soda solution in water in the affected shed at least thrice a day.
- ☞ Calves should be separated from their ailing mothers (lactating cows) and boiled milk should be provided to them.
- ☞ In severe cases antibiotics were recommended to prevent secondary bacterial complications.

8. FMD Vaccination done during the year 2008-09 in Orissa.

Vaccination in rural areas is undertaken mainly in cattle that too protect costly dairy animals and bullocks, therefore very low percentage of susceptible population is covered. The vaccination was carried out routinely as per vaccination calendar annually in all the districts under ASCAD. The percentage of vaccination coverage in each district is presented in table-25. The total vaccination coverage in the whole state is around 27.80 %. In addition to the vaccination carried out by the Department, the vaccination of the dairy cows is also undertaken by the Orissa milk federation (OMFED). The vaccination coverage% is calculated as per the vaccination carried out by the Department (Fig-21 & 22).

Table-25. District wise FMD Vaccination done in Orissa during the year 2008-09.

SI No	District	Vaccination done	Total susceptible population	Vaccination Percentage% 2007-08	Vaccination Percentage% 2008-09	No of Outbreaks reported
1	Anugul	140000	505197	2.47	27.71	1
2	Bolangir	98600	527843	2.36	41.70	0
3	Balasore	310000	896921	10.60	34.56	1
4	Baragarh	250000	483345	41.38	51.72	0
5	Bhadrak	110000	617593	20.24	17.81	0
6	Boudh	110000	236462	21.25	46.52	0
7	Cuttack	330000	633959	24.45	52.05	6
8	Deogarh	50000	178510	44.82	10.53	1
9	Dhenkanal	105000	474949	17.90	22.11	1
10	Gajapati	50000	232742	32.23	21.49	0
11	Ganjam	230000	837254	14.34	27.48	1
12	Jagatsinghpur	145000	327940	25.92	44.22	2
13	Jajpur	80800	653741	11.48	12.36	1
14	Jharsuguda	85000	167263	35.88	50.82	0
15	Kalahandi	110000	462935	25.93	23.77	1
16	Kandhamal	109200	336200	10.42	32.49	0
17	Kendrapara	125000	453697	12.13	27.56	2
18	Keonjhar	215000	787227	10.80	27.32	2
19	Khurda	100000	403579	17.35	24.78	1
20	Koraput	60000	525883	15.22	11.41	1
21	Malkangiri	60000	434655	16.10	13.81	0
22	Mayurbhanj	300000	936149	20.84	32.05	0
23	Nuapada	55000	266261	26.29	20.66	0
24	Nawarangapur	45000	454578	11.00	10.00	0
25	Nayagarh	70000	286440	29.68	24.44	0
26	Puri	82000	492326	15.24	16.66	1
27	Rayagada	45000	371877	25.55	12.11	0
28	Sambalpur	214250	379410	26.36	56.47	0
29	Sonepur	60000	234086	34.18	25.64	0
30	Sundergarh.	225000	681537	25.68	33.02	1
	Total	3969850	14280559	20.96%	27.80 %	23

Fig-21 : District Wise Vaccination Coverage Percentage-(2008-09)

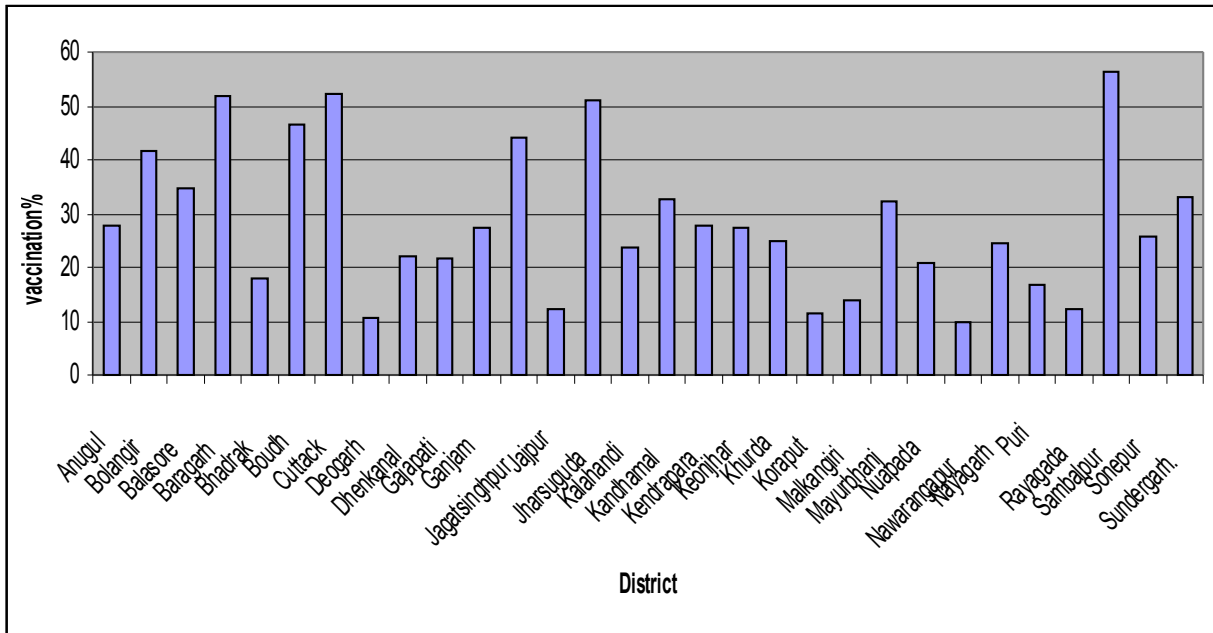
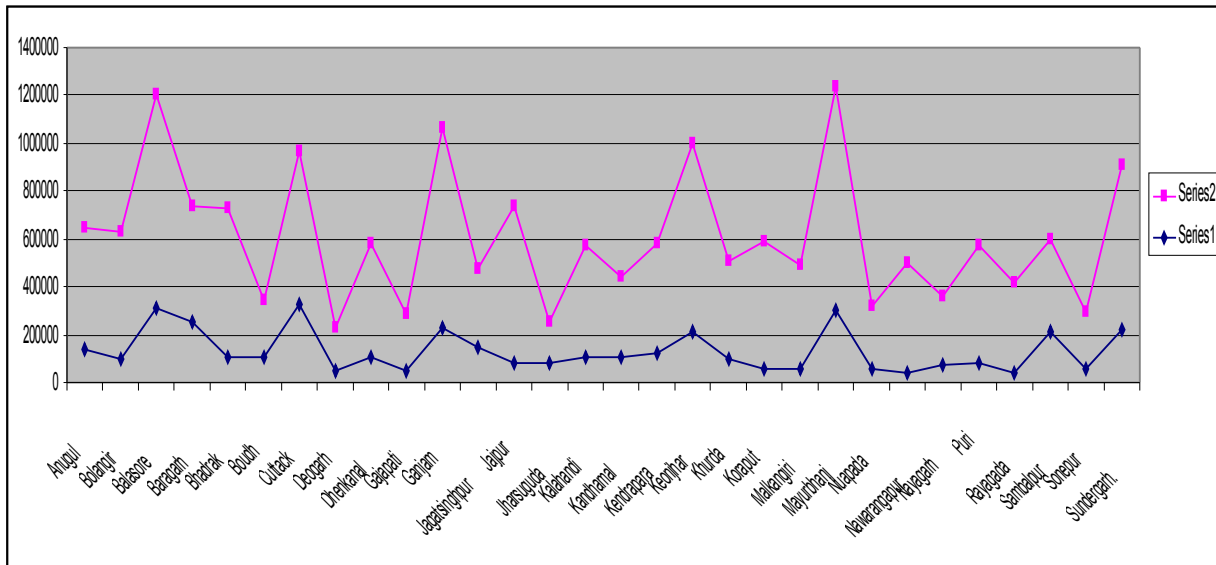


