

**All India Co-ordinated Research Project on
Animal Disease Monitoring & Surveillance
(AICRP on ADMAS)**

ANNUAL REPORT
2010 - 11



**Project Directorate
on
Animal Disease Monitoring and Surveillance**

**Hebbal, Bangalore - 560 024
Karnataka, India**





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Project Director's Remarks



During the period under report 2010-11, with the participation and cooperation of the collaborating units, animal disease monitoring and surveillance work under AICRP on ADMAS was carried out in different parts of India. As there are only 15 collaborating units working at present, it is increasingly difficult to arrive at a national picture so far as prevalence and incidence of important bacterial, viral and parasitic animal diseases are concerned. To address this issue, three important aspects need to be attended: i. There should be atleast one collaborating unit in each state/union territories, ii. PD_ADMAS needs to be made the nodal point for all the projects in the area epidemiology of animal diseases, iii. There is strong need for all the stakeholders atleast in public domain should be networked to have a cohesive animal monitoring and surveillance program so that a clear countrywide picture emerges before appropriate measures towards effective control are initiated.

Apart from the above policy issues, improvements are needed at individual collaborating unit level to achieve visible/ perceivable success in terms of monitoring and surveillance. As example, some of the units have not adhered to the delineated 15 animal diseases for epidemiological analysis even though they were requested to do so. Some of the units have not made a comparative analysis of the current year with atleast previous five years disease data which would have helped in identifying the changing patterns. Some of the units have not complied with the random sero-survey format supplied by PD_ADMAS so that a general national sero-epidemiological picture emerges. Another important area of critical outbreak analysis (atleast two diseases/outbreaks) during the year so as to gain clear understanding of the epidemiology of the disease needs to be carried out. In general, most of the units have reported the summary of the work done in their respective units not only under AICRP-ADMAS but also under AICRP-FMD, FMD-CP, AINBT, and Outreach Program on Zoonotic diseases etc., instead of concentrating of the identified diseases.

I am also aware that the input provided to undertake the work in terms of fund and other support like supporting manpower and conveyance are very limited and does not meet the requirement of the units. This needs to be addressed in consultation with the Council in the coming five year plan period.



(H. Rahman)
Project Director





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Executive Summary

Ahmedabad

- The unit has reported outbreaks of HS, PPR, CCPP, BQ and cowpox/buffalopox during 2010-11 in Gujarat.
- Haemorrhagic Septicaemia outbreaks were reported from Junagarh, Kutch-Bhuj, Rajkot, Mehsana, Banaskantha, Panchmahals, Ahmedabad in that order.
- Three outbreaks of PPR in Bhavangar, Junagarh and Valsad were recorded.
- Of the five outbreaks of CCPP, four were reported from Bhavanagar and 1 from Porbander.
- Four outbreaks of BQ, in one each in Tapi, Valsad and two in Rajkot were recorded.
- One outbreak of cowpox/buffalo pox has also been reported.
- The coordinating unit also screened serum samples of sheep and goat for PPR and of breeding bulls and humans for brucellosis using various ELISA formats. Two of the 240 breeding bulls and 23 of the 30 humans samples were positive for brucellosis. About 23% serum samples were positive for PPR infection.
- Besides the above, other lab investigations done at the unit are also reported.

Bangalore

- District-wise meteorological data for the state was collected and the incidence of diseases in the state were correlated.
- District wise data of economically important diseases of livestock and poultry in the state has been collected from the state Dept. of Animal Husbandry and State Animal Disease Diagnostic Laboratory & Information centres. The data have been collated and analysed in relations to Agro-climatic zones of the state, seasons of the year, different physiographic zones and in relation to different meteorological data, using appropriate statistical methods.
- State level and District-wise priorities of diseases were identified based on the number of attacks and mortality rates for different diseases. Based on the disease incidence data, 215 outbreaks of Black Quarter were reported in the state and is an important bacterial disease among bovines. The disease was reported in 18 out of 30 districts, While Hassan district topped the list with highest number of 135 outbreaks during the year, Chikkaballapur, Dharwad, Gulbarga and Uttara Kannada districts were at the bottom, with one outbreak each district. Tumkur (27) Shivamogga (10), Chitradurga (7) Haveri (6), were the other districts, which have reported significant numbers of outbreaks. The crude incidence rate of the disease during the period under report is 7.34 per 10⁵ susceptible population, and crude mortality rate is 3.86 per 10⁵ susceptible population. The case fatality rate observed during the year is 50.17%.
- One Hundred and Sixty outbreaks of Hemorrhagic Septicemia were reported in the state. The disease was reported in 15 out of 30 districts, While Chitradurga district topped the list with highest number of 56 outbreaks during the year, Bangalore (U) district was at the bottom, with one outbreak. Hassan (42) Gulbarga (9), Bagalkot, Dharwad (8) Shimoga (7) were the other districts, which have reported significant numbers of outbreaks. The crude incidence rate of the disease during the period under report is 9.89 per 10⁵ susceptible population, and crude mortality rate is 3.78 per 10⁵ susceptible population. The case fatality rate observed during the year is 36.77%.
- Sixty two outbreaks of Enterotoxaemia were reported in the state during the year. The disease is commonly reported from the sheep rearing districts in the state. Tumkur (27), Chitradurga (19), Gulbarga (5) have reported the disease outbreaks in the decreasing order. The crude incidence rate of the disease during the period under report is 9.32 per 10⁵ susceptible population, and crude mortality rate is 5.13 per 10⁵ susceptible population. The case fatality rate observed during the year is 48.96%.
- Fifteen outbreaks of Anthrax were reported in the state during the year. The number of outbreaks reported per month is within 5, the severity of the disease was greater during the month of December 2010. The crude

incidence rate of the disease during the period under report is 1.37 per 10⁵ susceptible population, and crude mortality rate is 1.24 per 10⁵ susceptible population. The case fatality rate observed during the year is 90.90%. The disease is highly endemic in Bangalore (R), Chamarajanagar, Chikkaballapur, Davanagere, Kolar and Tumkur districts.

- Seventy two outbreaks of Sheeppox and Goatpox were reported in the state during the year. The disease was reported from 13 out of 30 districts in the state. The most affected districts were Gulbarga (12), Bagalkot (11) Chitradurga (10) and Tumkur (8). The crude incidence rate of the disease during the period under report is 13.71 per 10⁵ susceptible population, and crude mortality rate was 3.38 per 10⁵ susceptible population. The case fatality rate observed during the year is 24.67%.
- PPR disease was reported from 9 out of 30 districts in the state. During the year under report 37 outbreaks were reported. The crude incidence rate of the disease was 8.54 per 10⁵ susceptible population, and crude mortality rate was 1.38 per 10⁵ susceptible population. The case fatality rate observed during the year was 11.45%.
- The Economic losses (Rs. in Lakhs) in the state due to HS, BQ, Anthrax, ET during 2010-11 is as follows:

a. HS:	184.96
b. BQ:	89.74
c. Anthrax:	11.19
d. ET:	147.48
Grand Total:	433.38

And the total loss due to these diseases is **Rs. 433.38 Lakhs** approximately.

Barapani

- CSF and two major bacterial diseases (HS & BQ) were recorded in Meghalaya. Maximum number of outbreaks were reported during February (28), and March (40).
- Eighteen outbreaks of CSF affecting 223 pigs and 119 death was reported. Maximum outbreaks of classical swine fever in swine of Meghalaya was reported during December (11), January (12), February (12) and March (18)
- Twenty four outbreaks each of HS and BQ affecting 240 animals and 351 animals were reported. Outbreaks of BQ and HS were higher during the months of December, January and March.
- A total of 35 samples were collected from Yak from west Kameng district of Arunachal Pradesh for screening brucellosis and IBR. None of the samples was found positive for brucellosis by RBPT while 18 samples were positive for IBR by indirect ELISA kit (IBR).

Bhopal

- The unit has reported outbreaks/incidences of HS, PPR, BQ, rabies and classical swine fever during 2010-11 in Madhya Pradesh.
- Seventeen PPR outbreaks were reported from 9 districts of the State with maximum no. of outbreaks in Shivpuri district. Most of the outbreaks occurred in March and February months.
- Eight outbreaks CSF were reported from 06 districts in the State with most outbreaks reported from Chhindwara District. The outbreaks occurred in August, June and July.
- Incidences of Rabies were reported in Betul, Bhopal, Ashoknagar and Sagar districts. Betul district had a maximum no of incidences and the areas where the incidences were reported were located mostly in forest.
- A total 25 outbreaks of HS were reported from 13 districts of the State. Jabalpur district had maximum no of outbreaks followed by Balaghat and Betul, Indore, Dhar, Katni districts. The maximum no of outbreaks were reported in August month followed by April, May, June & July months.
- Five outbreaks of Black Quarter were reported from Chhindwara and Balaghat districts and one outbreak of Anthrax was reported from Sidhi district.
- Besides the disease reporting and investigation, the unit also carried out sero-surveillance for brucellosis, double

intra dermal test (DID) for TB in Govt. Breeding farms, private farms and villages and found most animals negative for tuberculosis. The unit also screened large number of samples for protozoan diseases and per cent positivity varied from 2.13 to 3.53.

Cuttack

- The important diseases of small ruminants in the state are PPR and CCPP with very high reported outbreaks and mortality every year. The other diseases of importance include goat pox, HS and enterotoxaemia. In bovines the outbreaks of BQ tops the list followed by HS and Anthrax.
- 37 Black Quarter outbreaks have occurred in bovines in which 286 animals were affected and 206 have died. Highest number of outbreaks was reported in East and South Eastern coastal plain (23).
- Haemorrhagic Septicaemia was recorded in Cattle, Buffalo, Sheep, Goat. A total of 14 outbreaks have occurred in bovines in which 136 animals were affected and 64 animals died. Maximum level of outbreak was observed in the month of July 2010 and January 2011. Two H.S. outbreaks occurred in Buffaloes in Deogarh and Gajapati districts in the month of October and February. Of the 27 affected animals 18 died. Two outbreaks of HS occurred in goats of Jajpur and Ganjam districts in the month of April, killing 21 of the 37 affected. H.S. outbreaks (2 OBS) was also observed in sheep in Jajpur and Khurda district in the month of April and August affecting 30 animals out of which 28 animals died. No outbreaks were recorded in the month of April, May, August, November, December and February probably due to less stress as well as due to regular vaccination. The outbreaks were recorded in the month of June, July, September, January and March.
- The prevalence of blood Protista and Rickettsia like Theileriosis, Babesiosis, Trypanosomiasis and Anaplasma were studied and identified.
- The occurrence of different gastro-intestinal parasites like nematodes, trematodes and cestodes were identified.
- The prevalence of bovine tuberculosis, John's disease and brucellosis were studied confining to Government Livestock Breeding Farms as well as private farms.

Guwahati

- The unit collected sample based state level population survey of important diseases of livestock and poultry. Main livestock migratory Routes were identified.
- Meteorological data from 7 regional meteorological centres located in different districts of Assam were collected and the incidence of disease in the state was correlated.
- Out of five major bacteriological diseases of animals, outbreaks of haemorrhagic septicaemia occurred in highest numbers (166 outbreaks) and affected 22 districts. Maximum no of outbreaks were recorded from Barpeta, Dhemaji districts (12 each) followed by Goal Para and Golaghat district (11 each).
- Anthrax continues to be major disease of public health importance in four different districts of Assam.
- A total of 129 outbreaks of black quarter were recorded from 19 districts of Assam.
- Out of 743 serum samples tested for brucellosis, 74 were found to be positive. None was found positive for tuberculosis out of 231 animals tested by single intradermal tuberculin test.
- Among the viral diseases of pigs, 159 outbreaks of classical swine fever were recorded in 21 districts of Assam causing heavy morbidity and mortality.
- *Peste des petits ruminants* continues to be the emerging disease of goats in Assam and one outbreak was recorded in a government goat breeding farm in district of Assam after introduction of goats from other states of North India.
- Orf or contagious ecthyma is another emerging disease of goats in Assam and occurred in epidemic form in Golaghat and Kamrup districts. Out of 258 serum samples tested for orf, 208 samples were found to be positive.
- Besides the livestock diseases the state unit has also recorded many poultry diseases.
- Fascioliasis, amphistomiasis and babesiosis are other parasitic diseases recorded in the state.



Hyderabad

- PPR, sheep and goat pox, rabies were the main viral diseases, while HS, BQ, ET, Anthrax were the main bacterial diseases recorded in Andhra Pradesh.
- Highest number of Hemorrhagic Septicemia outbreaks were recorded in Guntur district (28 outbreaks, 123 attacks, 40 deaths) followed by East Godavari district (20 outbreaks, 81 attacks, 19 deaths). Total Outbreaks were 78, with 369 attacks and 137 deaths. More number outbreaks (64) recorded in coastal Andhra region followed by Telangana (8) and Rayalaseema (6) regions. The disease is in decreasing trend when compared to previous years because of mass vaccinations conducted in all the endemic areas.
- Highest outbreak of BQ was reported in Visakhapatnam (8) followed by Adilabad (4). Region wise it is Coastal Andhra (9) with most outbreaks followed by Telangana (8) and Rayalaseem (1) regions.
- The incidence of Anthrax (Bovines) is in decreasing trend when compared to previous years due to wide spread vaccination program.
- Highest outbreaks of ET were reported from Anantapur, followed by Medak and Prakasam districts. The disease showed a reducing trend due to mass vaccinations in all endemic areas by campaign mode.
- PPR was reported in 11 districts of AP. Highest outbreaks were reported in Prakasam and Visakhapatnam districts.
- The incidence of Sheep pox disease was showing a decreasing trend and only 35 outbreaks were reported during the year, when compared to previous years. This may be due to protection of all susceptible sheep against Sheep pox in all the endemic areas of the districts every year by campaign mode.
- A total of 4796 serum samples were examined for brucellosis out of which 536 samples were found positive (11.17%). During the year 2010-11, 1276 cattle and 2628 buffaloes have been screened against brucellosis. Out of which 74 cattle and 381 buffaloes have been found positive for brucellosis i.e. 4.88% in cattle and 9.75% in buffaloes. Brucellosis in human was also monitored by sero-prevalence studies. Around 180 human sera samples have been tested. Of which 30 samples were found to be positive for brucellosis i.e. 16.6%. This high percentage of incidence in humans might be due to retesting of positive samples repeatedly after each course of treatment.

Imphal

- Fourteen outbreaks of Black Quarter occurred during the year; Imphal-East (7) and Imphal-West (4), Senapati (2) and Bishnupur (1) had outbreaks with a total of 207 attacks and 100 deaths. Maximum number of BQ outbreaks occurred during the month of September, 2010 and followed by February, 2011.
- There were 17 outbreaks of Classical Swine Fever with 245 attacks and 120 deaths
- Two Hemorrhagic Septicemia outbreaks were reported at Imphal-West and Thoubal district of the state with 9 attack and 3 deaths.
- 980 cattle sera samples were screened by brucellosis AB-ELISA test during the year under Report of which 780 sera samples were tested at the ELISA Laboratory of the Unit and another lot of 200 sera samples were tested at the Project Directorate on ADMAS, Hebbal, Bangalore. The results revealed the maximum prevalence of 98% in Imphal-East and minimum of 22% in Tamenglong district. All districts of the state had brucellosis sero-positive cattle population.
- Of the 190 Goat and sheep sera samples screened by PD-ADMAS, Hebbal, Bangalore, only 3 goats in Senapati District and 1 in Thoubal District were seropositive for Brucella antibodies.
- Similarly, the above sera samples were also tested for Infectious Bovine Rhinotracheitis (IBR) by employing AB-ELISA Technique. Imphal-East had highest seropositive cases of 52% followed by 38% in Imphal-West and Thoubal district and a minimum of 8% seropositive in Ukhrul district.
- Surveillance of Bovine Tuberculin-PPD sensitive cattle of 6 districts (four valley and two hilly district) could not find out any sensitive reactors after 72 hours of observation.
- Likewise, intra-dermal sensitivity test of Jhonin-PPD in these animals could not find any positive reactor.



- Leptospire staining examination of 49 blood samples and 28 urine samples from febrile dogs, cats and goats by using PD_ADMAS Leptospira Staining kit did not show any positives.
- Altogether, 1895 livestock faecal samples were examined as routine examination to detect parasitic load in livestock and pets.
- Eight canine cases were positive for rabies in Imphal-East, Imphal-West and Ukhrul district of the state.

Jaipur

- In the year 2010-2011, Foot & Mouth Disease was the major disease that affected livestock in Rajasthan. The other disease outbreaks are as follows.
- In total nine outbreaks of HS were reported affecting 114 and killing 68 animals. Jaipur district was most affected with 4 outbreaks (21 of 38 affected animals died). In Dholpur case fatality rate in the HS outbreaks was 100%. Other districts affected were Alwar, Baran and Dausa.
- Three outbreaks of BQ were reported in Rajasthan. In the two consecutive previous years i.e. 2007-08 & 2008-09 2009-10 one outbreak was reported, However in the year 2006-07 there were two outbreaks of BQ one each at Ganganagar & Hanumangarh district.
- 223 samples (cow-178, buffalo-31, dog-1, camel-13) were screened for brucellosis using Rose Bengal Plate Test (RBPT), of which 53 (cow-31, buffalo-22) were positive.
- Two outbreaks of PPR were reported from Kota & Baran districts in April 2010 & March 2011 respectively. In Kota district in one outbreak 60 goats were affected out of which 20 died.
- There were 3 outbreaks of classical swine fever affecting 202 animals of which 110 died due to disease showing about 55% mortality. Control of disease was achieved through effective immunization of animals.
- Out of 1672 samples screened, 25, 66,125 and 12 samples were found positive for theileriosis, babesiosis, trypanosomiasis and anaplasmosis respectively.

Kolkata

- Anthrax outbreaks reported (23) in this year are same as previous year. The morbidity rate (0.85%) and mortality rate (0.85%) has increased in comparison to previous year. Incidence reported was only from five districts.
- Eleven outbreaks of HS have been reported in the West Bengal. The outbreaks show decreasing trend as compared to previous year. The case fatality rate (50%), morbidity rate (1.18%) and mortality rate (0.54%) were also decreased in comparison to previous years.
- The outbreaks of Black Quarter (100) increased remarkably in comparison to previous years. Morbidity (1.19%) and case fatality rate (42.54%) increased but mortality rate (0.50%) decreased.
- The number of PPR outbreaks (194) increased in comparison with last year. Case fatality rate (14.31%), morbidity rate (11.63 %) and mortality rate (1.66%) decreased. The highest number of PPR outbreaks reported from Malda district (59), followed by Burdwan (18), Dakshin Dinajpur (12) and Birbhum (11) district.
- Considerable increase in the number of sheep and goat pox outbreaks (127) with about same case fatality rate (9.56%). In this year, incidence reported only from 9 districts. Highest incidence (35) reported from Hooghly, followed by fourteen (33) from Howrah, North 24 Paragana (23) and Burdwan (16) district.
- The outbreak of swine fever during last five years show decreasing trend.

Ludhiana

- Two BQ outbreaks in a single farm in Patiala in October and December
- Two HS outbreaks in Ludhiana in May
- One outbreak of Sheep pox in migratory flock from Patiala
- Two outbreaks of Gastroenteritis in Pigs in Ropar and Ludhiana



- A total of 347 cattles were tested for Tuberculosis by SID (Single intradermal testing) and 30 animals (approx. 8.6%) were found positive. Out of total 72 goats tested for T.B (SID), 3 were found positive.
- A total of 347 animals were tested for John's disease and 4 animals were found to be positive.
- 2689 animals were screened for brucellosis (on the request of the farmers) and 775 animals were found positive on the basis of RBPT and STAT test. Large number of samples (244/367) from Patiala were positive for brucellosis. An overall increasing trend of brucellosis over past five years was observed.
- Ten tetanus incidences in Patiala were noticed.
- Three cases of babesia in Kapurthala, Ludhiana and Moga, anaplasmosis in Kapurthala and Amritsar, theileriosis in Ludhiana were recorded.

Palode

- Kerala has reported five outbreaks of anthrax, three outbreaks of HS, one outbreak of PPR and 26 incidences of rabies, besides some parasitic diseases in the year 2010-11. No outbreak of classical swine fever was reported.
- Five outbreaks were reported in four districts, viz., Kollam, Pathanamthitta, Kannur and Thrissur during December 2010, February 2011 and March 2011. Six cattle were affected and the mortality was 100 %.
- Three outbreaks of HS with 6 attacks in cattle and 5 attacks in buffaloes were reported. Out of the 11 affected animals, 6 cattle died. Ernakulam and Kollam were the affected districts. A combined infection of Anthrax and HS was reported in two cattle and one goat at Edamullakkal Panchayath of Kollam District. Vaccination programme was undertaken and the disease could be contained without further incidence.
- A single outbreak/incidence of PPR was reported in Kerala in Akathethara panchayat of Palakkad district. A single goat was affected and the incidence was effectively controlled by timely vaccination. In the previous year also the outbreak of PPR in Kerala was from Palakkad district.
- Twenty six cattle and eleven goats were affected with rabies and all the animals succumbed to death. These are the laboratory confirmed cases only.
- Eight crossbred Holstein Friesian cows were diagnosed of having anaplasmosis during the month of December 2010 in Idukki district which was confirmed by blood smear examination and also by PCR, out of which six animals died.

Pune

- A total of 63 outbreaks of different diseases have occurred in large, small ruminants, pigs & poultry. In large ruminants, Black Quarter and Hemorrhagic Septicemia accounts for major losses whereas in small ruminants Hemorrhagic Septicemia and PPR predominates in disease outbreaks and causes major losses.
- The 13 outbreaks of Hemorrhagic Septicemia have occurred in bovines killing 59 of the 124 affected animals. Incidence risk rate this year was higher compared to average of last five years (0.78%) and case fatality rate is same to that of average of last five years.
- There were 22 outbreaks of BQ in which 108 animals were affected and 81 have died. Incidence risk rate is higher as compared to average of last five year (0.27%) and case fatality is higher as compared to average of last five year (66.7 %).
- Incidence risk observed for anthrax during the year under report is 0.67% which is lower as compared to average of last five year (1.18 %). Case fatality rate is more as compared to average of last five year (23.87%).
- A total of nine PPR outbreaks have occurred in which 335 animals were affected and 100 animals died. Incidence risk rate is lower as compared to average of last five year (3.98 %) and case fatality rate is higher (30%) as compared to average of last five years (23.47 %).
- Three outbreaks of sheep & goat pox have occurred in Kolhapur district in which 182 animals were affected and 93 animals died. Incidence risk rate is overall same as compared to average of last five year (3.14 %) and case fatality rate is higher as compared to average of last five years (28 %).

- A total of 74 Pigs were affected and 65 have died in two CSF outbreaks. The incidence risk rate is low as compared to average of last five years (21.1%) and case fatality rate is higher as compared to average of last five years (66.08%).

Ranchi

- PPR was identified as major disease threatening Ranchi during the year 2010-11 with 374 deaths from 21 outbreaks.
- During the three preceding years however, the PPR problem was not there. But, during 2006-07 it was identified as major threat.

Srinagar

- Animal population survey in two villages each in Samba, Kathua, Reasi, Doda, Jammu and one village each in Pulwama, Udhampur, Kupwara completed.
- Animal diseases (Viral: Rabies, Sheep pox, PPR, Equine Influenza; Bacterial: HS, BQ, Foot Rot and Anthrax) and four avian viral disease are regularly monitored by the Institute.
- Four HS outbreaks at Rajouri and Kathua affecting 31 cattle caused death of 3 cattle in the months of September, November and December.
- No anthrax, No TB by SID
- 11 incidences of the Rabies disease were recorded in Kupwara and Kulgam districts of the state affecting (97) cattle with (05) deaths.
- 486 nos. of sera samples have been collected randomly from identified villages and were sent to PD-ADMAS Bangalore.
- 20 outbreaks of sheeppox were observed, maximum outbreaks were mostly recorded in high snowfall areas, occurring in all seasons.
- 10 outbreaks of footrot in early monsoon followed by late monsoon, mostly in hilly and high rainfall areas of Kashmir Division



1. AICRP-ADMAS Collaborating Unit-Ahmedabad, Gujarat

Table 1.1. Major disease out-breaks reported in Gujarat State during the last seven years

No.	Name of Disease	No.of outbreaks 2004-2005	No.of outbreaks 2005-2006	No.of outbreaks 2006-2007	No.of outbreaks 2007-2008	No.of outbreaks 2008-2009	No.of outbreaks 2009-2010	No.of outbreaks 2010-2011
1	FMD	35	25	15	13	8	19	8
2	HS	38	27	18	13	24	12	15
3	BQ	1	8	0	0	2	0	3
4	CCPP	3	11	3	6	2	0	5
5	PPR	6	0	0	3	5	5	3
6	Anthrax	2	5	4	1	1	1	0
7	Sheep Pox	1	4	1	10	7	1	0
8	IBD	5	2	2	1	0	0	0
9	RD	4	1	1	0	0	1	0
10	Coccidiosis	3	3	0	2	1	0	0
11	Bird Flue	-	1	0	0	0	0	0
12	Facioliasis	-	1	0	0	0	1	0
13	Rabies	0	0	0	0	0	4	0
14	Cow pox/Buffalo Pox	0	0	0	0	0	2	1
15	Eq. Influenz	0	0	0	0	0	4	0
16	Trypanosomiasis	0	0	0	0	0	0	3
17	Foot Rot	0	0	0	0	0	0	2
18	Fowl Typhoid	0	0	0	0	0	0	3

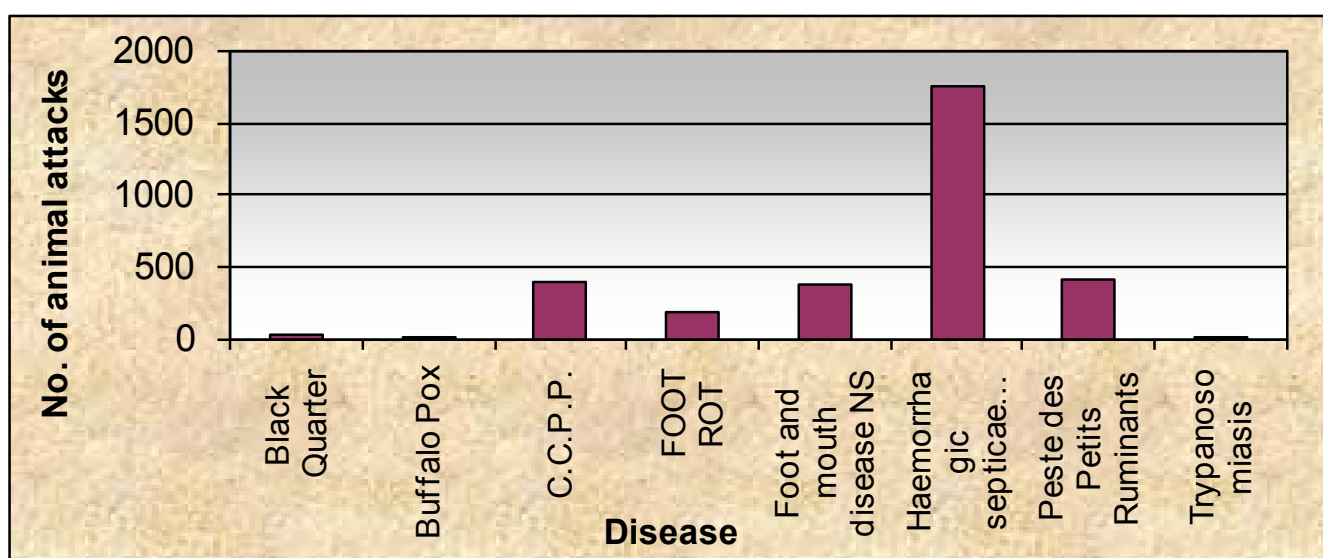


Fig. 1.1. Cumulative Disease Attacks (2010-11)

Haemorrhagic Septicaemia

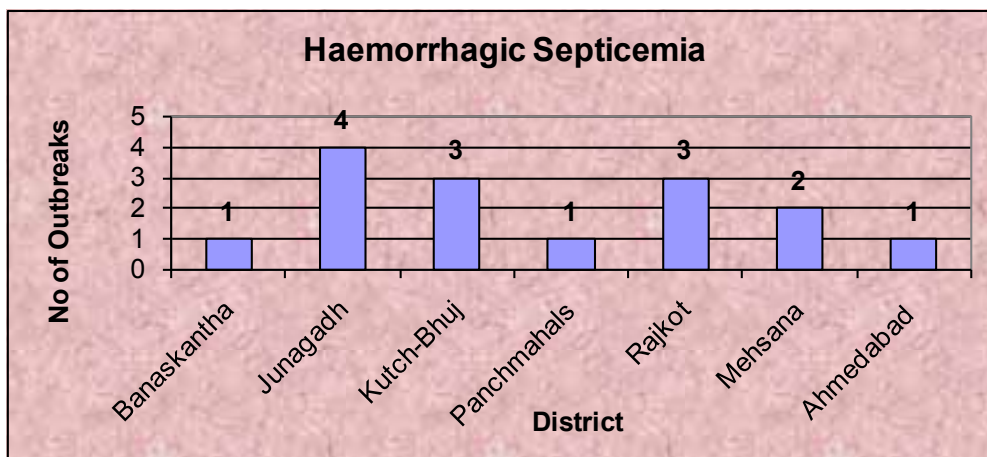


Fig. 1.2. Year 2010-11 Out Breaks District wise

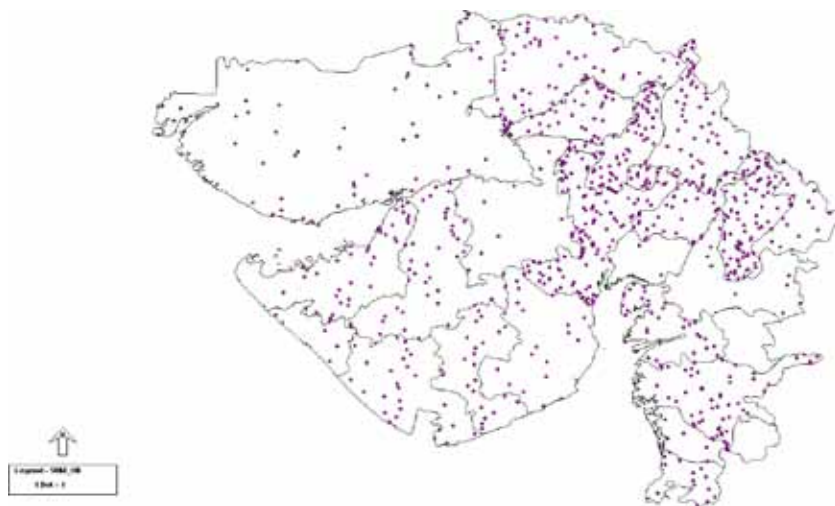


Fig. 1.3. Occurrence of HS during 1995-2009

PPR

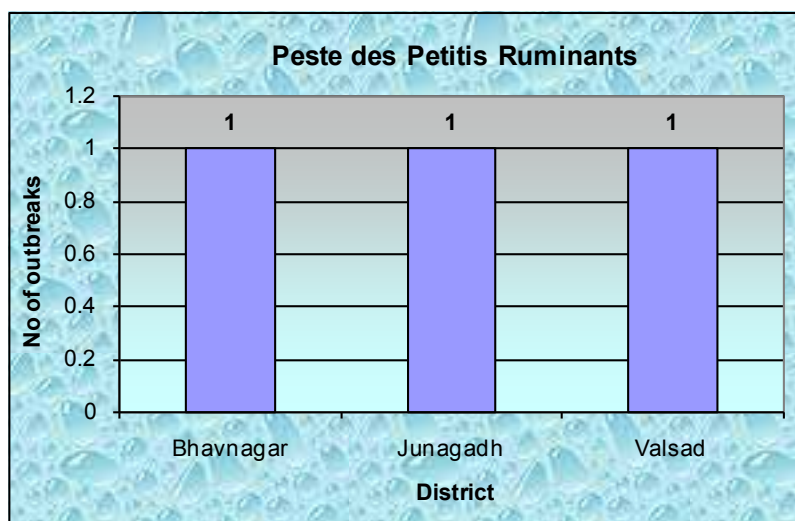


Fig. 1.4. Outbreaks of PPR District wise during 2010-11



Fig. 1.5. Occurrence of PPR during 1995-2009

CCPP

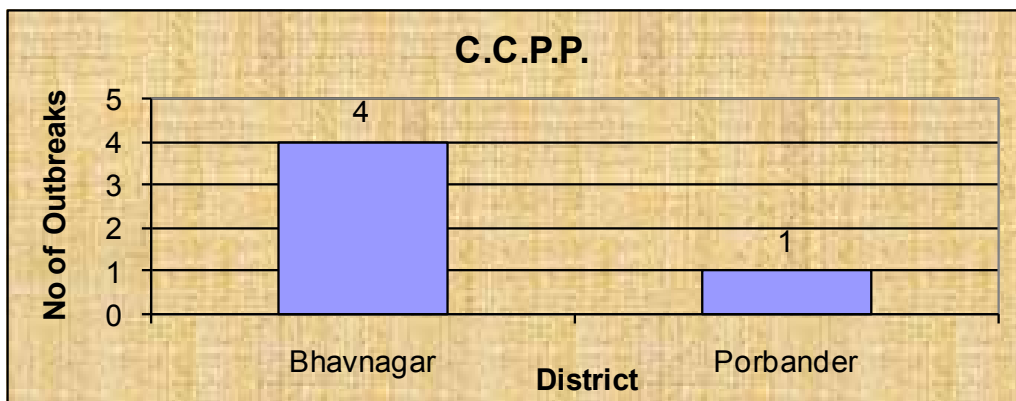


Fig. 1.6. Outbreaks of CCPP District wise during 2010-11

BQ

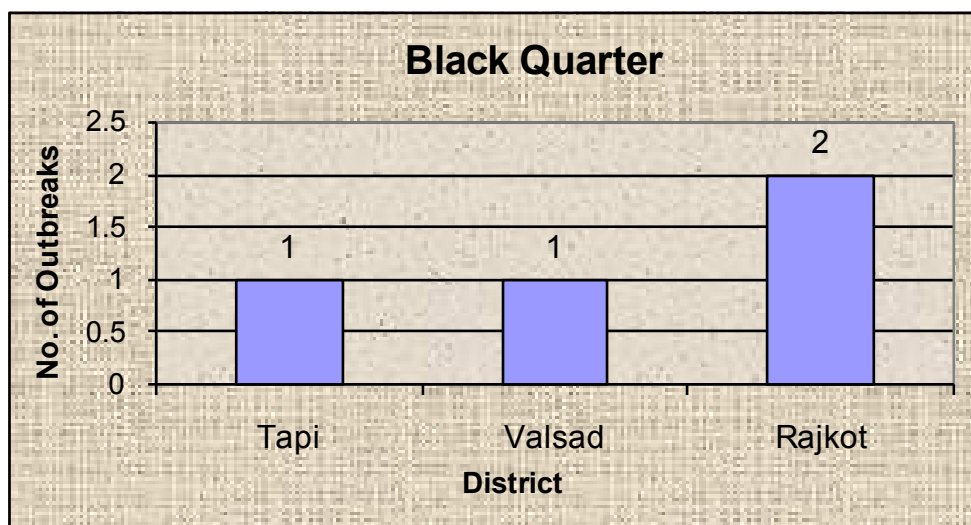


Fig. 1.7. Outbreaks of BQ District wise during 2010-11



Fig. 1.8. Occurrence of BQ during 1995-2009

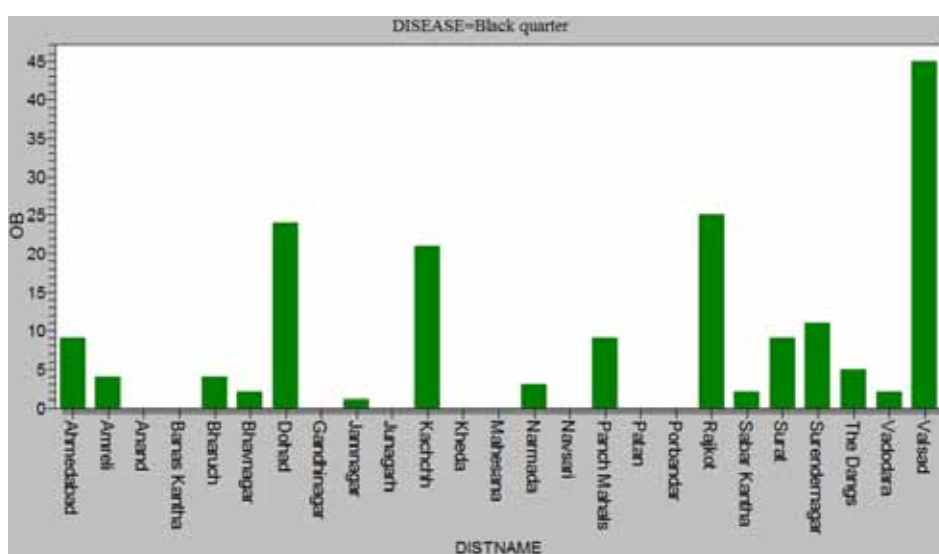


Fig. 1.9. District wise distribution of BQ outbreaks during 1995-2009

Sheep and Goat Pox



Fig.1.10. Occurrence of Sheep and Goat Pox during 1995-2009

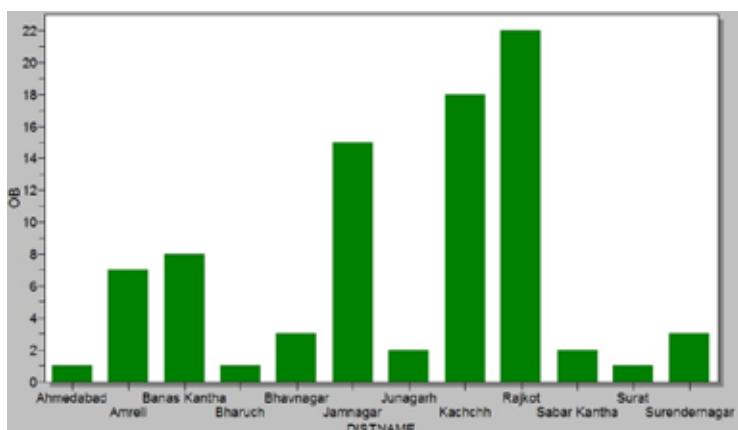


Fig. 1.11. District wise distribution of Sheep and Goat Pox outbreaks during 1995-2009

Disease Control Strategies During year 2010-11

HS

Vaccination before the monsoon period is carried out in the state for the prevention of the HS. Ring vaccination, isolation and movement restriction in affected area. Campaign for the clean vaccination during the Krishi-Mahotsav in the state organized during May-June.