Fig-22 : District Wise Vaccination with respect to Population



9. Livestock Migratory Routes in the State.

Livestock migration and movement is a common phenomenon in the state. The movement is for two reasons i.e., for the purposes of trade and for grazing. The trade in livestock falls under any of the following 3 categories

- (i) Trade in milch animals
- (ii) Trade in draught animals
- (iii) Trade in livestock for slaughter

Similarly large-scale movement of animals occurs in the state wherein cattle fairs are held across the state all throughout the year and large scale buying and selling of livestock occurs.

Trade in milch animals is common between the Ganjam, Gajapati, Rayagada, Koraput and Malkangiri districts of the state with the border districts of Andhra Pradesh wherein large scale buying and selling of CB milch animals take place at cattle markets. The animals are normally transported on road (Fig-11).

There is great demand for draft animals in the state brought from Chhatishgarh to the local cattle markets of Sundergarh, Nuapara, Nabrangpur, Bargarh, Jharsuguda, Koraput and Malkangiri districts in Orissa.

The animals for slaughter purpose are sold to West Bengal, A.P and Jharkhand from the Mayurbhanj, Balesore, Keonjhar and Sundergarh districts of the state.

Name of the Districts	Bordering state
Malkangiri, Koraput	Andhra Pradesh
	West Bengal
	Jharkhand
	Chhatishgarh

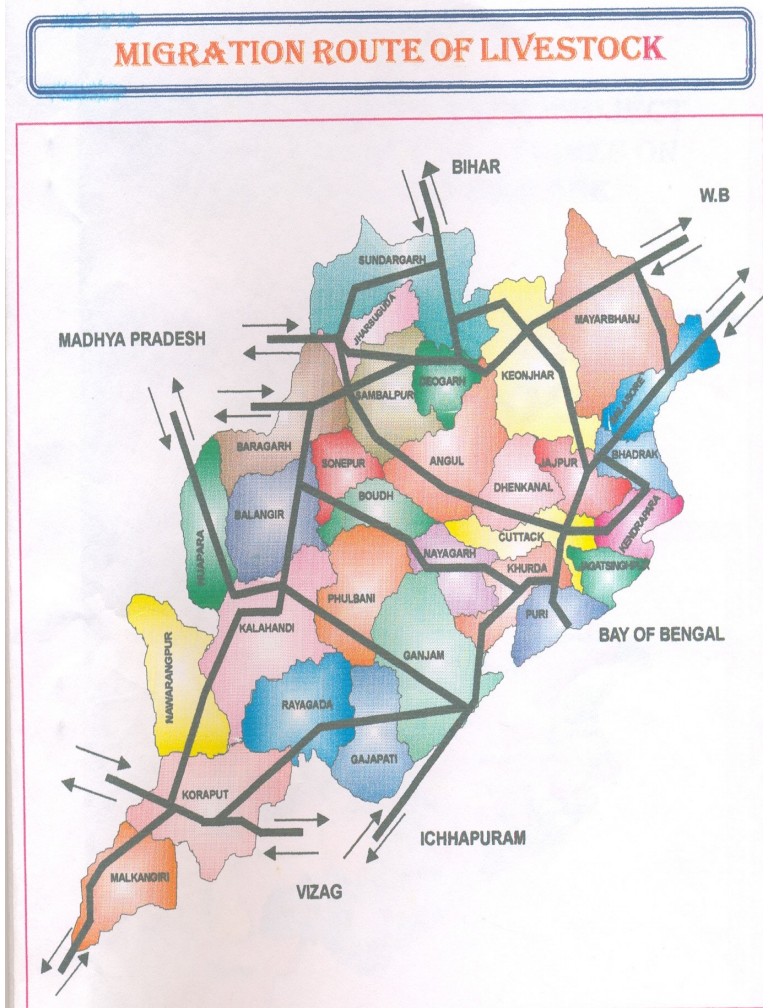


Fig-23. Migration route of Livestock

Stock routes

Cattle route no-1. Sohela(Bargarh distt) → Belaguntha(Ganjam distt)

Rajasthan-Sohela-Bargarh-Sonepur-Manmunda-Boudh-Purunakatak-Chakapad
M.P.-Tikabali-Ichhapur(A.P.)- Bahadajhola-Hinjilikatu-Belaguntha-Raikia-Phulbani

No-2.A.P.-Ganjam-Khurda=Ichhapur-Hinjilikatu- Bahadajhola-Nayagarh-Begunia-
Hariralpur(Jatni)- Delang-Barikpur- Bhadrak - West Bengal

No-3 Vizianagaram – Bobli- Salur - Koraput

Cattle route no-4 Chhatishgarh - Kotpad- Koraput

Cattle route no-5 Jharkhand- Rairangpur- Mayurbhanj - Mednipore(W.B.)

Cattle route no-6 Nayagarh - Khurda – Bhadrak- W.B.

Cattle route no-7

Jajpur → Biraja market to Bhadrak via Barikpur → W.B.

Cattle route no-8Dharmasala to Sujanpur & Bhadrak W.B.

10. Investigation of FMD Outbreaks

(1) Village level Outbreaks

In all outbreaks were attended by officers of this institute in the villages/towns and collected the epidemiological information and necessary data.

- (1) **1. District** - Jagatsinghpur
2. Village -Majhikhora,Ranapur,Naradia,Tundi
3. Date of first attack – 15.7.2008
4. Date of last attack – 24.7.2008
5. Details about the outbreak

Species	Population at risk	No of animals affected	No of animals died
Cattle	4179	209	4
Buffalo	14	-	0
Sheep	432	-	0
Goat	847	-	0
Pigs	-	-	0
TOTAL	5472	209	4

- 6. Morbidity %** - 5.0 %
7. Mortality% - 1.91 %
8. Course of infection - 8 days(average)

9. Severity of outbreak - extensive, covering 18 villages
 10. Economic loss -Rs 4,03,000/-
 11. Source of infection -Purchase of new animals from local cattle market
 12. Vaccination details - 2800 doses of FMD vaccination in affected area & 4100 doses in free area. BN
 -FM07TAS 035, Mfg -06/07, Exp - 5/09, Intervet
 13. Virus type Identified - 'O'

- (2) **1. District - Balesore**
 2. Village - Dhuliuda, Tentulia, Mainsamari
 3. Date of first attack -27.6.2008
 4. Date of last attack - 6.6.2006
 5. Details about the outbreak

Species	Population at risk	No of animals affected	No of animals died
Cattle	453	11	0
Buffalo	-	-	-
Sheep	-	-	0
Goat	24	-	0
Pigs	-	-	0
TOTAL	477	11	0

6. Morbidity % - 5.29 %
 7. Mortality % - nil
 8. Course of infection - 9 days (average)
 9. Severity of outbreak - moderate, limited to a 3 village area
 10. Economic loss - Rs 42,000/-
 11. Source of infection - flood and movement of animals
 12. Vaccination details - BN-FM07TAS 058, Mfg -12/07, Exp-11/09, Intervet, 32000 doses in Basta block
 13. Virus type Identified - NVD

- (3) **1. District - Cuttack**
 2. Village - Madhubana, Nuasahi, Bachipur & Ambaborei in Barang block
 3. Date of first attack - 19.8.2008
 4. Date of last attack -27.8.2008
 5. Details about the outbreak

Species	Population at risk	No of animals affected	No of animals died
Cattle	1108	111	2
Buffalo	-	-	-
Sheep	16	-	0
Goat	186	-	0
Pigs	30	-	0
TOTAL	1340	111	2

6. Morbidity % - 10.01%
 7. Mortality % - 1.8 %
 8. Course of infection - 8 days (average)
 9. Severity of outbreak - extensive covering 4 villages
 10. Economic loss - Rs 77,250/-

11. Source of infection –Purchase of new animals from local cattle market
 12. Vaccination details - 1000 doses, BN –FM 07TAS 026, Mfg – 6/07 ,Exp- 5/09, Intervet
 13. Virus type Identified – ‘O’

(4) 1. District - Jajpur

2. Village -Byree, Badchana
 3. Date of first attack – 12.9.2008
 4. Date of last attack – 22.9.2008
 5. Details about the outbreak

Species	Population at risk	No of animals affected	No of animals died
Cattle	278	41	0
Buffalo	-	-	0
Sheep	-	-	0
Goat	-	-	0
Pigs	-	-	0
TOTAL	278	41	0

6. Morbidity % - 14.74%
 7. Mortality% - nil
 8. Course of infection - 10 days(average)
 9. Severity of outbreak - mild, limited to a particular area
 10. Economic loss - Rs 74,500/-

11. Source of infection –Flood and Purchase of new animals from local cattle market
 12. Vaccination details - unvaccinated
 13. Virus type Identified – ‘O’

(5) 1. District - Jagatsinghpur

2. Village -Dandillo
 3. Date of first attack – 3.9.2008
 4. Date of last attack – 27.9.2008
 5. Details about the outbreak

Species	Population at risk	No of animals affected	No of animals died
Cattle	250	25	0
Buffalo	-	-	0
Sheep	125	-	0
Goat	240	-	0
Pigs	-	-	0
TOTAL	615	25	0