Sheep Pox

Ring vaccination, isolation and movement restriction in affected area.

PPR

Ring vaccination, isolation and movement restriction in affected area.

BQ

Vaccination before the monsoon period is carried out in the state for the prevention of the BQ in hilly areas and border areas of the state.

Brucellosis

Calf-hood vaccination is implemented.

Equine Influenza

Isolation and movement restriction in affected area.

Parasitic Infestation:

Mass anthelmintic drenching camp were organized by the department. Concentrates containing anthelmintic were supplied by milk co-operative unions. During Krishi-Mahotsav by state Government and Pashu Arogya Mela mass anthelmintic drenching camp organized for Sheep and Goat.

Table 1.2. Vaccination in the Gujarat State during 2010-2011

Sr. No.	Name of Disease	Vaccination
1.	HS	8200401
2.	BQ	660061
3.	Anthrax	14715

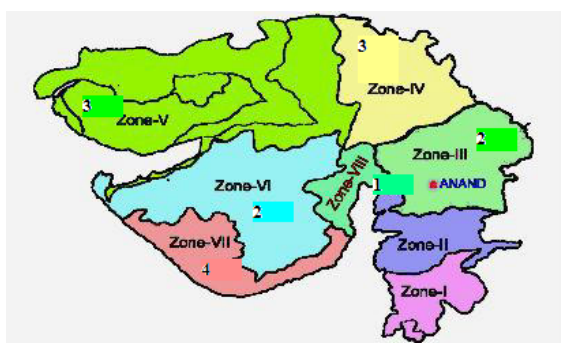
Sr. No.	Name of Disease	Vaccination
	Brucellosis	2212
	Enterotoxaemia	1441506
	Sheep Pox	46535
	PPR	215800
	Rabies (Anti Rabies Vaccine)	19421
	Ranikhet Disease (F1)	2297345
	Fowl pox	627861
	Marek's Disease	428112
	Infectious Bronchitis (IB)	30020
	Infectious Bursal Disease (Gumboro)	2026137
	Ranikhet (Iasota)	1119145
	Ranikhet (R2B)	100512
	Duck Plague	50740

Table 1.3. Zone Wise Disease Outbreaks during the year 2010-11

Sr. No.	Agro-Climatic Zone	Disease								Total
		H.S.	B.Q.	C.C. P.P.	P.P.R.	Fowl Typhoid	Trypanosomiasis	Buffalo Pox	Foot Rot	
1	South Gujarat (Heavy Rain Area)	-	2	-	1	1	-	-	-	4
2	South Gujarat - Area (Districts & Talukas)	-	-	-	-	-	-	-	-	-
3	Middle Gujarat - Area (Districts & Talukas)	2	-	-	-	1	2	-	-	5
4	North Gujarat - Area (Districts & Talukas)	3	-	-	-	1	-	-	-	4
5	Bhal & Coastal Area (Districts & Talukas)	1	-	-	-	-	-	-	-	1
6	South Saurashtra Area (Districts & Talukas)	4	-	5	2	-	1	1	2	15
7	North Saurashtra Area (Districts & Talukas)	2	1	-	-	-	-	-	-	3
8	North West Zone Area (Districts & Talukas)	3	-	-	-	-	-	-	-	3
	Total	15	03	05	03	03	03	01	02	35



PPR



HS



CCPP

Fig. 1.12. Agroclimatic zone wise distribution of outbreaks

Haemorrhagic Septicaemia

Ahmedabad Region

Used Weather data of Ahmedabad are available from Indian Meteorology Department website (Mean of 100 years: 1901-2000). Disease data of Ahmedabad region of year 1995 to 2011.

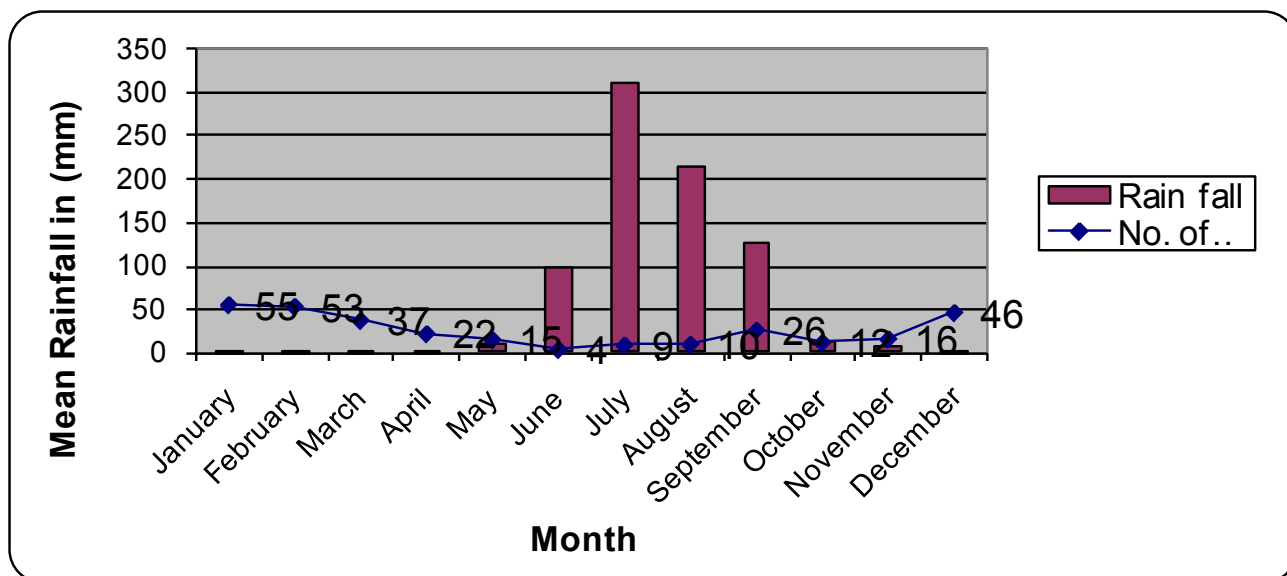


Fig. 1.13. Distribution of HS outbreaks as per month wise rainfall

Baroda Region

Used Weather data of Baroda are available from Indian Meteorology Department website (Mean of 48 years :1952-2000). Disease data of Baroda region of year 1995 to 2011

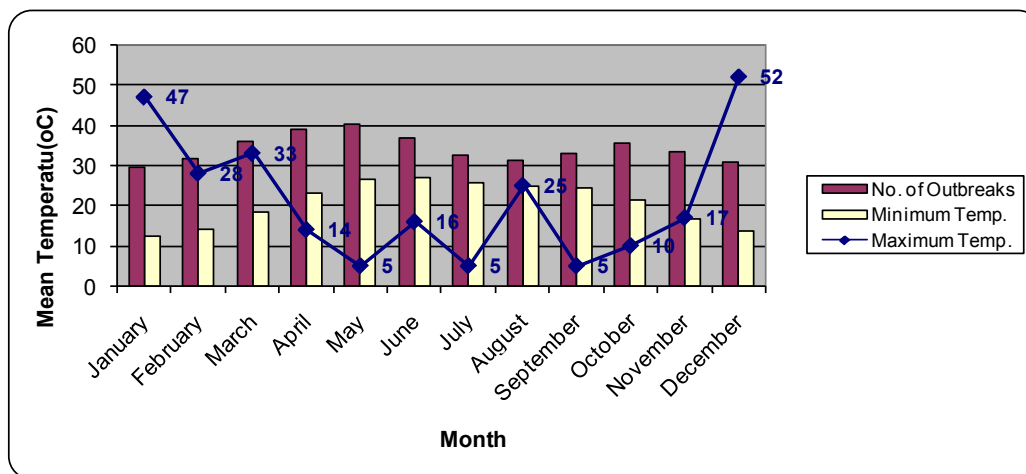


Fig. 1.14. No. of outbreaks in relation to Maximum and Minimum Temperature

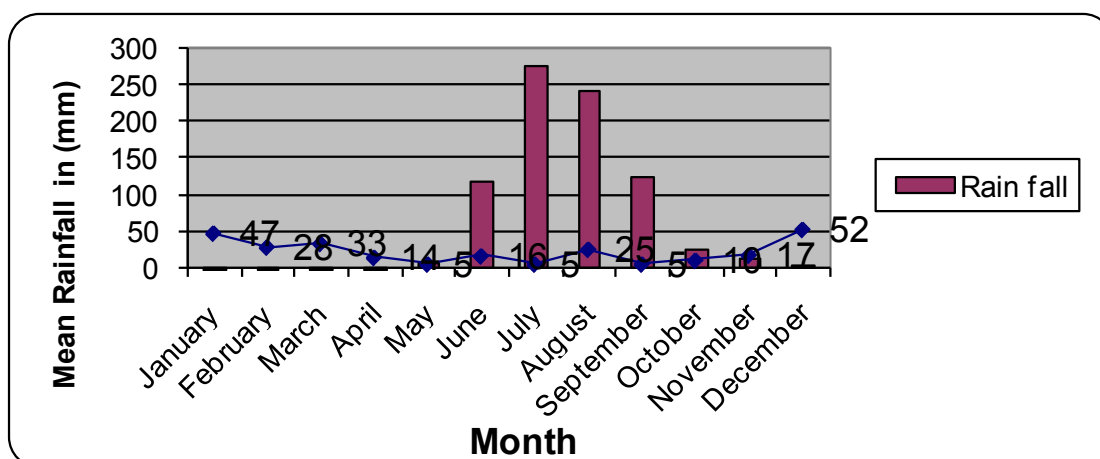


Fig. 1.15. Distribution of HS outbreaks as per month wise rainfall

Rajkot Region

Used Weather data of Rajkot are available from Indian Meteorology Department website (Mean of 49 years: 1905-2000). Disease data of Rajkot region of year 1995 to 2011

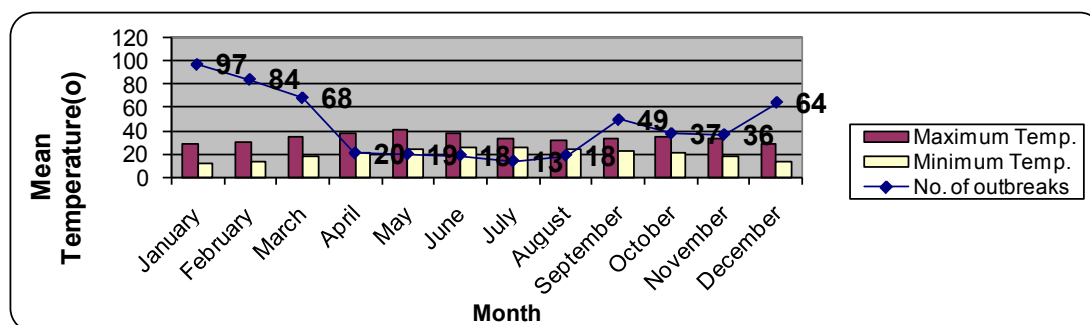


Fig. 1.16. No. of outbreaks in relation to Maximum and Minimum Temperature

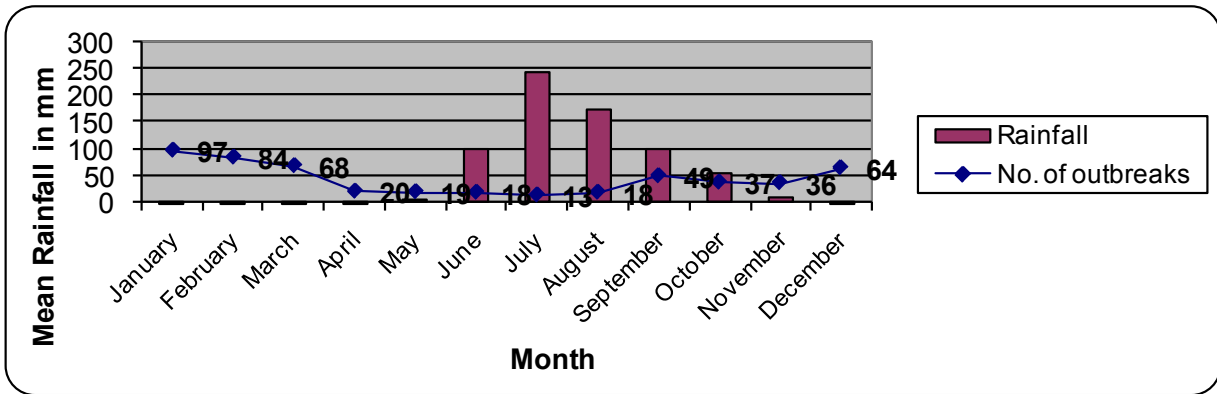


Fig. 1.17. Distribution of HS outbreaks as per month wise rainfall

PPR

Used Weather data of Rajkot are available from Indian Meteorology Department website (Mean of 49 years: 1905-2000). Disease data of Rajkot region of year 1995 to 2009. Out of total 42 outbreaks in reporting period, 33 are reported in the Rajkot Region.

Rajkot region

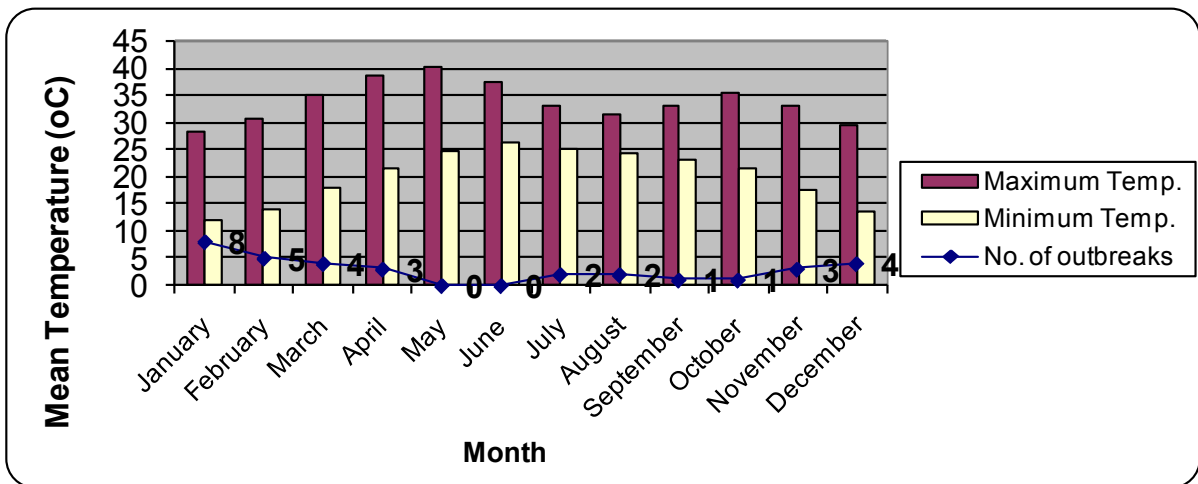


Fig. 1.18. No. of outbreaks in relation to Maximum and Minimum Temperature

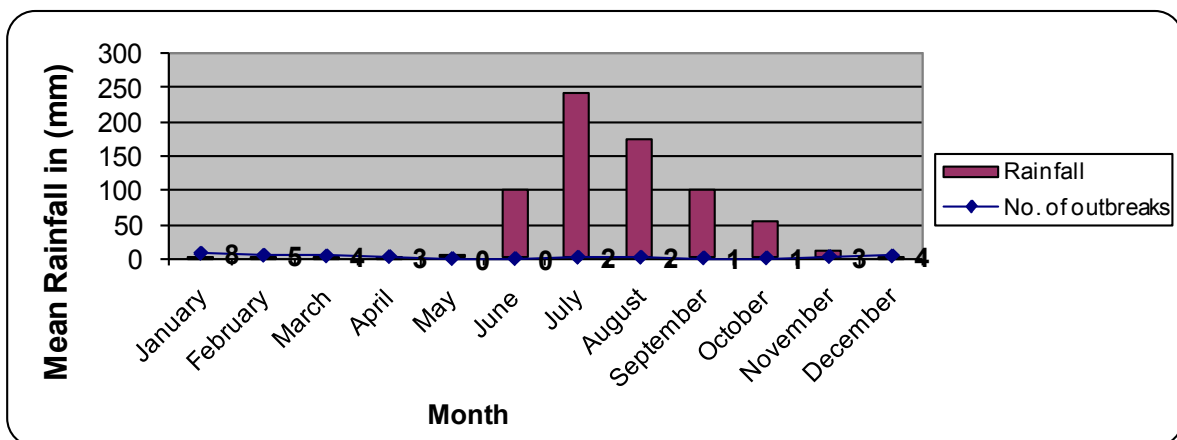


Fig. 1.19. Distribution of HS outbreaks as per month wise rainfall



Fig. 1.20. Major Livestock Routes In Gujarat State

2. AICRP-ADMAS Collaborating Unit Bangalore, Karnataka

Table 2.1 Month-wise Mean meteorological parameters of the State

Month	Mean Max. temp (°C)	Mean Min. temp (°C)	Mean Rainfall (mm)
April 2010	38.15	22.66	30.88
May 2010	37.49	22.98	97.1
June 2010	33.97	21.48	147.6
July 2010	33.12	21.93	282.7
August 2010	31.63	21.00	227.7
September 2010	31.55	20.09	138.1
October 2010	31.31	19.92	126.9
November 2010	30.41	16.92	95.3
December 2010	30.27	16.68	4.86
January 2011	30.47	14.74	-
February 2011	31.45	17.64	7.7
March 2011	36.17	18.93	12.7