6. Morbidity % - 0.1%
 7. Mortality% - nil
 8. Course of infection - 24 days(average)
 9. Severity of outbreak - mild, limited to a particular area
 10. Economic loss - Rs.45,500/-

11. Source of infection –Recent flood.
 12. Vaccination details -Vaccinated 2 month back 350 doses.
 13. Virus type Identified – ‘O’

(6) 1. District - Cuttack

- 2.Village -Nischintakoili
 3.Date of first attack – 5.10.2008
 4.Date of last attack – 25.10.2008
 5.Details about the outbreak

Species	Population at risk	No of animals affected	No of animals died
Cattle	1602	15	0
Buffalo	-	-	0
Sheep	49	-	0
Goat	474	-	0
TOTAL	2125	15	0

- 6.Morbidity % - 0.93%
 7.Mortality% - nil
 8.Course of infection - 15 days(average)
 9.Severity of outbreak - mild, limited to a particular area
 10.Economic loss -Rs.28,500/-
 11.Source of infection –Through milker of near by village where 15 days back FMD occurred
 12.Vaccination details - 500 doses on 22.9.2008, BN-300/207,FMD 71AS035 ,Mnf- 6/07 ,Exp-5/09
 13.Virus type Identified – ‘O’

(7) 1.District - Cuttack

- 2.Village -Mahanga block, Village – Chyanpal,Mulubasanta & Kothapada
 3.Date of first attack – 22.9.2008, 4.10.2008 & 24.9.2008
 4.Date of last attack – 14.10.2008 , continuing & 18.10.2008
 5.Details about the outbreak

Species	Population at risk	No of animals affected	No of animals died
Cattle	460	41	2
Buffalo	-	-	0
Sheep	410	-	0
Goat	-	-	0
Pigs	-	-	0
TOTAL	870	41	0

- 6.Morbidity % - 8.91 %
 7.Mortality% - 4.0 %
 8.Course of infection - 15 days(average)
 9.Severity of outbreak - extensive covering 3 villages
 10.Economic loss -Rs.81,250/-
 11.Source of infection –movement of animals
 12.Vaccination details - 150 doses on 8.10.2008, BN-300/207,FMD 71AS035 ,Mnf- 6/07 ,Exp-5/09
 13.Virus type Identified – ‘O’

(8) 1.District - Kendrapada

- 2.Village -Sanabetara & Naganpur in Garadpur block
 3.Date of first attack – 13.10.2008
 4.Date of last attack – 20.10.2008
 5.Details about the outbreak

Species	Population at risk	No of animals affected	No of animals died
Cattle	638	3	0
Buffalo	82	23	3
Sheep	-	-	0
Goat	-	-	0
TOTAL	720	26	3

- 6.Morbidity % - 3.61 %
7.Mortality% - 11.53 %
8.Course of infection - 6 days(average)
9.Severity of outbreak - mild, limited to a particular area
10.Economic loss - Rs 62,125/-
11.Source of infection -Nomadic herd
12.Vaccination details - 650 doses FMD vaccination
13.Virus type Identified - 'O'

- (9) **1.District - Khurda**
2.Village -Dhangua & Khetrapal in Chilika block
3.Date of first attack - 12.10.2008
4.Date of last attack - 23.10.2008
5.Details about the outbreak

Species	Population at risk	No of animals affected	No of animals died
Cattle	147	23	0
Buffalo	-	-	0
Sheep	-	-	0
Goat	-	-	0
Pigs	-	-	0
TOTAL	147	23	2

- 6.Morbidity % - 15.64 %
7.Mortality% - nil
8.Course of infection - 9 days(average)
9.Severity of outbreak - moderate, limited to particular 2 village area
10.Economic loss - Rs 44,500/-
11.Source of infection -Not clear
12.Vaccination details - 500 doses vaccination
13.Virus type Identified - 'O'

- (10) **1.District - Dhenkanal**
2.Village -Kamakhyanagar
3.Date of first attack - 10.10.2008
4.Date of last attack - 20.10.2008
5.Details about the outbreak

Species	Population at risk	No of animals affected	No of animals died
Cattle	232	70	0
Buffalo	-	-	0
Sheep	-	-	0
Goat	-	-	0
TOTAL	232	70	2

- 6.Morbidity % - 30.17 %
 7.Mortality% - nil
 8.Course of infection - 9 days(average)
 9.Severity of outbreak - moderate, limited to particular area
 10.Economic loss - Rs 1,31,000/-
 11.Source of infection -Not clear
 12.Vaccination details - 300 doses vaccination on 1.10.2008
 13.Virus type Identified - 'O'

- (11) **1.District - Koraput**
 2.Village - Semiliguda
 3.Date of first attack - 8.10.2008
 4.Date of last attack - 26.10.2008
 5.Details about the outbreak

Species	Population at risk	No of animals affected	No of animals died
Cattle	1114	9	0
Buffalo	235	-	0
Sheep	-	-	0
Goat	-	-	0
Pigs	-	-	0
TOTAL	1349	9	0

- 6.Morbidity % - 0.8 %
 7.Mortality% - nil
 8.Course of infection - 14 days(average)
 9.Severity of outbreak - moderate, limited to particular area
 10.Economic loss - Rs 16,500/-
 11.Source of infection -Not clear
 12.Vaccination details- 500 doses vaccination on 1.11.2008,
 13.Virus type Identified - 'O'

- (12) **1.District - Cuttack**
 2.Village -Baharana in Niali block
 3.Date of first attack - 2.2.2009
 4.Date of last attack - 10.2.2009
 5.Details about the outbreak