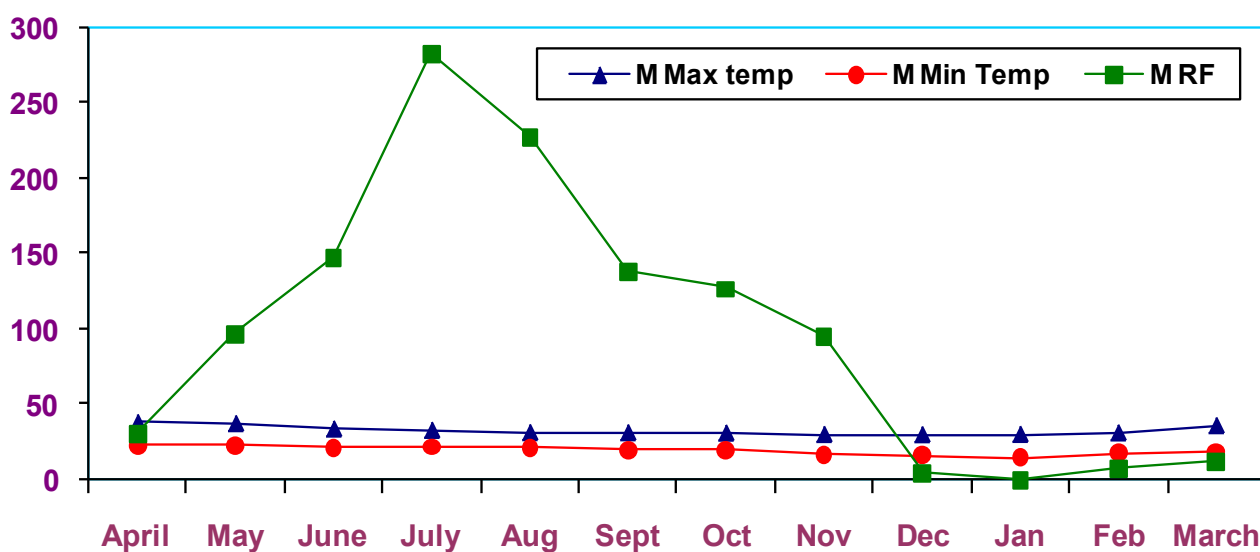


Fig. 2.1. Temporal mean Maximum and Minimum Temperature and Rainfall (mm)

Table 2.2. Zone wise mean Maximum and Minimum Temperature and Rainfall (mm)

Ecozone	Mean Max. temp (°C)	Mean Min. temp (°C)	Mean Rainfall (mm)
Arid Zone	35.92	20.60	468.4
Semi Arid zone	32.85	19.30	880.5
Coastal zone	30.11	19.76	2662.7

Disease profile during the year 2010-11

The following diseases have been monitored during the study period in the state. The details of the diseases are presented in the Table 2.3

Table 2.3. Details of the Disease Outbreaks, Attacks and deaths due to Notifiable diseases in the state

Sl. No.	Disease	Obs	Attacks	Deaths (%)
1	Haemorrhagic Septicaemia	160	1104	406 (36.77%)
2	Black Quarter	215	566	284 (50.17%)
3	Enterotoxaemia	62	482	236 (48.96%)
4	Rabies	9	12	7 (58.33%)
5	Anthrax	15	44	40 (90.90%)
6	Peste des Petits Ruminants	37	620	71 (11.45%)
7	Sheep and Goat Pox	72	989	244 (24.67%)
8	Blue Tongue	50	1470	94 (6.39%)

The scientists from the Collaborating unit of ADMAS, Bangalore along with the scientists working in the eight Animal Disease Diagnostic Laboratories and Information centres of Institute of Animal Health and Veterinary Biologicals, located at Bellary, Belgaum, Bidar, Gulbarga, Davangere, Mangalore, Mysore and Shimoga were involved in the investigation and laboratory confirmation of the infectious diseases of livestock & poultry that are reported in the state. Due to the efforts of the Collaborating Unit, Bangalore, The Director of Animal Husbandry and Veterinary Services in Karnataka has given a circular to all the field veterinarians making it mandatory for laboratory confirmation of outbreaks before an outbreak is declared.

The details of the investigations carried out by the scientists of CU-ADMAS, Bangalore during the year is as follows:

1.	Haemorrhagic septicaemia	20
2.	Black quarter	07
3.	Anthrax	03
4.	PPR	13
5.	Blue tongue	18
6.	Sheep & Goat pox	12
7.	Enterotoxaemia	06
8.	Others	45

In addition to this the staff of CU-ADMAS and scientists of Animal disease diagnostic laboratory and information centres (ADDL&IC) have received clinical samples from the field outbreaks of various diseases, analysed them and confirmed the outbreaks. The results of these laboratory examinations, confirmation of the outbreaks and incidence of the disease is included in preparation of the report.

Epidemiology of bacterial diseases

Haemorrhagic Septicaemia (HS)

During the year under report (2010-11), 160 outbreaks of HS were reported in the state as compared to 180 Obs the previous year. The scientists of the Collaborating Unit of ADMAS were involved in investigation of 20 HS outbreaks during the period under report.

Hemorrhagic septicaemia is an important bacterial disease, which was reported frequently in the state.

Temporal distribution of HS

HS was reported throughout the study period in the state with peak number of outbreaks reported in the month August 2010. Monthly data for the occurrence of HS was computed from the available data for the year 2010-11 and the same is presented in the following Table 2.4 and Fig. 2.2.

Table 2.4. Month wise details of HS outbreaks during the year 2010-11

Month	Outbreaks	Attacks	Deaths	MIR per 10 ⁵ susceptible population
April 2010	1	6	3	0.01
May 2010	7	19	13	0.06
June 2010	11	47	21	0.15
July 2010	24	142	73	0.46
August 2010	39	306	102	1.00
September 2010	32	381	96	1.24
October 2010	5	18	11	0.05
November 2010	9	39	20	0.12
December 2010	7	36	24	0.11
January 2011	14	42	23	0.13
February 2011	6	57	13	0.18
March 2011	5	11	7	0.03
Total	160	1104	406	3.62

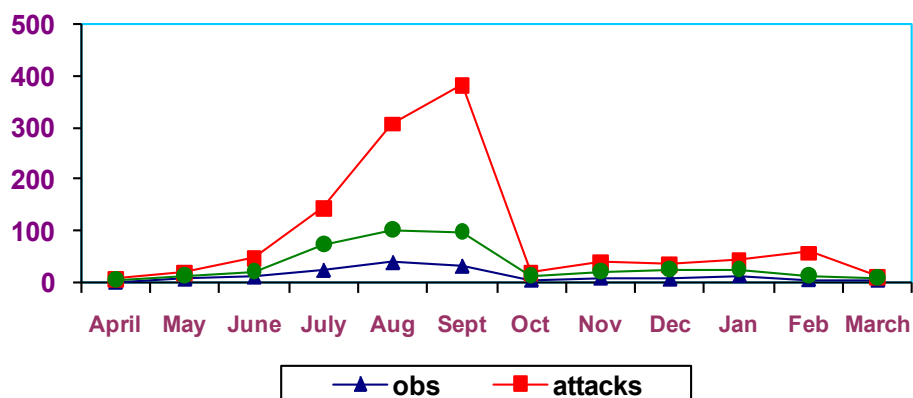


Fig. 2.2. Graph showing the month wise outbreaks, Attacks and mortality due to HS during 2010-11 in Karnataka

Analysis of the epidemic curve indicates that the disease is endemic in the state with the disease peaking in the months of June, July, August, September and January.

Spatial distribution of HS

During the study period, HS was reported in 15 out of 30 districts. Chitradurga district with 56 outbreaks was at the top of the scale followed by Hassan with 42 outbreaks. Dharwad and Bagalkot have reported 8 outbreaks each. While Mandya reported 4 outbreaks and Bellary, Gadag, Tumkur and Uttara Kannada reported 2 outbreaks each. Fifteen districts viz. Bangalore (R), Belgaum, Bidar, Bijapur, Chamarajanagar, Chikmagalur, Chikkaballapur, Dakshina Kannada, Kodagu, Kolar, Koppal, Mysore, Ramanagar, Udupi, and Yadgiri districts did not report the incidence of the disease.. Bangalore(U) reported solitary outbreak and was at the bottom of the scale. District wise incidence of HS during 2010-11 is presented in the table 2.5.

Name of the District	Details of Outbreaks and incidence rate in different species per 10 ⁵ susceptible population				
	No. of Obs	Cattle	Buffalo	Sheep	Goats
Chamarajanagar	-	-	-	-	-
Chikmagalur	-	-	-	-	-
Chikkaballapur	-	-	-	-	-
Chitradurga	56	2.93	111.37	19.22	28.47
D. Kannada	-	-	-	-	-
Davanagere	6	0.25	24.59	-	-
Dharwar	8	2.72	33.96	-	-
Gadag	2	17.65	-	-	-
Gulbarga	9	1.47	0.90	0.45	-
Hassan	42	3.31	64.80	-	-
Haveri	6	-	21.73	-	-
Kodagu	-	-	-	-	-
Kolar	-	-	-	-	-
Koppal	-	-	-	-	-
Mandya	4	-	6.51	-	-
Mysore	-	-	-	-	-
Ramnagar	-	-	-	-	-
Raichur	5	0.24	4.27	-	-
Shimoga	7	1.72	20.39	-	-
Tumkur	2	0.84	-	0.56	-
Udupi	-	-	-	-	-
Uttara Kannada	2	-	15.16	-	-
Total	160	2.25	16.11	12.09	33.90

Based on the incidence of the disease, the districts in the state are classified as high, moderate and low incidence districts. The incidence rate, mortality rate of the disease was computed based on the base bovine (including buffaloes) population of 2007 census.

The disease outbreaks were reported in large numbers in Chitradurga district (56) and Hassan (42).

Although multi-species involvement of the disease was observed in several districts, the morbidity rate and mortality rate was higher in buffaloes as compared to cattle, sheep and goats. Bangalore (U) reported the disease only in cattle while Mandya and Uttara Kannada districts reported the disease only in buffaloes. The results of analysis suggest that the buffaloes are the most susceptible species in the state and deserve more care with severity of change in climatic condition.

The crude incidence rate of the disease during the period under report was 9.89 per 10⁵ susceptible population, and crude mortality rate was 3.78 per 10⁵ susceptible population. The case fatality rate observed during the year was 36.77%.

Influence of macro-ecosystems on HS

Karnataka state is reorganized into 30 revenue districts. The state is divided into three ecozones viz., arid zone comprising of 5 revenue districts of Bijapur, Bagalkote, Bellary, Raichur and Koppal extending over an area of 39,505 sq. Kms. The second zone is the Semi arid zone comprising of districts of Gulbarga, Yadgiri, Dharwar, Gadag, Haveri, Shimoga, Chitradurga, Davangere, Chikamagalur, Kolar, Hassan, Mysore, Chamarajanagar, Belgaum, Bangalore Urban, Bangalore Rural, Tumkur, Mandya, Chikkaballapur and Ramanagar. The semi arid zone is the largest ecozone in the state and extends over an area of 1,29,452 Sq.Kms. The coastal zone consisting of 4 revenue districts of Uttar Kannada, Dakshina Kannada, Udupi and Kodagu is the smallest ecozone and extends over an area of 22,834 Sq.Kms.

The result of study on the influence of different ecosystem on HS attacks in the state is given in the following Table 2.6.

Table 2.6. Incidence of HS in different macro-ecosystems of the state during 2010-11

Ecozone	Obs	HS attacks				
		Cattle	Buffaloes	Sheep	Goats	Total
Arid Zone	15	4	40	109	20	173
Semi Arid zone	143	104	521	183	105	913
Coastal zone	2	-	18	-	-	18
Total	160	108	579	292	125	1104

The disease was prevalent mostly in the Semi arid zone of the state probably due to larger area and larger populations compared to the other zones.

Influence of different Physiography on incidence of HS

The state has topography ranging from the narrow long stretch of coastal plains to spectacular heights of Western Ghats culminating in gentle slopes. Broadly the state is divided into four physiographic regions. (1) The coastal region, a narrow strip of plain land extending from the Arabian sea coast to foot of western ghats, (2) The Malnad region (Western Ghats) – mainly a forest belt adjoining the east of the coastal region measuring about 40-60 Kms in width and extending from Belgaum in the north to Kodagu in the south, (3) The Deccan plateau (Northern Maidan)– which includes districts of Bidar, Gulbarga, Yadgiri, Bijapur, Bagalkote, Raichur, Koppal, Parts of Belgaum, Dharwar, Haveri, Gadag and Bellary and (4) The southern Maidan– which includes districts of Shimoga, Chitradurga, Davanagere, Chikamagalur, Tumkur, Hassan, Mandya, Bangalore Urban, Bangalore Rural, Kolar, Mysore, Chamarajnagar, Chikkaballapur and Ramanagar.

The result of study on the influence of different Physiography on HS attacks in the state is given in the following Table 2.7

Table 2.7. Haemorrhagic septicaemia profile in different physiography areas

Physiography	Obs	No. of attacks					No. of deaths				
		C	B	S	G	T	C	B	S	G	T
Coastal zone	2	-	18	-	-	18	-	14	-	-	14
Western Ghats	-	-	-	-	-	-	-	-	-	-	-
Northern Maidan	40	48	117	111	20	296	16	74	8	2	100
Southern Maidan	118	60	444	181	105	-	41	207	27	17	292
Total	160	108	579	292	125	1104	57	295	35	19	406

C-Cattle, B-Buffaloes, S-Sheep, G-Goats, T-Total

During the period under study, the highest number of attacks and mortality due to HS occurred in Southern Maidan when compared to Northern Maidan and Coastal Zone.

Influence of total rainfall on Haemorrhagic Septicaemia:

The number of HS outbreaks reported in different group of districts with various rainfall range in the state is given in the following Table 2.8

Table 2.8. Hemorrhagic septicaemia profile in different rainfall ranges

Rain fall range	No. of Obs	No. of attacks				No. of deaths			
		C	B	S	G	C	B	S	G
200mm to 400 mm	6	28	11	-	-	8	8	-	-
401mm to 600 mm	60	29	181	115	20	16	83	14	2
601mm to 800 mm	61	11	224	175	105	8	122	21	17
801mm to 5738mm	33	40	163	2	-	25	82	-	-
Total	160	108	579	292	125	57	295	35	19

C-Cattle, B-Bufferaloes, S-Sheep, G-Goats

Total rainfall has an influence on HS outbreaks with maximum number of outbreaks occurring in high rainfall areas and the districts receiving low rainfall reported less number of outbreaks. The peak number of outbreaks was reported during the peak monsoon activity in the state, probably due to the influence of stress factors associated with rainfall.

Effect of seasons on occurrence of HS in the state:

In order to identify the disease incidence rate during different seasons of the year, the twelve month period of study has been categorized into the following four seasons:

- S-1: January to February – winter season (Avg. Rainfall – 77mm)
- S-2: March to May - summer (Avg. Rainfall – 2710 mm)
- S-3: June to September- Early monsoon (Southwest) (Avg. Rainfall –22076 mm)
- S-4: October to December-Late monsoon (Northeast) (Avg.rainfall – 6814mm)

In order to assess the effect of climatic factors on HS incidence, monthly mean climatic factors data was obtained. The climatic factors that were considered for analysis were Monthly mean maximum and minimum temperature and total rainfall.

The correlation between seasonal occurrence of HS and other meteorological data are given in the following Table 2.9

Table 2.9. Seasonal outbreak of HS during 2010-11

Season	No. of OBs.	Max. Temp.	Min. Temp.	Rain fall (mm)
S-1 (Winter)	20	31.0	16.9	77
S-2 (Summer)	13	37.2	21.5	2710
S-3 (Early monsoon)	106	32.5	21.1	22076
S-4 (Late monsoon)	21	30.6	17.8	6814

Results indicate that highest numbers of HS outbreaks were recorded during the early monsoon followed by late monsoon, winter and summer. The early monsoon with a maximum temp of 32.5 °C and highest total rainfall of 22076mm has certain influences on the incidence on HS.

Relationship of Agro climatic zones of the state with HS Outbreaks

The state has been divided into ten Agro – Climatic zones, based on the moisture index of the soil, topography, rainfall pattern, soil texture and characteristics, climate and the crop patterns. Incidence of Haemorrhagic septicaemia was analysed with particular reference to these agro-climatic zones. The various agro-climatic zones in the state and their zonal numbers are given below:

1. North – Eastern Transition zone.....Zone – 1
2. North – Eastern Dry zone.....Zone – 2
3. Northern dry ZoneZone– 3
4. Central dry Zone.....Zone – 4
5. Eastern dry Zone.....Zone – 5
6. Southern dry Zone.....Zone – 6
7. Southern transition Zone.....Zone – 7
8. Northern Transition ZoneZone – 8
9. Hilly ZoneZone – 9
10. Coastal Zone.....Zone – 10

An attempt was made to relate the incidence rate to the Agro-Climatic zones in the state. However it was observed that these agro-climatic zones per se couldn't form the basis for analysis of disease incidence, because data are generally reported on district basis and a particular district can form the part of more than one agro-climatic zone, because of overlapping agro-climatic features. However, the districts whose major area falls into a particular agro climatic zone was classified under that zone and considered for analysis.

The result of study on the influence of different Agro climatic Zone on HS attacks in the state is given in the following Table 2.10

Table 2.10. Incidence of HS in different agro climatic zones

Sl. No.	Agro climatic Zone	No. of Obs.		No. of Attacks		No. of Deaths	
		No.	%	No.	%	No.	%
1	North- Eastern Transition zone	-	-	-	-	-	-
2	North- Eastern Dry zone	14	8.75	39	3.53	12	2.95
3	North- Dry zone	12	7.50	191	17.30	40	9.85
4	Central Dry Zone	64	40.0	572	51.81	197	48.52
5	Eastern Dry Zone	1	0.62	13	1.17	13	3.20
6	Southern Dry Zone	4	2.50	11	0.99	8	1.97
7	Southern Transition Zone	49	30.62	194	17.57	74	18.22
8	Northern Transition Zone	14	8.75	66	5.97	48	11.82
9	Hilly Zone	2	1.25	18	1.63	14	3.44
10	Coastal Zone	-	-	-	-	-	-
	Total	160		1104		406	

Highest numbers of HS outbreaks (64) were reported from the Central Dry Zone. It accounted for 40% of the total outbreaks, 51.81% of the total attacks and 48.52% of the total mortality in the state. This zone is followed by Southern Transition Zone (49), which accounted for 30.62 % of the outbreaks, 17.57 % of attacks and 18.22 % of mortality.