Species	Population at risk	No of animals affected	No of animals died
Cattle	1029	11	0
Buffalo	-	-	0
Sheep	-	-	0
Goat	-	-	0
TOTAL	1029	11	2

- 6.Morbidity % - 1.06 %
 7.Mortality% - nil
 8.Course of infection - 7 days(average)
 9.Severity of outbreak - moderate, limited to particular area
 10.Economic loss - Rs 20,500/-

11. Source of infection – Trade in animals from neighbouring district
 12. Vaccination details – 700 doses vaccination on September month
 BN-FM08/TAS056, Mfg-11/08, Exp- 10/10, Intervet
 13. Virus type Identified – ‘O’

(11) FMD Outbreaks in Organised Farm
(1) District - Sundergarh

1. Name of the Farm – Livestock breeding & Dairy farm, Kuanrunda, Sundergarh
 2. Location – Kuanrunda, Sundergarh
 3. Date of first attack – 24.8.2008
 4. Date of last attack – 28.8.2008
 5. Details about the outbreak

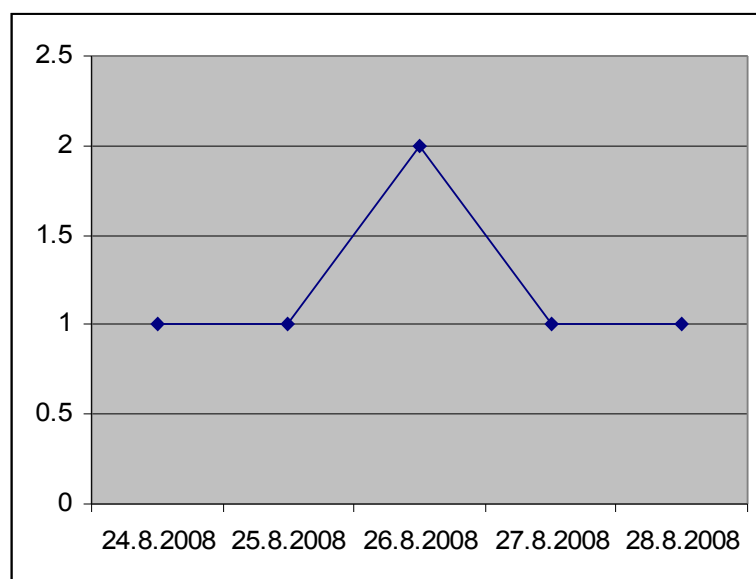
Species	Population at risk	No of animals affected	No of animals died
Cattle	62	6	0

6. Datewise attack of animals

Sl no	Date	No of affected animals	Cumulative total
1	24.8.2008	1	1
2	25.8.2008	1	2
3	26.8.2008	2	4
4	27.8.2008	1	5
5	28.8.2008	1	6

7. Morbidity % – 0.96%
 8. Mortality % – nil
 9. Course of infection – 8 days (average)
 10. Severity of outbreak – mild
 11. Economic loss – 40 lit of milk per day loss observed, Rs 21000/-
 12. Source of infection – Movement of animals from nearby village to farm pasture land for grazing where FMD was prevalent last month
 13. Vaccination details – On 1.11.2007 and 22.8.2008 FMD vaccination was done
 Batch no-FM06TAS039 /// FM 07 TAS 020
 Mfg date- Nov 2006/// April 2007
 Exp date - Oct 2008/// Mar 2009
 INTERVET.
 14. Virus type Identified – NVD

Epidemic Curve (Livestock breeding & Dairy farm, Kuanrunda, Sundergarh)



- (2) **District** - **Kalahandi**
- 1.Name of the Farm - Frozen semen Bull farm, Bhawanipatna, Kalahandi
- 2.Location - Bhawanipatna, Kalahandi
- 3.Date of first attack - 20.8.2008
- 4.Date of last attack - 24.8.2008
- 5.Details about the outbreak

Species	Population at risk	No of animals affected	No of animals died
Cattle	14	14	0

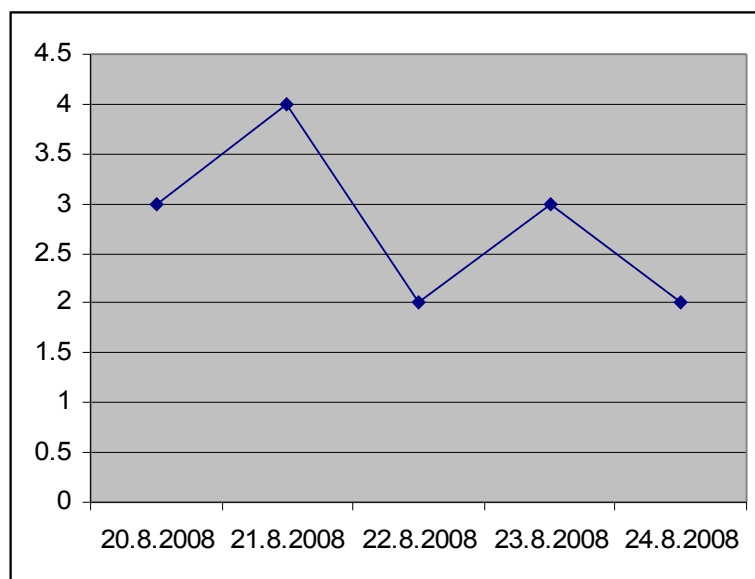
6.Datewise attack of animals

Sl no	Date	No of affected animals	Cumulative total
1	20.8.2008	3	3
2	21.8.2008	4	7
3	22.8.2008	2	9
4	23.8.2008	3	12
5	24.8.2008	2	14

- 7.Morbidity % - 100 %
- 8.Mortality% - nil
- 9.Course of infection - 9 days(average)
- 10.Severity of outbreak - mild
- 11.Economic loss - Rs 7000/-
- 12.Source of infection - Movement of animals from nearby village to farm pasture land
- 13.Vaccination details - FMD vaccination was done
 Batch no- FM 07 TAS 020
 Mfg date- April 2007
 Exp date - Mar 2009
 INTERVET.