Black Quarter (BQ)

Black quarter, a soil borne Clostridial disease of bovines, is another important bacterial disease that is responsible for large number of outbreaks and mortality among bovines in the state. The disease is endemic in the state. Black quarter was reported from 18 districts out of 30 districts in the state. During the year under report 215 (216 during the year 2009-10) outbreaks with 566 attacks and 284 deaths were reported. Bangalore (R), Bangalore (U), Belgaum, Bellary, Bidar, Bijapur, Dakshina Kannada, Gadag, Kolar, Koppal, Ramanagar and Udupi districts did not report the disease.

Temporal pattern of BQ distributions

The disease was reported in the state throughout the year under report. The disease did not exhibit any seasonality. Peak numbers of outbreaks 31 outbreaks were observed in the month of November. Month wise incidence of the disease during 2010-11 is tabulated in Table 2.11

Table 2.11. Month wise BQ Incidence during 2010-11

Month	Outbreaks	Attacks	Deaths	MIR per 10 ⁵ susceptible population
April 2010	8	16	9	0.10
May 2010	14	46	24	0.31
June 2010	14	35	17	0.23
July 2010	9	16	4	0.10
August 2010	12	14	7	0.09
September 2010	12	53	26	0.35
October 2010	16	24	10	0.16
November 2010	31	58	21	0.39
December 2010	30	78	36	0.52
January 2011	24	86	61	0.58
February 2011	23	72	36	0.48
March 2011	22	68	33	0.45
Total	215	566	284	3.81

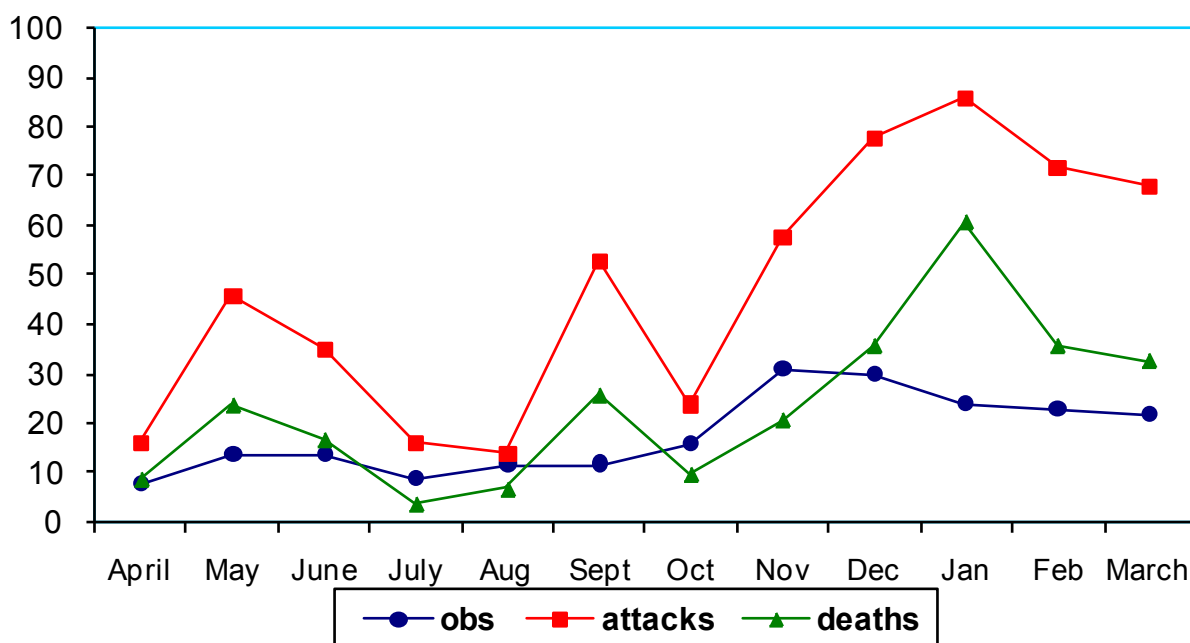


Fig. 2.4. Month wise Outbreaks, Attacks and mortality due to BQ during 2010-11

As can be seen from the fig. 2.4, the BQ outbreaks were reported throughout the year and did not follow any seasonal / temporal trend. However the outbreaks were more frequently reported between November to March.

Spatial Pattern of BQ

The disease was reported in 18 out of 30 districts in the state. Bangalore(R), Bangalore(U), Belgaum, Bellary, Bidar, Bijapur, Dakshina Kannada, Gadag, Kolar, Koppal, Ramanagar and Udupi districts did not report the disease.

Hassan has reported maximum number of outbreaks (135) of 215 BQ outbreaks in the state District wise incidence of BQ is shown in Table 2.12.

Table 2.12: District wise incidence of Black Quarter during 2010-11

Name of the district	Details of Outbreaks and incidence rate in different species per 10 ⁵ susceptible population				
	No. of Obs	Cattle		Buffaloes	
		Attack	Mort	Attack	Mort
Bagalkot	2	0.99	0.66	-	-
Bangalore (R)	-	-	-	-	-
Bangalore (U)	-	-	-	-	-
Belgaum	-	-	-	-	-
Bellary	-	-	-	-	-
Bidar	-	-	-	-	-
Bijapur	-	-	-	-	-
Chamarajanagar	3	2.19	1.46	-	-
Chikmagalur	4	1.29	0.25	-	-
Chikkaballapur	1	1.26	1.26	-	-
Chitradurga	7	4.40	1.17	-	-
D. Kannada	-	-	-	-	-
Davanagere	2	0.50	0.25	-	-
Dharwar	1	5.45	2.72	-	-
Gadag	-	-	-	-	-
Gulbarga	1	0.14	0.14	-	-
Hassan	135	43.58	18.47	3.13	1.56
Haveri	6	7.70	4.49	1.67	1.67
Kodagu	3	3.35	1.67	-	-
Kolar	-	-	-	-	-
Koppal	-	-	-	-	-
Mandya	2	0.57	-	-	-
Mysore	4	1.13	0.81	-	-
Ramanagar	-	-	-	-	-
Raichur	2	0.49	0.24	-	-
Shimoga	10	8.62	4.65	-	-
Tumkur	27	14.93	7.63	2.48	0.41
Udupi	-	-	-	-	-
Uttara Kannada	1	9.52	9.52	4.21	4.21
Yadgiri	4	5.29	2.20	-	-
Total	215	7.77	4.08	2.82	1.63

The crude incidence rate of the disease during the period under report is 7.34 per 10⁵ susceptible population, and crude mortality rate is 3.86 per 10⁵ susceptible population. The case fatality rate observed during the year is 50.17%.

Influence of macro-ecosystems on BQ for the period under study

The different ecosystems that exist in the state and the details there of are mentioned earlier under Haemorrhagic septicaemia. The study on the influence of different ecosystem on BQ attacks indicates that the highest number of outbreaks was reported from the **semi arid zone (207)** followed by **arid zone (4)** and the **coastal zone (4)**.

The result of study on the influence of different ecosystem on BQ attacks in the state is given in the following Table 2.13

Table 2.13. Distribution of BQ in different Ecozones of the State

Ecozones	OBs	Attacks			Deaths		
		Cattle	Buffalo	Total	Cattle	Buffalo	Total
Arid Zone	4	5	-	5	3	-	3
Semi Arid zone	207	503	14	517	233	6	239
Coastal zone	4	39	5	44	37	5	42
Total	215	547	19	566	273	11	284

As can be seen from the table-13 the maximum incidence of black quarter is in the semiarid zone compared to the other two zones.

Influence of different Physiography on incidence of BQ in the state

The profile of BQ in different physiography zones of the state is presented in the Table 2.14

Table 2.14. Black quarter profile in different Physiography zones of the state

Physiography	No. of OBs	No. of attacks			No. of deaths		
		Cattle	Buffalo	Total	Cattle	Buffalo	Total
Coastal zone	1	35	5	40	35	5	40
Western Ghats	3	4	-	4	2	-	2
Northern Maidan	16	54	2	56	29	2	31
Southern Maidan	195	454	12	466	207	4	211
Total	215	547	19	566	273	11	284

During the period under study, the highest number of attacks and mortality due to BQ occurred in Southern Maidan compared to Northern Maidan and Western Ghats.

Effect of seasons on occurrence of BQ in the state

Season wise occurrence of BQ outbreaks is presented in Table 2.15

Table 2.15. The correlation between seasonal occurrence of BQ and other meteorological data

Season	No. of OBs.	Max. Temp.	Min. Temp.	Rain fall (mm)
S-1 (Winter)	47	31.0	16.9	77
S-2 (Summer)	44	37.2	21.5	2710
S-3 (Early monsoon)	47	32.5	21.1	22076
S-4 (Late monsoon)	77	30.6	17.8	6814

The analysis indicates that the incidence of BQ was highest in Late monsoon season (77) followed by Early Monsoon (47), Winter (47), and Summer (44). The BQ outbreaks were reported throughout the study period and did not follow any seasonal trend.

Relationship of Agro climatic zones of the state with BQ Outbreaks

An attempt was made to relate the incidence rate of BQ to the Agro-Climatic zones in the state. The result of study on the influence of different Agro climatic Zone on BQ attacks in the state is given in the following Table 16

Table 2.16. Incidence of BQ in different agro climatic zones

Sl. No.	Agro climatic Zone	No. of Obs.		No. of Attacks		No. of Deaths	
		No.	%	No.	%	No.	%
1	North -Eastern Transition Zone	-	-	-	-	-	-
2	North – Eastern Dry Zone	7	3.25	15	2.65	7	2.46
3	North – Dry Zone	2	0.93	3	0.53	2	0.70
4	Central Dry Zone	36	16.74	111	19.61	51	17.95
5	Eastern Dry Zone	1	0.46	3	0.53	3	1.05
6	Southern Dry Zone	9	4.18	15	2.65	9	3.16
7	Southern Transition Zone	149	69.30	337	59.54	148	52.11
8	Northern Transition Zone	7	3.25	38	6.71	22	7.74
9	Hilly Zone	4	1.86	44	7.77	42	14.7
10	Coastal Zone	-	-	-	-	-	-
	Total	215		566		284	

Highest number of outbreaks (149) was reported from the **Southern Transition zone**. It accounted for 69.30% of the total outbreaks, 59.54% of the total attacks and 52.11% of the total mortality due to BQ in the state. This zone is followed by **central Dry zone** (36 Obs), which accounted for 16.74% of the outbreaks, 19.61% of attacks and 17.95% of mortality and **Southern Dry zone** (9 Obs), which accounted for 4.18% of the outbreaks, 2.65% of attacks and 3.16% of mortality.

Relationship of soil type with BQ incidence

The soil types of Karnataka are broadly classified into four categories viz., Red loamy soil, red laterite soil, shallow and medium black soil and red black soil. The red laterite soil is commonly seen in the coastal Karnataka and it is distributed in the districts of Uttara Kannada, Dakshina Kannada, Udupi and Kodagu. The shallow and medium deep black soil is distributed in the districts of Belgaum, Bidar, Dharwar, Gadag, Gulbarga, Yadgiri and Haveri districts and red and Black soil is found in districts of Bagalkote, Bellary, Koppal and Raichur districts. The other districts of the state are rich in Red loamy soil. The relationship between the soil type BQ outbreaks are give in table 2.17.

An analysis of the relationship of soil type to incidence of Black quarter indicates that the disease is more in Red loamy soil area and lowest in Red Laterite soil.

Table No. 2.17. The relationship between the soil type and BQ outbreaks

Soil type	No. of Obs.	No. of attacks			No. of deaths		
		Cattle	Buffalo	Total	Cattle	Buffalo	Total
Red loamy soil	195	454	12	466	207	4	211
Red & Black soil	4	5	-	5	3	-	3
Shallow & medium deep black soil	12	49	2	51	26	2	28
Red Laterite soil	4	39	5	44	37	5	42
Total	215	547	19	566	273	11	284

Anthrax

Anthrax was sporadic in the state and reported in 6 out of 30 districts. During the year (2010-11) under report 15 outbreaks of anthrax were reported in the state (21 during 2009-10). The disease was reported from Bangalore(R), Chamarajanagar, Chikkaballapur, Davangere, Kolar and Tumkur districts. Tumkur district accounted for more number of outbreaks (7) reported in the state. The disease was reported among cattle, buffaloes, sheep and goats. The incidence rate and mortality rate for different species of animals in different districts given in Table 2.18

Table 2.18. Incidence of Anthrax in different districts during 2010-11

Sl. No.	Name of the district	No. of Obs	Incidence rate/ 10 ⁵				Mortality rate/ 10 ⁵			
			C	B	S	G	C	B	S	G
1	Bangalore (R)	1	-	-	4.24	-	-	-	4.24	-
2	Chamarajanagar	1	1.09	-	-	-	1.09	-	-	-
3	Chikkaballapur	3	1.26	-	-	-	1.26	-	-	-
4	Davanagere	2	0.50	-	1.79	-	0.50	-	1.79	-
5	Kolar	1	0.83	-	-	-	0.83	-	-	-
6	Tumkur	6	-	-	1.31	1.35	-	-	1.12	0.96
	Total	15	0.87	-	1.75	1.35	0.87	-	1.62	0.96

C-Cattle, B-Buffero, S-Sheep, G-Goats.

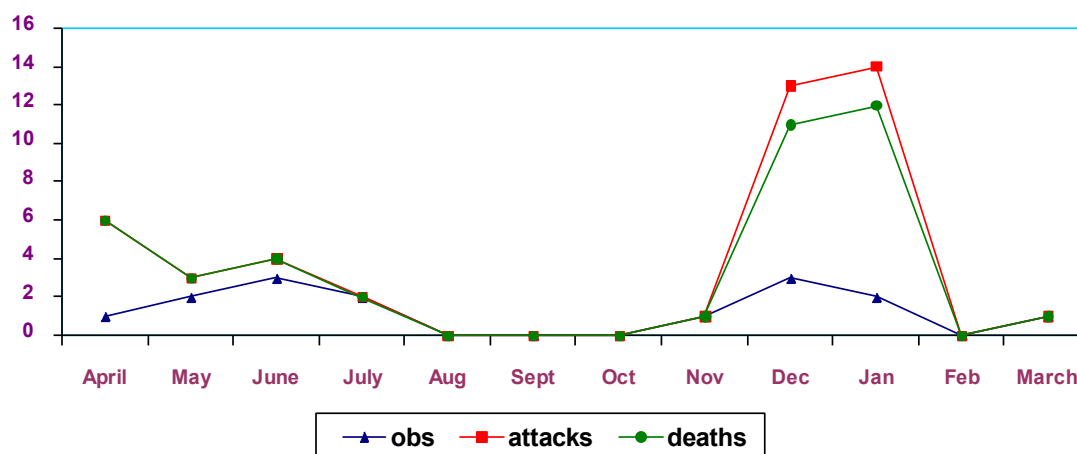


Fig. 2.3. Monthly Outbreaks, Attacks and Deaths due to Anthrax in Karnataka during 2010-11

The number of outbreaks reported per month was within 5 outbreaks, the severity of the disease was greater during the month of December 2010. (Fig. 2.5)

The crude incidence rate of the disease during the period under report was 1.37 per 10⁵ susceptible population, and crude mortality rate was 1.24 per 10⁵ susceptible population. The case fatality rate observed during the year was 90.90%.

Relationship of soil type with Anthrax incidence

An analysis of the relationship of soil type to incidence of Anthrax, indicates that the disease was more in Red loamy soil area and no outbreaks were reported in areas of red and black soil, Shallow & medium deep black and Red Laterite soil. The results are given in Table 2.19.

Table 2.19. The relationship between the soil type and Anthrax outbreaks

Soil type	No. of Obs.	No. of attacks					No. of deaths				
		C	B	S	G	Total	C	B	S	G	Total
Red loamy soil	15	10	-	27	7	44	10	-	25	5	40
Red & Black soil	-	-	-	-	-	-	-	-	-	-	-
Shallow & medium deep black soil	-	-	-	-	-	-	-	-	-	-	-
Red Laterite soil	-	-	-	-	-	-	-	-	-	-	-
Total	15	10	-	27	7	44	10	-	25	5	40

As can be seen from the Table 2.19, all the reported Anthrax outbreaks were recorded in red loamy soil areas. Areas rich in red and black soil, black cotton soil and laterite soil did not report anthrax outbreaks.

Enterotoxaemia (ET)

During the year (2010-11) under report 62 outbreaks of ET were reported in the state as against 119 outbreaks reported during the year 2009-10. The details of the ET outbreaks are given in the Table 20. The disease was mainly reported from the sheep rearing districts of the state viz. Bijapur, Chikkaballapur, Chitradurga, Davanagere, Gulbarga, Raichur, Shivamogga, Tumkur and Yadgiri districts.

Table 2.20. District-wise incidence of Enterotoxaemia in sheep & goats

Districts	No. of OBs	Incidence rate 10 ⁵		Mortality rate 10 ⁵	
		Sheep	Goat	Sheep	Goat
Bijapur	4	26.85	0.66	23.86	0.22
Chikkaballapur	1	1.90	-	1.90	-
Chitradurga	19	20.54	13.29	8.67	8.95
Davanagere	3	17.38	-	5.99	-
Gulbarga	5	4.12	0.35	0.68	-
Raichur	1	0.54	-	0.18	-
Shimoga	1	198.4	-	138.9	-
Tumkur	27	8.62	-	4.49	-
Yadgiri	1	1.37	0.52	-	-
Total	62	11.29	4.14	5.34	3.96

Highest numbers of outbreaks were reported in Tumkur district (27) followed by Chitradurga (19)

The crude incidence rate of the disease during the period under report was 9.32 per 10⁵ susceptible population, and crude mortality rate was 5.13 per 10⁵ susceptible population. The case fatality rate observed during the year was 48.96%.

Temporal distribution

Highest numbers of outbreaks (23) were reported during the month of May 2010.

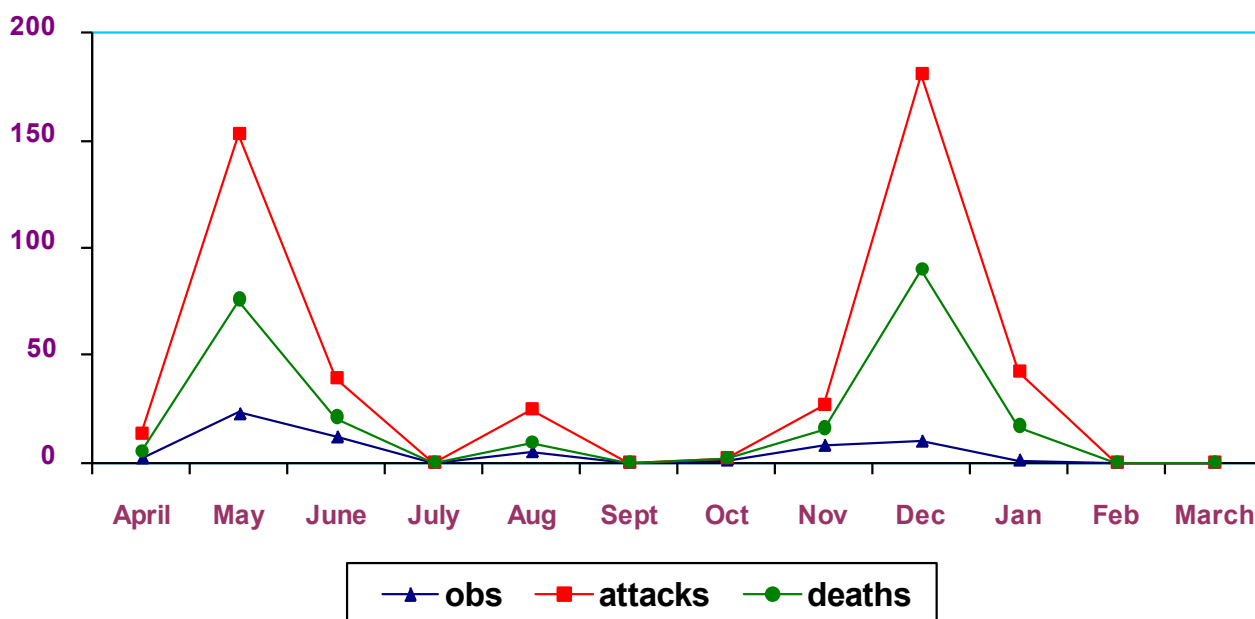


Fig. 2.6. Monthly incidence of Outbreaks, Attacks and Deaths due to Enterotoxaemia in Karnataka during 2010-11.

It can be seen from the Fig. 2.6 that there is variation in the number of outbreaks and the attack rates, which vary considerably from month to month. High attacks were encountered during the month of December 2010 followed by May.

Relationship of soil type with ET incidence

The soil type wise occurrence of ET are presented in Table 2.21.

An analysis of the relationship of soil type to incidence of ET indicates that the disease was more in Red loamy soil area and shallow and medium deep black soil areas and lowest in Red and black soil and no outbreaks were reported in areas of Red Laterite soil.

Table 2.21. The relationship between the soil type and ET outbreaks

Soil type	Obs	No. of attacks			No. of deaths		
		Sheep	Goat	Total	Sheep	Goat	Total
Red loamy soil	55	404	52	456	198	34	232
Red & Black soil	1	3	-	3	1	-	1
Shallow & medium deep black soil	6	20	3	23	3	-	3
Red Laterite soil	-	-	-	-	-	-	-
Total	62	427	55	482	202	34	236

The Distribution of ET in different Ecosystems

The distribution of ET in different ecosystems of the state was analysed during period of study. The result of study on the influence of different ecosystem on ET attacks in the state is given in the Table 2.22.

The disease was more prevalent in Semiarid Ecosystem followed by Arid ecosystem. ET was not reported in the coastal ecozone.

Table 2.22. Distribution of ET in different Ecozones of the State

Eco zones	No. of Obs	Attacks			Mortality		
		Sheep	Goat	Total	Sheep	Goat	Total
Arid Zone	5	12	3	15	9	1	10
Semi Arid zone	57	415	52	467	193	33	226
Coastal zone	-	-	-	-	-	-	-
Total	62	427	55	482	202	34	236

Epidemiology of Viral Diseases

Sheep & Goat Pox

SheepPox & Goatpox disease were reported from 13 out of 30 districts in the state. The district wise outbreak of sheep and goat pox is depicted in Table 2.24. During the year under report 72 outbreaks were reported as against 81 outbreaks that were reported during 2009-10. The number of attacks and death were 989 and 244 deaths respectively. The disease was observed throughout the year with peak outbreaks reported during the month of April 2010 and January 2011 (Table 2.23).

Table 2.23. Month wise outbreaks of Sheep and Goat pox during the year 2010-11

Month	Outbreaks	Attacks	Deaths	MIR per 10 ⁵ susceptible population
April 2010	18	205	42	1.30
May 2010	6	102	25	0.65
June 2010	2	18	1	0.11
July 2010	1	36	5	0.22
August 2010	1	60	14	0.38
September 2010	2	13	2	0.08
October 2010	1	6	-	0.03
November 2010	3	18	2	0.11
December 2010	8	81	22	0.51
January 2011	18	345	110	2.20
February 2011	4	25	17	0.15
March 2011	8	80	4	0.51
Total	72	989	244	6.30

The most affected districts were Gulbarga (12), Bagalkot (11), Chitradurga (10), Tumkur (8), Davanagere (7) and Bijapur (7).

The details of the sheep and goatpox are given in Table 2.24.

Table 2.24. The details of Sheep & Goat Pox during 2010-11

Name of the district	Details of Outbreaks and incidence rate in different species per 10 ⁵ susceptible population				
	No. of Obs	Sheep		Goats	
		Attack	Mort	Attack	Mort
Bagalkot	11	15.93	6.40	-	-
Belgaum	1	6.67	1.55	-	-
Bijapur	6	71.60	23.86	0.66	0.22
Chikkaballapur	5	11.41	0.47	-	-
Chitradurga	10	10.98	2.63	-	-
Davanagere	7	283.13	78.64	-	-

Gadag	4	93.15	23.92	-	-
Gulbarga	12	23.13	2.29	-	-
Haveri	2	5.27	3.38	-	-
Koppal	3	2.11	0.63		
Mandya	2	2.61	0.78		
Raichur	1	0.54	0.18	-	-
Tumkur	8	5.15	0.56	-	-
Total	72	14.58	3.59	0.66	0.22

Highest attack rate Davanagere (283.13 per 10⁵ Susceptible population) followed by Gadag (93.15 per 10⁵ Susceptible population) Bijapur (71.60) and Gulbarga (23.13).

The crude incidence rate of the disease during the period under report was 13.71 per 10⁵ susceptible population, and crude mortality rate was 3.38 per 10⁵ susceptible population. The case fatality rate observed during the year was 24.67%.

Influence of Macro ecosystems on Sheep Pox & Goat Pox infection

The study on the influence of different ecosystems on incidence of sheep & goatpox in the state was studied. The results are given in Table 2.25.

Table 2.25. Distribution of Sheep & Goat Pox in different Ecozones of the State

Eco zones	No. of Obs	Attacks			Mortality		
		Sheep	Goat	Total	Sheep	Goat	Total
Arid Zone	21	144	3	147	55	1	56
Semi Arid Zone	51	842	-	842	188	-	188
Coastal Zone	-	-	-	-	-	-	-
Total	72	986	3	989	243	1	244

The disease incidence was more in semi arid ecozone with 51 outbreaks, 842 attacks and 188 deaths followed by Arid zone with 21 outbreaks, 147 attacks and 56 deaths and Coastal zone did not report incidence of sheep and goatpox.

Incidence of Sheep & Goat Pox in different agro climatic zones

An attempt was made to relate the incidence rate of Sheep pox & goat pox to the Agro-Climatic zones in the state. The details of sheep and goat pox incidence in the different Agro climatic zones in the state are presented in Table 2.26.

Table 2.26. Incidence of Sheep & Goat Pox in different agro climatic zones

Sl. No.	Agro climatic Zone	No. of OBs.		No. of Attacks		No. of Deaths	
		No.	%	No.	%	No.	%
1	North –Eastern Transition Zone	-	-	-	-	-	-
2	North – Eastern Dry Zone	13	18.05	104	10.51	11	4.50
3	North – Dry Zone	25	34.72	496	50.15	144	59.01
4	Central Dry Zone	25	34.72	317	32.05	75	30.73
5	Eastern Dry Zone	5	6.94	48	4.85	2	0.81
6	Southern Dry Zone	2	2.77	10	1.01	3	1.22
7	Southern Transition Zone	-	-	-	-	-	-
8	Northern Transition Zone	2	2.77	14	1.41	9	3.68
9	Hilly Zone	-	-	-	-	-	-
10	Coastal Zone	-	-	-	-	-	-
	Total	72		989		244	

Highest number of outbreaks (25) was reported from the **North dry zone and Central dry zone (Table 2.26)**. In the north dry zone 34.72% of the total outbreaks, 50.15% of the total attacks and 59.01% of the total mortality was recorded due to Sheep pox in the state. This zone is followed by Central dry zone with 34.72% of the total outbreaks 32.05% of the total attacks and 30.73% deaths, North Eastern Dry Zone with (13 Ob), 104 (10.51%) attacks and 11 (4.50) deaths reported from this zone. No outbreaks were reported in North Eastern Transition Zone, Southern Transition Zone, Hilly Zone and Coastal Zone.

Seasonal influence of Sheep & Goat Pox disease

Incidence of sheep pox in different seasons was studied during the year under report and the results are presented in Table No. 2.27

Table 2.27. Seasonal incidence of Sheep and Goat pox during 2010-11

Season	No. of OBs.	Max. Temp.	Min. Temp.	Rain fall (mm)
S-1 (Winter)	22	31.0	16.9	77
S-2 (Summer)	32	37.2	21.5	2710
S-3 (Early monsoon)	6	32.5	21.1	22076
S-4 (Late monsoon)	12	30.6	17.8	6814

Although the disease was observed in all the seasons, the disease incidence was significantly higher in Summer (32) followed by Winter (22), Late monsoon (12) and Early monsoon (6).

Influence of total rainfall on Sheep & Goat Pox infection

Details of sheep and goat pox outbreaks in different rainfall ranges are presented in Table 2.28

Total rainfall had no influence on sheep & goat pox outbreaks. Outbreaks were reported in all rainfall ranges but number of outbreaks were more in rainfall range 401mm to 600mm.

Table 2.28. Sheep & Goat Pox profile in different rainfall ranges

Rainfall range	No. of Obs	No. of attacks		No. of deaths	
		Sheep	Goats	Sheep	Goats
200mm to 400 mm	14	360	-	83	-
401mm to 600 mm	27	200	3	66	1
601mm to 800 mm	11	103	-	25	-
801mm to 5738mm	20	323	-	69	-
Total	72	986	3	243	1

Peste Des Petits Ruminants (PPR)

PPR was reported from 9 out of 30 districts in the state. During the year under report 37 outbreaks were reported. The details of the Annual incidence rate are given in Table 2.29. The number of attacks and deaths were 620 and 71 respectively. The disease incidence has increased during the year 2010-11 as compared to the previous year 2009-10 (20).

Table 2.29. District wise incidence of PPR during the year 2010-11

Sl. No.	Name of the District	Details of outbreaks and incidence rate in different species per 10 ⁵ susceptible population				
		No. of Obs	Attacks per 10 ⁵		Mortality per 10 ⁵	
			Sheep	Goats	Sheep	Goats
1	Bagalkot	3	16.97	3.30	0.59	-
2	Bijapur	4	128.28	18.80	17.90	1.54
3	Chikkaballpur	3	3.80	17.41	-	7.20

4	Chitradurga	2	1.86	2.98	-	-
5	Gulbarga	6	19.92	1.05	0.45	0.35
6	Hassan	2	7.45	10.58	1.98	1.51
7	Raichur	1	1.44	-	0.9	-
8	Tumkur	8	8.24	3.09	0.84	1.15
9	Yadgiri	8	22.67	12.69	2.74	4.23
	Total	37	9.48	7.06	1.09	1.82

The crude incidence rate of the disease during the period under report was 8.54 per 10⁵ susceptible population, and crude mortality rate was 1.38 per 10⁵ susceptible population. The case fatality rate observed during the year was 11.45%.

The outbreaks of PPR in different ecozones are presented in Table 2.30.

Table 2.30. Distribution of PPR in different Ecozones of the State

Eco zones	No. of OBs	Attacks			Mortality		
		Sheep	Goat	Total	Sheep	Goat	Total
Arid Zone	8	165	99	264	15	7	22
Semi Arid zone	29	256	100	356	19	30	49
Coastal zone	-	-	-	-	-	-	-
Total	37	421	199	620	34	37	71

More number of PPR outbreaks was reported in semi arid zone followed by arid zone. While no outbreak of PPR was reported in the coastal zone.(Table 2.30).

Seasonal influence of PPR disease

Incidence of PPR in different seasons of the year was studied during the year under report and presented in Table 2.31. The disease was reported in all the seasons with highest number of outbreaks (21) recorded during late monsoon.

Table 2.31. Seasonal outbreak of PPR during 2010-11

Season	No. of OBs.	Max. Temp.	Min. Temp.	Rain fall (mm)
S-1 (Winter)	6	31.0	16.9	77
S-2 (Summer)	6	37.2	21.5	2710
S-3 (Early monsoon)	4	32.5	21.1	22076
S-4 (Late monsoon)	21	30.6	17.8	6814

Influence of total rainfall on PPR infection

The number of PPR outbreaks reported in each rainfall range is given in Table 2.32.

Districts falling under Rainfall range of 401mm to 600mm recorded maximum number of outbreaks (25). Total rainfall has an influence on PPR outbreaks with the maximum outbreaks occurring in moderate rainfall areas followed by areas with high rainfall areas.

Table 2.32. PPR profile in different rainfall ranges

Rainfall range	No. of outbreaks	No. of attacks		No. of deaths	
		Sheep	Goats	Sheep	Goats
200mm to 400 mm	3	16	29	-	12
401mm to 600 mm	25	293	153	27	23
601mm to 800 mm	3	25	11	5	-

Rainfall range	No. of outbreaks	No. of attacks		No. of deaths	
		Sheep	Goats	Sheep	Goats
801mm to 5738mm	6	87	6	2	2
Total	37	421	199	34	37

Table 2.33. Incidence of PPR in different agro climatic zones

Sl. No.	Agro climatic Zone	No. of OBs.		No. of Attacks		No. of Deaths	
		No.	%	No.	%	No.	%
1	North-Eastern Transition Zone	-	-	-	-	-	-
2	North – E. Dry Zone	15	40.54	158	25.48	21	29.57
3	Northern Dry Zone	7	18.91	256	41.29	17	23.94
4	Central Dry Zone	10	27.02	132	21.29	15	21.12
5	Eastern Dry Zone	3	8.10	45	7.25	12	16.90
6	Southern Dry Zone	-	-	-	-	-	-
7	Southern Transition Zone	2	5.40	29	4.67	6	8.45
8	Northern Transition Zone	-	-	-	-	-	-
9	Hilly Zone	-	-	-	-	-	-
10	Coastal Zone	-	-	-	-	-	-
	Total	37		620		71	

Highest number of PPR outbreak (15) was reported from the North Eastern Dry Zone. It accounted for 40.54% of the total outbreaks, 25.48% of the total attacks and 29.57% of the total mortality in the state as presented in Table 2.33.

Epidemiology of Parasitic Diseases

There is no surveillance data available in the state for the parasitic diseases. However the data available at the different ADDL&IC's of the Institute has been collected, collated and analysed.

i) Blood protista

As per the available records, *Theileria annulata*, *Babesia bigemina*, *Anaplasma marginale*, and *Trypanosoma evansi* are the common blood protista that are reported in cattle and buffaloes of the state. The blood protista commonly affect exotic breeds and their crosses. Their incidence is dependent on vector dynamics in the particular area. By and large the tick infestation in domestic animals is common and it can be expected that high incidence of blood protista in the animals.

Theileriosis

Of the 4,630 blood smears that were examined in different laboratories of the Institute,

15.24% of the smears showed piroplasms of *Theileria annulata*. Apparently healthy animals also showed the presence of *Theileria* indicating the carrier status. The ticks are the main transmitting agents for tropical Theileriosis, and it is transtadial and therefore more easily transmitted as compared to other hemoprotozoan diseases. The transmission of the disease from one animal to the other animal and the infectivity to the tick depends upon the parasitaemia of the host. *Hyalomma sp.* of ticks has been identified in the state to transmit the disease. Results of blood smear examination in different laboratories are depicted in Table 2.34

Table 2.34. Results of blood smear examination in different laboratories

Name of the laboratory	No. of blood smears examined	Theileriosis +ve(%)	Babesiosis +ve(%)	Trypanosomiasis +ve(%)	Anaplasmosis +ve(%)
1. IAH&VB, Bangalore	457	59(12.9)	2(0.43)	-	8(1.75)
2. ADDL & IC, Belgaum	563	7(1.24)	3(0.53)	1(0.17)	36(6.39)
3. ADDL & IC, Bellary	328	5(1.52)	4(1.21)	8(2.43)	8(2.43)
4. ADDL & IC, Bidar	192	7(3.64)	3(1.56)	-	3(1.56)
5. ADDL&IC, Davanagere gfDDdDavanagere	727	86(11.82)	2(0.27)	86(11.82)	-
6. ADDL & IC, Gulbarga	854	35(4.09)	4(0.46)	4(0.46)	3(0.35)
7. ADDL & IC, Mangalore	85	21(24.70)	16(18.82)	-	-
8. ADDL & IC, Mysore	906	432(47.68)	99(10.92)	1(0.11)	73(8.05)
9.ADDL&IC, Shivamogga	518	54(10.42)	1(0.19)	5(0.96)	1(0.19)
Total	4630	706(15.24)	134(2.89)	105(2.26)	132(2.85)

Theileriosis continues to be the important haemoprotozoan disease in cattle in Karnataka although a potent vaccine is available for control of disease. The incidence of Theileria has been reported in different areas in decreasing order as ADDL&IC Mysore (47.68%) ADDL&IC Mangalore (24.70 %), ADDL&IC Davanagere (11.82%).

Babesiosis

Incidence of bovine babesiosis is not common and only 2.89% of the blood smears examined showed the presence of parasites in the blood smears. *Babesia bigemina* is the species that affect cattle and buffaloes in the state.

Trypanosomiasis

Trypanosomes have been demonstrated in the blood of cattle and buffaloes in the state. The disease is more prevalent in cattle of villages that are located in the fringe areas of the forest. The animals are let out to forest for grazing where they are exposed to biting flies through which they get infected. The species that has been identified in the state is *Trypanosoma evansi*, and it is reported from Belgaum, Bellary, Davanagere, Mysore and Shivamogga districts. However the laboratory results indicate 2.26% prevalence during the year under report.

ii) Rickettsial Diseases

Anaplasmosis

Anaplasma marginale is the common parasite that is recorded in the domestic animals of the state. During the study period 2.85 % of the blood smears examined showed presence of Anaplasma marginale in the peripheral blood smears.

iii) Gastrointestinal Parasitism

Faecal samples that were received at the diagnostic laboratories of the institute were processed and screened for the presence of parasitic eggs. The results are tabulated and presented in Table 2.35.