14. Virus type Identified – NVD

Epidemic Curve(Frozen semen Bull farm, Bhawanipatna, Kalahandi)



- (3) **District** - **Ganjam**
- 1.Name of the Farm - Private Dairy farm,Kukudakhandi,Ganjam
 - 2.Location - Kukudakhandi,Ganjam
 - 3.Date of first attack – 8.11.2008
 - 4.Date of last attack – 14.11.2008
 - 5.Details about the outbreak

Species	Population at risk	No of animals affected	No of animals died
Cattle	118	20	0

6.Datewise attack of animals

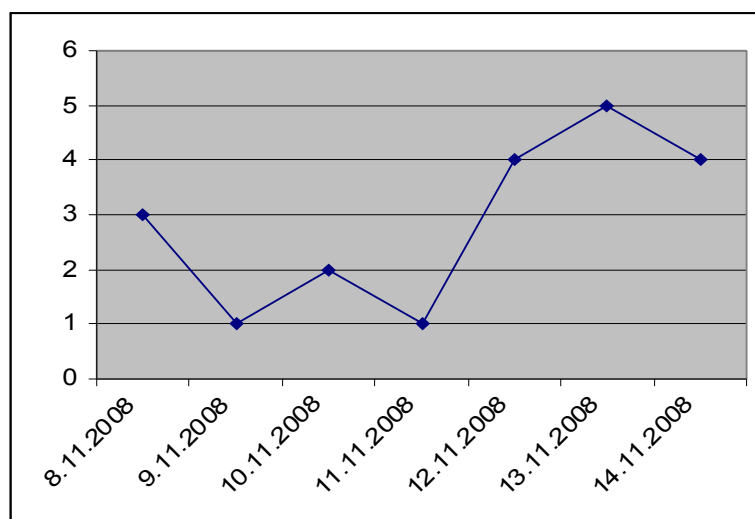
Sl no	Date	No of affected animals	Cumulative total
1	8.11.2008	3	3
2	9.11.2008	1	4
3	10.11.2008	2	6
4	11.11.2008	1	7
5	12.11.2008	4	11
6	13.11.2008	5	16
7	14.11.2008	4	20

- 7.Morbidity % - 16.94 %
- 8.Mortality% - nil
- 9.Course of infection - 11days(average)
- 10.Severity of outbreak - moderate
- 11.Economic loss - 80 lit of milk per day loss observed, Rs 62000/-
- 12.Source of infection –Movement of animals & Milker
- 13.Vaccination details -On 12.10. 2008 FMD vaccination was done
Batch no- FM 07 TAS 020
Mfg date- April 2007
Exp date - Mar 2009

INTERVET.

14. Virus type Identified – ‘O’

Epidemic Curve(Private Dairy farm, Kukudakhandi, Ganjam)



- (4) **District** - **Ganjam**
 1.Name of the Farm - ARC Choudwar(MPCS Dairy farm),Cuttack
 2.Location - Choudwar,Cuttack
 3.Date of first attack – 7.2.2009
 4.Date of last attack – 10.2.2009
 5.Details about the outbreak

Species	Population at risk	No of animals affected	No of animals died
Cattle	131	25	0

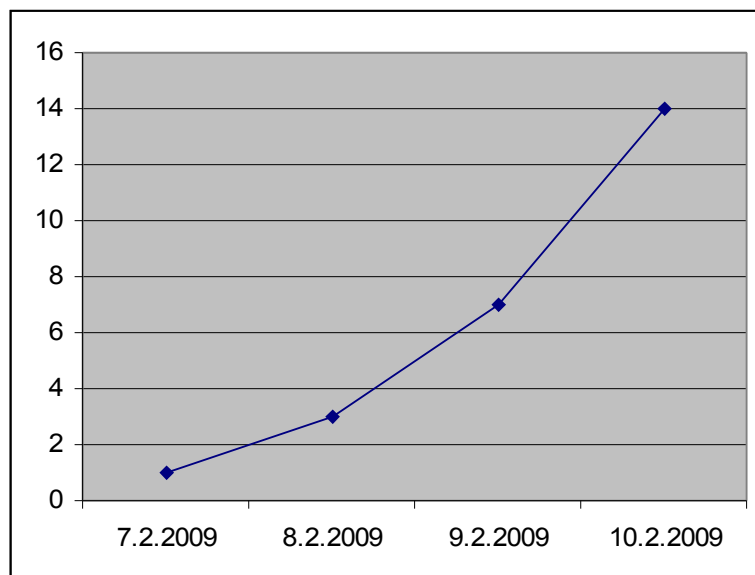
6.Datewise attack of animals

Sl no	Date	No of affected animals	Cumulative total
1	7.2.2009	1	1
2	8.2.2009	3	4
3	9.2.2009	7	11
4	10.2.2009	14	25

- 7.Morbidity % - 11.45 %
 8.Mortality% - nil
 9.Course of infection - 8 days(average)
 10.Severity of outbreak - moderate
 11.Economic loss - 90 lit of milk per day loss observed, Rs 90,000/-
 12.Source of infection –Movement of animals & Bullock cart used for transportation of straw
 13.Vaccination details -On 25.9 2008 FMD vaccination was done
 Batch no-FM 309/08
 Mfg date- Feb-08
 Exp date – Jan-10
 Indian Immunologicals

14. Virus type Identified – “O”

Epidemic Curve (ARC Choudwar(MPCS Dairy farm),Cuttack)