Table 2.35. Results of faecal examination

Sl. No.	Name of the laboratory	Total No. of samples	Results of faecal examination		
			Nematodes	Trematodes	Cestodes
1	IAH&VB, Bangalore	106	50	10	3
2	ADDL & IC, Belgaum	207	36	110	76
3	ADDL & IC, Bellary	256	6	92	2
4	ADDL & IC, Bidar	929	91	49	275
5	ADDL&IC, Davanagere	743	161	192	10

Sl. No.	Name of the laboratory	Total No. of samples	Results of faecal examination		
			Nematodes	Trematodes	Cestodes
6	ADDL & IC, Gulbarga	309	22	29	19
7	ADDL & IC, Mangalore	269	3	133	104
8	ADDL & IC, Mysore	209	47	83	4
9	ADDL&IC, Shivamogga	92	8	15	-
	Total	3120	424	713	493

Strongyles were the common nematodes that were demonstrated in the faecal samples. But the parasitic load in most of the cases was light to moderate. The most common method for controlling Gastrointestinal (GI) parasitosis is by way of frequent dosing with anthelmintics. It is highly essential to test for anthelmintic resistance.

Disease profile in the state during 2010-11

Important Livestock disease recorded and monitored during 2010-11 in Karnataka during 2010-11 are depicted in Fig. 2.7. The diseases are listed in their order of priority. i) Black quarter (215 Obs), ii) Haemorrhagic septicemia (160 Obs), iii) Sheep and Goat pox (72 Obs) iv) Enterotoxaemia (62 Obs), v) Peste Des Petits Ruminants (37 Obs) and vi) Anthrax (15 Obs)

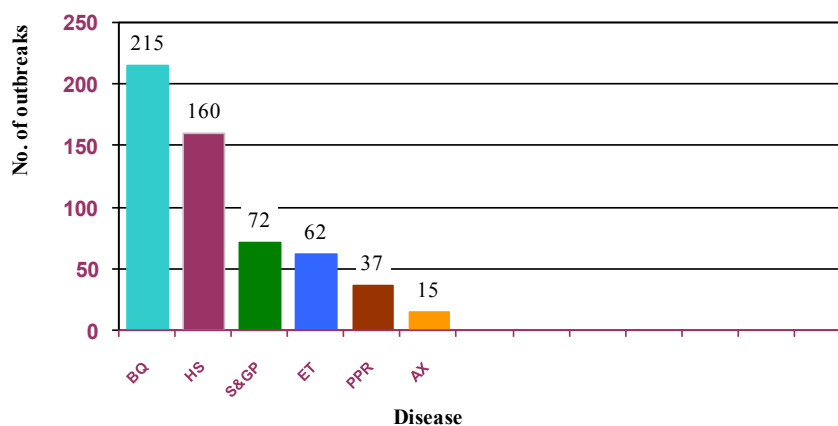


Fig. 2.7. Priority of Diseases in Karnataka during 2010-11

3. AICRP on ADMAS Collaborating Unit: Barapani, Meghalaya

Livestock Migratory Route

With the increasing demand of meat in the state, livestock migration and movement has become a common phenomenon either to suffice the trade needs or fulfill the grazing requirement. The quantum of movement towards the state is more rather than the outgoing livestock population owing to the inherently meager livestock population of the state.

Trade for meat animal is common between the neighboring districts of the state with the border districts of Assam and Bangladesh wherein large scale buying and selling of meat animals take place in unorganized markets.

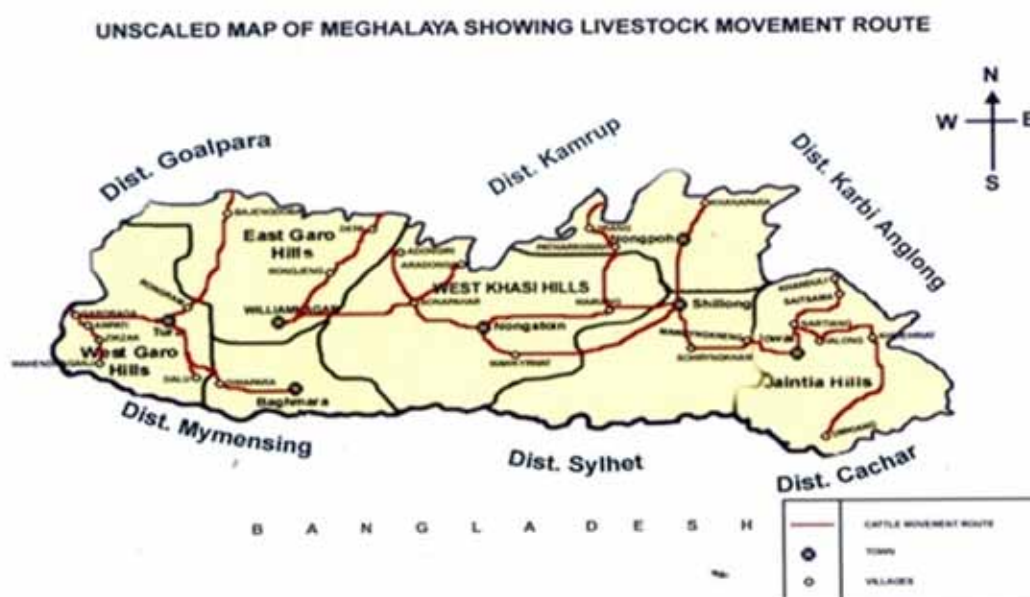


Fig. 3.1. Livestock Migratory Route

Epidemiological Analysis

The data on the livestock disease outbreaks, attack and mortality in the State of Meghalaya has been compiled from the monthly Animal Health information report on the incidence of specific and nonspecific diseases collected from the Disease Investigation Office and Disease Surveillance Office and published by the Directorate of Animal Husbandry and Veterinary, Government of Meghalaya. The epidemiological analysis of the data on various diseases affecting the livestock and poultry in the state during the period under report are done and correlated with the meteorological parameters.

Epidemiological analyses of livestock and poultry diseases pertaining to the species wise spatial and temporal analysis are discussed below

Spatial and Temporal analysis

The Spatial distribution indicates the places of occurrence of disease in the state of Meghalaya while temporal distribution relates to the time of occurrence of the disease outbreaks. Species wise spatial and temporal distributions against various diseases are illustrated below

I. Epidemiological analysis of cattle diseases

Spatial analysis

District wise prevalence of cattle diseases compiled from the data obtained for the disease like HS and BQ from the State A.H. and Veterinary Department, Meghalaya was analyzed and depicted (Table 3.2).

Table 3.1. Livestock Diseases Recorded in the State

Disease	No. of animals affected/no. of outbreaks				No. of animals died				Population at risk				No. of locations		Vaccination
	Cattle	Goat	Pig	Poultry	Cattle	Goat	Pig	Poultry	Cattle	Goat	Pig	Poultry	No. of dist	No. of Villages	
CSF	1096/89	--	--	--	--	-	54		--	--	375883	--	4	72	--
FP	--	--	--	8960/67	--	-	--	128	--	--	--	2262955	5	65	--
RD	--	--	--	3606/64	--	-	--	373	--	--	--	2262955	5	50	--
HS	240/24	--	--	--	0	-	--	--	452326	--	--	--	3	22	--
BQ	351/24	--	--	--	0	-	--	--	452326	--	--	--	3	22	--

Table 3.2. District-wise disease incidence in cattle of Meghalaya

Disease	Incidence	Jaintia	Ri-bhoi	East Khasi	West Khasi	East Garo	West Garo	South Garo
BQ	Outbreak	0	0	3	8	0	14	0
	Attack	0	0	37	128	0	186	0
	Death	0	0	0	0	0	0	0
HS	Outbreak	0	0	1	10	13	0	0
	Attack	0	0	8	140	92	0	0
	Death	0	0	0	0	0	0	0

Temporal analysis

Analysis of monthly data pertaining to outbreak, attack and death of cattle, compiled from the data obtained for the diseases like HS and BQ from the State A.H. and Veterinary Department, Meghalaya were analyzed and depicted (Table 3.3)

Table 3.3. Month Wise Incidence Of Diseases Of Cattle In Meghalaya

Disease	Incidence	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Total
BQ	Outbreak	1	0	1	1	2	2	0	0	6	6	0	6	25
	Attack	5	0	2	20	91	28	0	0	95	42	0	68	351
	Death	0	0	0	0	0	0	0	0	0	0	0	0	0
HS	Outbreak	1	0	0	1	2	1	1	0	5	6	0	7	24
	Attack	8	0	0	17	33	12	8	6	70	46	0	40	240
	Deaths	0	0	0	0	0	0	0	0	0	0	0	0	0

II. Epidemiological analysis of swine diseases

Spatial analysis

District wise prevalence of swine diseases compiled from the data obtained for diseases like Swine fever and Swine from the State A.H. and Veterinary Department, Meghalaya were analyzed and depicted (Table 3.4).

Table 3.4. District-wise disease incidence in swine of Meghalaya

Disease	Incidence	Jaintia	Ri-bhoi	East Khasi	West Khasi	East Garo	West Garo	South Garo
Swine fever	Outbreak	0	8	43	16	0	22	0
	Attack	0	18	606	248	0	224	0
	Death	0	3	33	3	0	15	0

Temporal analysis

Analysis of monthly data pertaining to outbreak, attack and death of Swines as compiled from the data obtained from the State A.H. and Veterinary Department, Meghalaya were analyzed and depicted (Table 3.5).

Table 3.5. Month Wise Incidence of Diseases Of Swine In Meghalaya

Disease	Incidence	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Total
Swine fever	Outbreak	1	1	3	6	9	6	4	6	11	12	12	18	89
	Attack	15	33	58	162	170	138	41	22	140	99	45	173	1096
	Deaths	0	0	0	0	0	0	3	0	0	0	0	51	54

III. Epidemiological analysis of Avian diseases

Spatial analysis

District wise prevalence of avian diseases compiled from the data obtained for the disease like Ranikhet disease, Fowl pox from the State A.H. and Veterinary Department, Meghalaya were analyzed and depicted (Table 3.6).

Table 3.6. District-Wise Disease Incidence In Avian of Meghalaya

Disease	Incidence	Jaintia	Ri-bhoi	East Khasi	West Khasi	East Garo	West Garo	South Garo
RD	Outbreak	1	2	35	11	0	15	0
	Attack	35	244	1722	1235	0	370	0
	Death	0	0	282	0	0	91	0
Fowl pox	Outbreak	9	13	32	12	0	1	0
	Attack	232	1647	6508	543	0	30	0
	Death	0	128	0	0	0	0	0

Temporal analysis

Analysis of monthly data pertaining to outbreak, attack and death of avian diseases compiled from the data obtained for the disease like Ranikhet disease, Fowl pox from the State A.H. and Veterinary Department, Meghalaya were analyzed and depicted (Table 3.7).

Table 3.7. Month wise incidence of avian diseases in Meghalaya

Disease	Incidence	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Total
RD	Outbreak	2	1	0	7	3	8	2	1	9	15	7	9	64
	Attack	215	114	0	226	830	134	236	44	331	455	555	466	3606
	Deaths	0	0	0	0	0	0	0	0	0	0	0	0	0
Fowl pox	Outbreak		3	1	10	13	9	7	4	7	7	0	6	67
	Attack	0	56	7	1015	2154	3979	464	452	293	309	0	231	8960
	Death	0	0	0	0	120	8	0	0	0	0	0	0	128

Overall outbreaks and attacks of major livestock and poultry diseases (2010-2011)

The species-wise, district-wise and month-wise outbreaks and attacks of major livestock and poultry diseases during 2010-11 are collectively depicted in Table 3.8 to 3.11.

Table 3.8. District-Wise Outbreaks of Diseases In Meghalaya

Species	Disease	Jaintia	Ri-bhoi	East Khasi	West Khasi	East Garo	West Garo	South Garo
Cattle	HS	0	0	1	10	13		0
	BQ	0	0	3	8	0	14	0
Swine	SF	0	8	43	16	0	22	0
Avian	RD	1	2	35	11	0	15	1
	Fowl pox	9	13	32	12	0	1	9

Table 3.9. District-Wise Attacks of Diseases In Meghalaya

Species	Disease	Jaintia	Ri-bhoi	East Khasi	West Khasi	East Garo	West Garo	South Garo
Cattle	HS	0	0	8	140	92	0	0
	BQ	0	0	37	128	0	186	0
Swine	SF	0	18	606	248	0	224	0
Avian	RD	35	244	1722	1235	0	370	35
	Fowl pox	232	1647	6508	543	0	30	232

Table 3.10. Month-wise disease outbreaks of livestock and poultry in Meghalaya

Species	Disease	April	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Total
Cattle	BQ	1	0	1	1	2	2	0	0	6	6	0	6	25
	HS	1	0	0	1	2	1	1	0	5	6	0	7	24
Swine	SF	1	1	3	6	9	6	4	6	11	12	12	18	89
Avian	RD	2	1	0	7	3	8	2	1	9	15	7	9	64
	Fowl Pox	0	3	1	10	13	9	7	4	7	7	0	6	67

Table 3.11. Month-wise disease attacks of livestock and poultry in Meghalaya

Species	Disease	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Total
	BQ	5	0	2	20	91	28	0	0	95	42	0	68	351
	HS	8	0	0	17	33	12	8	6	70	46	0	40	240
Swine	SF	15	33	58	162	170	138	41	22	140	99	45	173	1096
Avian	RD	215	114	0	226	830	134	236	44	331	455	555	466	3606
	Fowl Pox	0	56	7	1015	2154	3979	464	452	293	309	0	231	8960

Correlation of outbreak of diseases in the state of Meghalaya with the meteorological data (weather parameters affect on disease occurrence)

Bovines Outbreak of BQ and HS were higher during the months of December, January and March with 6 each outbreak for BQ and 5, 6 and 7 for HS respectively. The average rainfall and humidity was 22.3 mm, 72.8 %, respectively while the average maximum and minimum temperature was 20 and 8.1 °C, respectively.

Swine Maximum outbreaks of swine fever in swine of Meghalaya was reported during December (11), January (12), February (12) and March (18). The average rainfall and humidity was 32 mm, 71 %, respectively while the average maximum and minimum temperature was 20 and 8.1 °C, respectively.

Poultry In case of Ranikhet disease in poultry, maximum outbreaks were reported during December (9), January (15), February (7) and March (9) where the average rainfall and humidity was 32 mm, 71 %, respectively while the average maximum and minimum temperature was 20 and 8.1 °C, respectively, whereas fowl pox was recorded during July (10), August (13), September (9) and October (7). The average rainfall and humidity was 298.2 mm, 85.7 %, respectively while the average maximum and minimum temperature was 25.7 and 18.2 °C, respectively.

Investigation Of Livestock Diseases

a) Rotavirus infection in livestock

An outbreak of diarrhea in pigs at Govt. farm Krydemkulai was attended and fecal samples were collected

from ailing animals and screened for enteric pathogen which was found to be positive for group A rotavirus by SDS-PAGE and Reverse Transcription-Polymerase Chain Reaction (RT-PCR), besides *E.coli* was also recovered from some of the samples by culture and isolation methods.

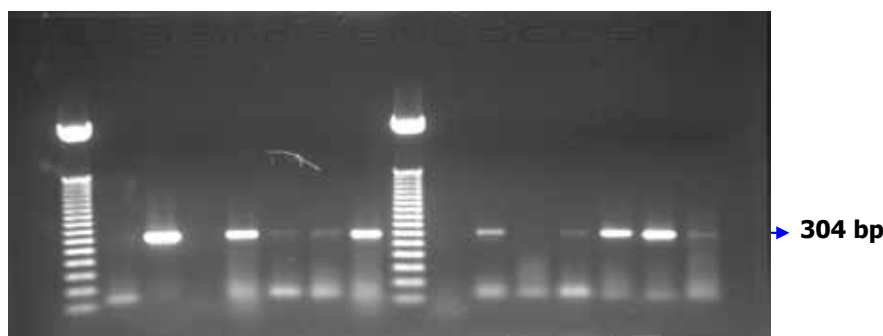


Fig. 3.2. Detection of rotavirus by RT-PCR with Rota 1 and Rota 2 primers

b) Poxvirus infection in turkey

An outbreak of suspected poxvirus infection in turkey was investigated. The scab samples were collected and inoculated into chorioallantoic membrane (CAM) of 9 day old chicken embryonated eggs. After the third passage, characteristic pock lesions could be identified.



Fig. 3.3 Lesions of poxvirus infection in turkey



Fig. 3.4 Pock lesions in CAM

c) PCR serogrouping of *Listeria monocytogenes* isolates

Isolates of *L. monocytogenes* recovered from various sources were subjected to PCR serogrouping against serogroup specific genes. Our studies indicated that 2.9% and 10.3% of the isolates falls in serogroups 1 & 4, respectively. This rapid PCR method can be employed for serogrouping studies of *L. monocytogenes*, as an alternative to more expensive and laborious methods.

d) Detection of mastitis pathogens

A total of 72 milk samples (20 clinical mastitis case and 52 from apparently healthy). Out of 52 apparently healthy 24 were CMT positive, in which 15 isolates were *Streptococcus agalactiae*, 4 *Staphylococcus* and 7 *E. coli*. From 20 clinical samples, 7 were *Staphylococcus*, 5 *E. coli* and 2 *Streptococcus agalactiae*. Molecular characterization of *Streptococcus agalactiae* was carried out against specific gene of 16S rRNA gene (220 bp) and *cfb* gene (153 bp) of Group B Streptococci (GBS).

e) Screening of brucellosis and IBR

A total of 35 samples were collected from Yak from west Kameng district of Arunachal Pradesh for screening brucellosis and IBR. None of the samples was found positive for brucellosis by RBPT while 18 samples were positive for IBR by indirect ELISA kit (IBR).

4. AICRP on ADMAS Collaborating Unit: Bhopal, Madhya Pradesh

Madhya Pradesh- Geographical location

Madhya Pradesh is located between longitude 74° E to 84° E and latitude 18° to 26° N. It forms the heart of India. It is surrounded by five states. On the north are Uttarpradesh and Rajasthan, Chhattisgarh in the east and Gujarat and Rajasthan on the west. Maharashtra is located on the southern boundary of Madhya Pradesh. The overall area of the state is 308 thousand square kilometers.

Climate

Madhya Pradesh has a subtropical climate. Like most of north India it has a hot dry summer (April-June) followed by monsoon rains (July-September) and a cool and relatively dry winter. The average rainfall is about 1370 mm. It decreases from east to west. The south-eastern districts have the heaviest rainfall, some places receiving as much as 2150 mm, while the western and north-western districts receive 1000 mm or less.