(5) **District** - Puri

- 1.Name of the Farm - Private Dairy farm , Puri
- 2.Location - Municipalty area, Atharanala, Puri
- 3.Date of first attack - 11.3.2009
- 4.Date of last attack - 28.3.2009
- 5.Details about the outbreak

Species	Population at risk	No of animals affected	No of animals died
Cattle	44	20	0

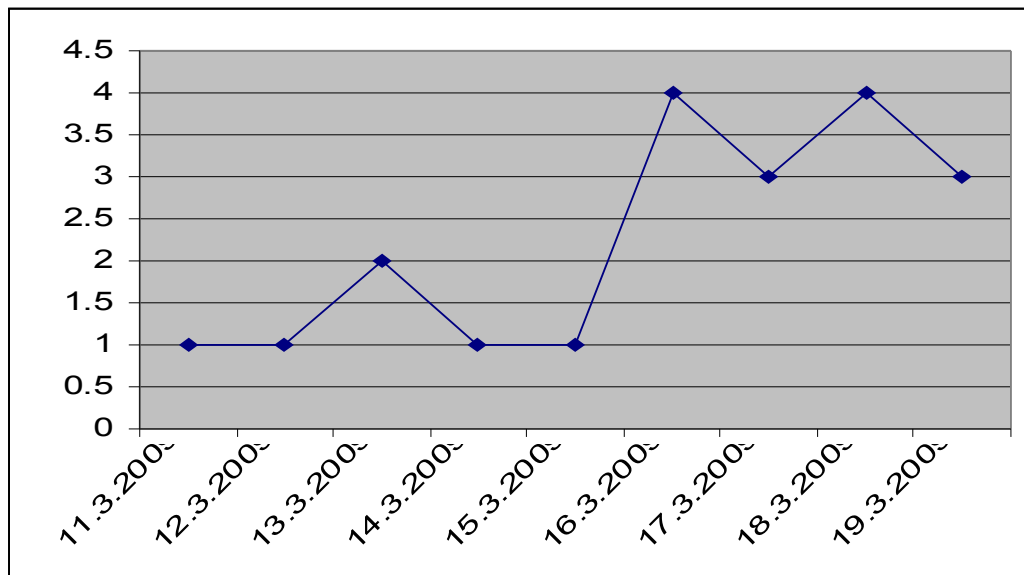
6.Datewise attack of animals

Sl no	Date	No of affected animals	Cumulative total
1	11.3.2009	1	1
2	12.3.2009	1	2
3	13.3.2009	2	4
4	14.3.2009	1	5
5	15.3.2009	1	6
6	16.3.2009	4	10
7	17.3.2009	3	13
8	18.3.2009	4	17
9	19.3.2009	3	20

- 7.Morbidity % - 45.45 %
- 8.Mortality% - nil
- 9.Course of infection - 11 days(average)

10. Severity of outbreak - moderate
11. Economic loss- 40 lit of milk per day loss observed, Rs 62000/-
12. Source of infection – through Milker
13. Vaccination details -On 9.10.2008 last FMD vaccination was done
Batch no-FOT 309/08
Mfg date- Feb-2008
Exp date – Jan - 2010
INTERVET.
14. Virus type Identified – “O”

Epidemic Curve (Private Dairy farm , Puri)



11. Extension Activities

1. Publication and distribution of posters and leaflets on FMD by Veterinary Information officer at the State Directorate level.
2. Film show through distribution of C.D. to field staff for farmers awareness camp.
3. T.V. programme about FMD awareness.
4. Issue of circular regarding collection of samples and epidemiological information to all the concerned authorities.
5. Individual contact with vets/Paravets during ASCAD training at this Institute.

12. Training

1. Dr P.K.Tripathy, Dr A.K.Mishra and Dr H.K. Sahoo of this Institute attended the CVE training programme on Diagnosis & Control of Avian Influenza at Orissa Veterinary College from 14.05.2008 to 17.05.2008.
2. Dr S.N.Behera, Dr L.K.Nayak and Dr B.Dash of this Institute attended the CVE training programme on Diagnosis & Control of Avian Influenza at Orissa Veterinary College from 21.05.2008 to 24.05.2008.
3. Dr B.Dash and Dr S.Samantaray of this Institute attended the training programme on recent trends of poultry disease & its diagnosis at RDDDL (ER),Kolkatta from 10.2.2009 to 12.2.2009.
4. Dr L.K.Nayak,LRVAS,ADRI, attended the training programme on BSE diagnosis in bovine brain samples using Histopathological technics and interpretation at RDDDL,Kolkatta from 3.12.2008 to 5.12.2008.
5. Dr P.K.Tripathy,OIC,FMD,Dr H.K. Sahoo,RA,ADRI,Dr L.K.Nayak,LRVAS,Dr A.K.Mishra,LRVAS and Dr B.Dash,LRVAS attended the District level Avian Influenza training programme as Resource person.
6. Active participation of all Officers of the Institute in training of vets/paravets on disease diagnosis and disease control under ASCAD training programme. Lectures were delivered in training at this Institute.

13. Participation in Workshop/Seminar/Symposia

1. Dr P.K.Tripathy,OIC, FMD, attended the Nodal officers meet on disease diagnosis and disease control at RDDDL(ER),Kolkatta on 5 th August,2008.
2. Dr P.K.Tripathy,OIC, FMD , attended the Workshop on surveillance and Management of Avian Influenza using GIS at NIAS,IISc campus,Bangalore from 2-3 rd July 2008.
3. Dr P.K.Tripathy,OIC, FMD , attended the Technical Workshop with International experts on Avian Influenza at Hotel Hayatt,Kolkatta from 23-27 th February 2009.
4. Dr H.K. Sahoo,RA, ADRI, attended the workshop on “Elucidating International routes of priority water bird species in India and central Asian fly ways to evaluate their potential to transmit highly pathogenic Avian Influenza at CDA,Chandraput,Chilika,Orissa during the month of Jan-2009.

14. Publication

Annual Report on FMD Network unit Orissa 2008-09 published during the year under report.

15. Visiting Dignitaries

The following dignitaries visited the Institute during the year 2008-09

1. Dr Lal Krishna,ADG(Animal health),ICAR
2. Dr B.Pattnaik,Project Director,PD_FMD,Mukteswar,Uttarakhand.
3. Dr Anikhet Sanyal,Senior scientist,PD_FMD,Mukteswar,Uttarakhand.

16. Bottlenecks

☞ Common practice of late reporting and non-reporting of FMD outbreaks by field veterinarians continued to be the major impediment in investigation process.

17. Budget and Expenditure

Financial statement showing the budget provision and expenditure in the year 2008-09 in respect of network unit, AICRP for epidemiological studies on FMD, Orissa.

Head	Previous balance (in Rs)	Funds received (in Rs)	Total fund available (in Rs)	Expenditure incurred (in Rs)	Balance as on 31 st March 2009 (in Rs)
TA	47,407	75,000	1,22,407	400	1,22,007
Contingency	--	3,90,000	3,90,000	1,23,059	2,66,941
Total	47,407	4,65,000	5,12,407	1,23,459	3,88,948

TECHNICAL SUMMARY 2008-09

1. During the year under report 23 outbreaks of FMD were reported with a total of 777 attacks and 12 deaths in bovines.
2. The highest number of outbreaks was recorded in the month of October (7) and solitary outbreaks in the month of December, March and no outbreaks in the month of April, May, June & January.
3. The disease was recorded in 15 out of 30 districts of the state. The highest number of outbreaks were recorded in the district of Cuttack (6).
4. During the year under report, 23 outbreaks were reported, out of which 16 outbreaks were investigated and from 2 outbreaks samples submitted by field staff for typing and retrospective diagnosis. FMD virus type 'O' was isolated from 7 Outbreaks diagnosed by Sero-typing, & 11 Outbreaks were retrospectively diagnosed and 5 OB were only reported on basis of clinical signs.
5. A total of 35 clinical samples were processed for virus typing by sandwich ELISA, FMD virus type 'O' was identified in 13 samples and in 22 samples no virus could be detected. Type 'A', 'Asia-1' & 'C' type were not detected during the year. Percentage of typability of the samples was found to be 37.15 %.
6. Thirty five (35) samples were forwarded to the Central laboratory, PD-FMD, IVRI, Mukteswar for further characterization and for virus repository.

7. A total of 244 sera samples were forwarded to PD-FMD for retrospective diagnosis by LPB ELISA. and it was observed that 173(70.90%) samples showed protective antibodies against 'O' type, 149(61.06%) against 'A' type and 92 (37.70%) against 'Asia-1' type.
8. A total of 279 samples were collected by the unit for the year 2008-09.
9. Economic loss due to milk yield Rs.10,50,000; due to mortality in calves is Rs.40,500 and total cost for treatment is Rs3,88,500.The approximate annual economic loss due to FMD outbreaks were estimated as Rs 14,79,000 in Orissa.
- 10 .Factors responsible for the spread of infection in the state have been studied.
11. Animal population under risk of FMD in Orissa were reported to be Cattle-142.80 lakhs, Buffalo-14.39 lakhs, Sheep- 17.58 lakhs, Goat 59.74 lakhs and Pig- 5.69 lakhs.
- 12 The total vaccination coverage in the whole state is around 27.80 %.
13. The percentage of prevalence of FMD in Orissa found to be 42.84 % by DIVA test.
14. At the very first trial above 70% of herd immunity against 'O'type could be observed in Jharsuguda district (87%) with Ro value of 7.69.The herd immunity against 'A' serotype above 70% could be deduced in Rayagada district (88%) with Ro value of 9.09. The herd immunity against 'Asia-1' serotype showed an average of 68% in Rayagada district with Ro value of 3.12.
15. Out of 3000 random serum samples, 1758 samples from 19 districts were subjected to LPB-ELISA to determine the serum antibody titer (\log_{10}) against FMDV. The results of sero-conversion of the sera samples are expressed in the standard \log_{10} values of ≤ 1.5 , 1.5 – 7.9, 1.8 – 2.09 and ≥ 2.1 .The number of samples having serum antibody titer(\log_{10}) of 1.8 & above against FMDV serotypes found to be 389(22.12%) against "O", 630(35.83%) against "A" and 349 (19.85%) against "Asia-1"

Acknowledgements

We express our deep sense of gratitude to Dr K.M.Bujarbaruha,Deputy Director General, Animal Sciences,ICAR; Dr Lal Krishna,ADG(Animal health),ICAR;Dr B.Pattnaik, Project Director, PD_FMD, Mukteswar, Uttarakhand for providing all the necessary financial and infrastructure facilities and providing guidance. We also wish to express our sincere thanks to the Shri Bishnupada Sethi, IAS, Director, Animal Husbandry and Veterinary Services, Orissa, Cuttack for providing necessary facilities and support. We also express our

appreciation to administrative support from ministerial, administrative, technical and other staff of the Directorate, Cuttack for their cooperation and excellent assistance.

All this work of the project could be possible only through the cooperation of Chief District Vety Officers, Sub-Divisional Vety Officers and all Veterinarians are thankfully acknowledged.

Last but not the least thanks to all the past and present officers, supporting staff and establishment staff of this Institute for their continuous, diligent and dedicated work.

Officer -in-charge
AICRP on F.M.D.

PROJECT COORDINATOR