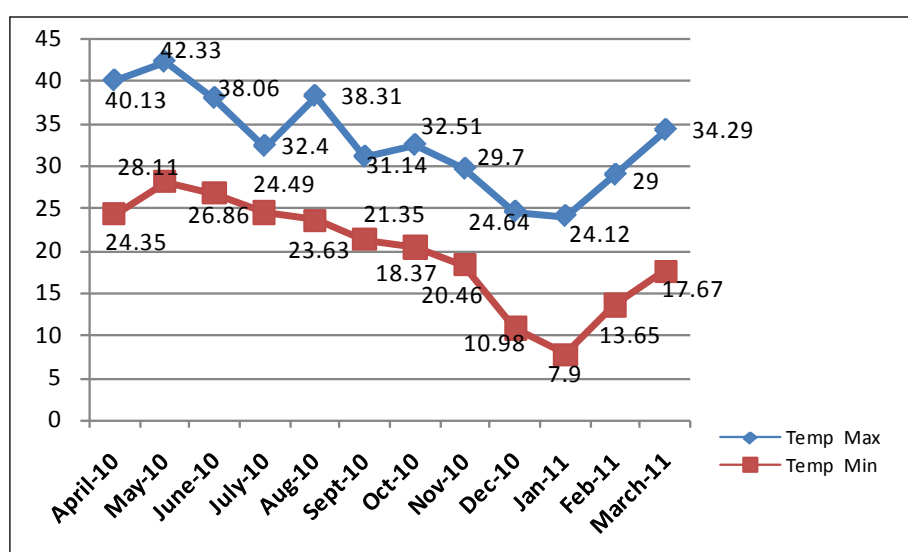


Fig. 4.1. Monthwise Average Temperature- Year 2010-11

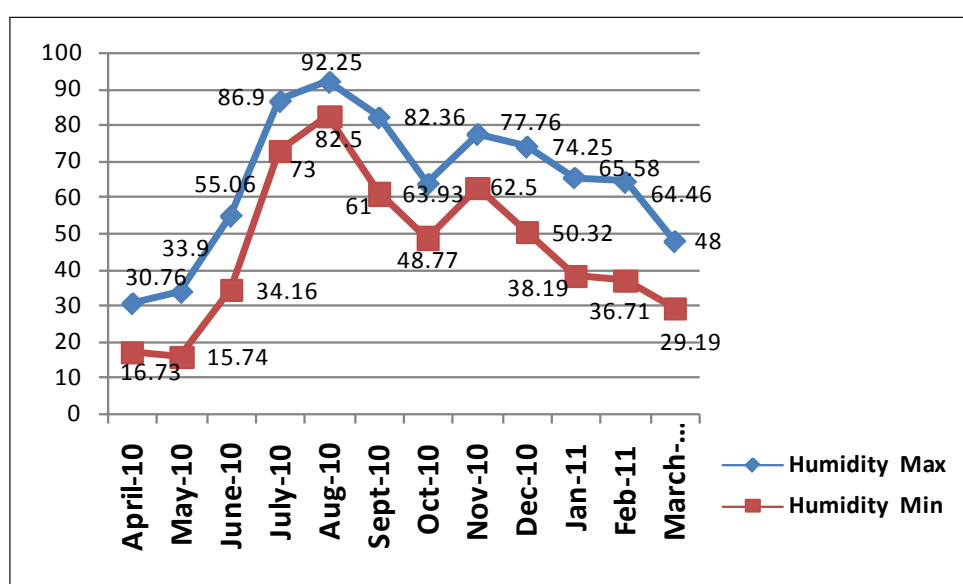


Fig. 4.2. Monthwise Average Humidity- Year 2010-11

Disease Profile Year 2010-11

Madhya Pradesh state is having 22 division/districts level laboratories in 50 districts. A total of **3, 58, 266** samples were tested in all by 22 laboratories of the State during the year 2010-11.

Outbreaks reported –Year 2010-11

The Outbreaks of livestock, poultry and wild life were declared at field level through various investigations. Postmortem examination and sample collection were carried out and collected samples were subjected for latest diagnosis methods for accurate diagnosis/ confirmation.

On the basis of field reports and laboratory investigations year-wise important diseases outbreaks in the State are as follows.

Table 4.1. Year-wise important diseases outbreaks in the State

S No	Diseases	Species	Year-wise Outbreaks					
			05-06	06-07	07-08	08-09	09-10	10-11
2	PPR	Caprine and Ovine	102	40	30	24	09	17
3	Swine Fever	Swine	28	12	03	03	16	08
4	Goat Pox	Caprine	-	01	-	-	-	-
5	HS	Bovine	32	39	30	39	37	25
6	BQ	Bovine	10	21	05	10	09	05
7	Anthrax	Bovine	09	05	05	06	01	01
8	Enterotoxaemia	Caprine and Ovine	03	--	-	01	01	-
9	Avian Influenza	Avian	01	--	-	-	-	-
10	Ranikhet	Avian	-	-	01	02	01	01

Priority of Disease in Madhya Pradesh Year 2010-11

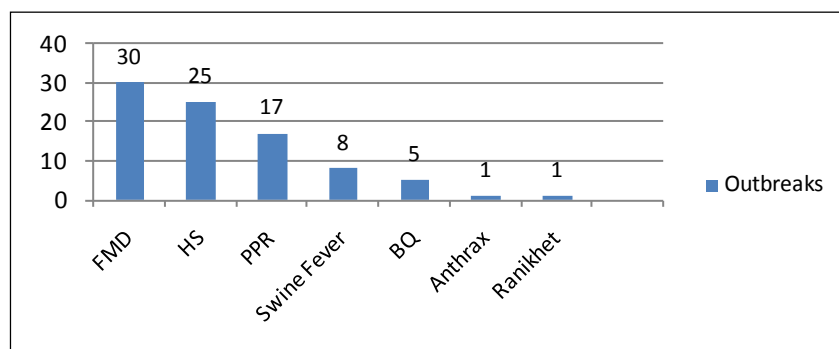


Fig4.3 Priority of Disease in Madhya Pradesh Year 2010-11

Disease prevalence in Agro-climatic regions

Table 4.2. Five years important disease outbreaks in different agro climatic regions

Sl. No.	Agro-climatic regions	Rainfall Ranges in mm	Districts	Diseases Prevalence
1	Chhattisgarh plains	1200 to 1600	Balaghat.	PPR, HS & BQ
2	Northern Hill Region of Chhattisgarh	1200 to 1600	Shahdol, Mandla, Dindori, Anuppur, Sidhi (Singroli Tehsil (Bedhan) Umariya .	PPR, Swine Fever, HS, BQ & Anthrax

Sl. No.	Agro-climatic regions	Rainfall Ranges in mm	Districts	Diseases Prevalence
3	Kymore Plateau & Satpura Hills	1000 to 1400	Rewa, Satna, Panna, Jabalpur, Seoni, Katni, Sidhi (except Singroli Tehsil)	PPR, Swine fever HS BQ & Anthrax
4	Central Narmada Valley	1200 to 1600	Narsinghpur, Hoshangabad, Sehore, (Budni Tehsil) Raisen (Bareli Teh.)	PPR, Swine fever HS BQ & Anthrax
5	Vindhya Plateau	1200 to 1400	Bhopal, Sagar, Damoh, Vidisha, Raisen (except Barely Teh.) Sehore (*except Budni Teh.) Guna (Chanchoda, Raghogarh, Aaron Tah)	PPR, Swine fever HS , BQ , Anthrax & Rabies
6	Gird Region	800 to 1000	Gwalior Bhind, Morena, Sheopur Kala, Shivpuri,(except Pichore, Karera, Nanwar, Khaniadhana Teh.) Guna (except Aron, Raghogarh, Chachoda Teh.) Ashoknagar	PPR, Swine fever & HS
7	Bundelkhand	800 to 1400	Chhattarpur, Datia, Tikamgarh, & Shivpuri (Karera, Pichhore, Narwar & Khaniadhana Tehsil)	PPR, Swine fever HS , BQ & Rabies
8	Satpura Plateau	1000 to 1200	Betul, and Chhindwara	PPR, Swine fever HS , BQ & Rabies
9	Malwa Plateau	800 to 1200	Mandsour, Neemuch , Ratlam, Ujjain, Dewas, Indore, Shajapur, Rajgarh, & Dhar (Dhar, Badnawar & Sardarpur Tehsils.) Jhabua (Petlawad Tehsil)	PPR, Swine fever HS , BQ & Rabies
10	Nimar (Plains)	800 to 1000	Khandwa, Burhanpur, Kargone, Barwani, Harda, Dhar, (Manawar, Dharpuri & Gandhawani Tehsil)	PPR, HS , BQ & Rabies
11	Jhabua Hills	800 to 1000	Jhabua District (except - Petlawad Tehsil) & Dhar (only Kukshi Tehsil)	HS & BQ

Pestes des petits ruminants (PPR)

PPR is most important viral disease of sheep and goat in the State. The PPR outbreaks are great problem for small live-stock owners in the State since last couple of years. Although the number of outbreaks bring down due to vaccination programme under ASCAD scheme. The year wise outbreaks of the disease are as follows.

Table 4.3. Year-wise PPR Outbreaks

Year	District	Species	O/Bs	Lab ,Y/N	Population	Attack	Death
2004-05	6	Caprine	6	Y-6	5842	744	101
2005-06	25	Caprine	102	Y 37 -N65	47499	6562	2369
2006-07	13	Caprine	40	13-Y, 27-N	11834	1925	745
2007-08	13	Caprine	30	25-Y	9741	1191	699
2008-09	13	Caprine	24	15Y,N 9	10666	1355	474
2009-10	09	Caprine	09	09 Y	2871	185	77

Table 4.4. PPR Outbreak- Year 2010-11

Sl. No.	District	OB	Species	Lab, Y/N	Population	Attack	Death
1	Bhopal	2	Goat	Y	1021	53	27
2	Raisen	2	Goat	Y	235	91	42
3	Betul	2	Goat	Y	589	15	2
			Sheep	Y	464	80	13

Sl. No.	District	OB	Species	Lab, Y/N	Population	Attack	Death
4	Burhanpur	2	Sheep	Y	5125	235	125
5	Khandwa	1	Goat	Y	225	10	10
6	Sagar	2	Goat	N	320	35	13
7	Guna	1	Goat	Y	651	21	19
8	Shivpuri	3	Goat	Y	1569	116	36
9	Seoni	2	Goat	Y	1435	185	22
Total		17	S & G	Y 15	11634	841	309

In this year seventeen (17) outbreaks were reported from 9 districts of the State. Under reporting of PPR outbreaks were observed in most of the districts of the State.

The distribution of outbreaks shows that maximum no of outbreaks were reported from the Shivpuri district, followed by Bhopal, Raisen, Betul, Seoni, Khandawa and Burhanpur districts.

Table No. 4.5. Distribution of PPR Outbreaks in different agro climatic zones 2010-11

Sl. No.	Agro climatic Zone	Crop zone	No. of OBs.	No. of Attacks	No. of Deaths
1	Chhattisgarh plains	Rice zone	-	-	-
2	Northern Hill Region of Chhattisgarh		-	-	-
3	Kymore Plateau & Satpura Hills	Wheat Rice Zone	2	185	22
4	Central Narmada Valley	Wheat Zone	2	91	42
5	Vindhya Plateau		4	88	40
6	Gird Region	Wheat-Jowar	4	137	55
7	Bundelkhand		-	-	-
8	Satpura Plateau	2	95	15	
9	Malwa Plateau	Cotton Jowar	-	-	-
10	Nimar (Plains)		3	245	135
11	Jhabua Hills		-	-	-

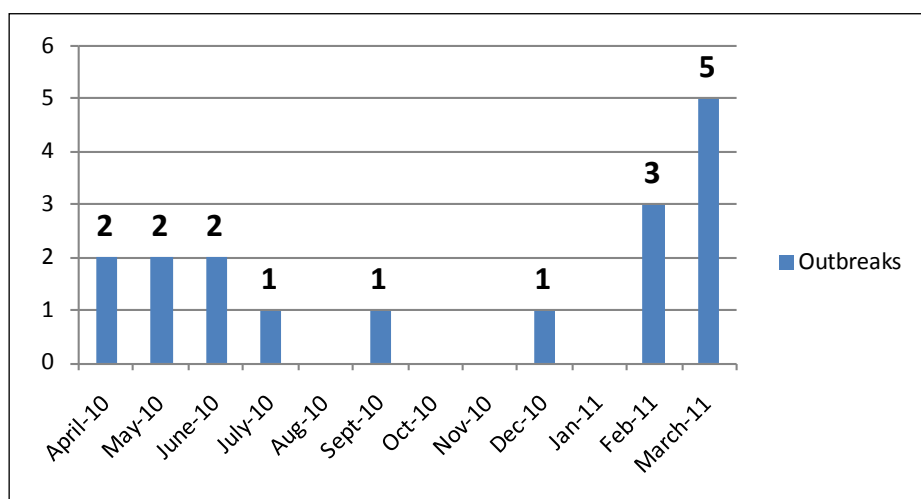


Fig. 4.4. Seasonal trend of PPR outbreaks in 2010-11

The disease was reported almost throughout the year. Maximum no of outbreaks were reported in March and February months. The disease is sporadic in nature.

Table 4.6. Correlation of PPR Seasonal outbreak with Temp, Humidity & Rainfall - Year 2010-11

Season	No. of Outbreaks	Temperature (Avg)		Humidity (Avg)		Rain fall (mm)
		Max	Min	Max	Min	
Summer (March- May)	4	39.44	24.00	35.59	18.55	3.6
Early monsoon (June-July)	3	35.21	25.67	70.98	55.08	320.1
Late monsoon (Aug- Oct)	1	35.98	21.81	79.51	64.09	414.2
Winter (Nov-Feb)	4	26.86	12.72	70.51	46.93	130.5

Sero-surveillance of PPR Infection

Sero-surveillance of PPR disease was conducted from the year 2005-06 onwards and almost all the villages were found sero-positive for this disease.

Table 4.7. Year-wise PPR Sero-prevalence

Year	No of Districts	Villages	Species	Positive samples	Negative samples	Total	% Positive
2005-06	18	134	Caprine	669	663	1332	50%
2006-07	09	39	Caprine	230	121	351	66%
2007-08	10	60	Caprine	323	313	636	51%
2008-09	10	40	Caprine	147	89	236	62%
2009-10	10	87	Caprine	442	298	740	60%
			Ovine	17	03	20	85%

Table-4.8. District wise Sero-prevalence of PPR disease –Year 2010-11

S No	Districts	Villages	Goat		Sheep		Total Tested	Total Positive
			Tested	Positive	Tested	Positive		
1	Betul	25	132	102	-	-	132	102
2	Hoshangabad	1	45	33	-	-	45	33
3	Raisen	1	12	5	-	-	12	5
4	Rajgarh	1	-	-	14	8	14	8
5	Indore	14	155	73	10	5	165	78
6	Khandawa	2	34	20	-	-	34	20
7	Burhanpur	1	-	-	18	16	18	16
8	Ujjain	8	71	53	2	1	73	54
9	Shivpuri	3	106	72	-	-	106	72
10	Sagar	8	49	25	-	-	49	25
11	Seoni	3	17	5	-	-	17	5
12	Mandala	42	100	77	-	-	100	77
G Total		109	721	465	44	30	765	495

In this year Sero-surveillance of PPR disease was conducted in 109 Villages and almost all the villages/districts were found sero-positive for this disease.

Swine Fever

Swine fever is an acute, highly contagious viral disease of swine. The disease is sporadic in nature and common in State. The year-wise outbreaks of Swine Fever disease is as follows.

Table 4.9. Year-wise Swine Fever Outbreaks

Year	Districts	O/Bs	Lab Y/N confirm.	Species	Population at risk	Attack	Death
2005-06	15	28	Y-21,N-7	Swine	16850	3538	2209
2006-07	10	12	7-Y, 5-N	Swine	7388	1423	533
2007-08	03	03	1-Y	Swine	2652	571	498
2008-09	02	03	03 Y	Swine	1217	196	99
2009-10	11	16	Y	Swine	3737	775	451

Table 4.10. Swine Fever Outbreaks- Year 2010-11

S No	Districts	OB	Lab Y/N	Population	Attack	Death
1	Bhopal	1	Y	56	23	16
2	Chhattarpur	1	Y	960	230	160
3	Chhindwada	3	2 Y, 1N	556	147	113
4	Mandla	1	N	200	75	35
5	Rewa	1	Y	70	25	12
6	Sidhi	1	Y	40	17	60
G Total		08	6 Y, 2 N	1882	517	396

In current year eight outbreaks were reported from 6 districts in the State. Maximum no of outbreaks were reported from Chhindwara District.

Table No. 4.11. Distribution of Swine fever Outbreaks in different agro climatic zones Year 2010-11

Sl. No.	Agro climatic Zone	Crop zone	No. of OBs.	No. of Attacks	No. of Deaths
1	Chhattisgarh plains	Rice zone	-	-	-
2	Northern Hill Region of Chhattisgarh		1	75	35
3	Kymore Plateau & Satpura Hills	Wheat-Rice Zone	2	42	72
4	Central Narmada Valley	Wheat Zone	-	-	-
5	Vindhya Plateau		1	23	16
6	Gird Region	Wheat-Jowar	-	-	-
7	Bundelkhand		1	230	160
8	Satpura Plateau		3	147	113
9	Malwa Plateau	Cotton - Jowar	-	-	-
10	Nimar (Plains)		-	-	-
11	Jhabua Hills		-	-	-

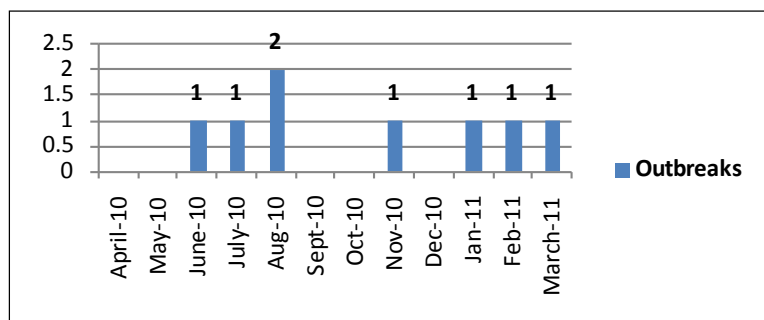


Fig. 4.5. Seasonal trend of Swine Fever outbreaks- Year 2010-11

The maximum no of outbreaks was reported in August month followed by June , July, Nov, Jan, Feb and March months.

Table 4.12. Correlation of Swine Fever seasonal outbreak with Temp, Humidity & Rainfall - Year 2010-11

Season	No. of Outbreaks	Temperature (Avg)		Humidity (Avg)		Rain fall (mm)
		Max	Min	Max	Min	
Summer (March- May)	1	39.44	24.00	35.59	18.55	3.6
Early monsoon (June-July)	2	35.21	25.67	70.98	55.08	320.1
Late monsoon (Aug- Oct)	2	35.98	21.81	79.51	64.09	414.2
Winter (Nov-Feb)	3	26.86	12.72	70.51	46.93	130.5

Haemorrhagic Septicemia

Haemorrhagic Septicemia is a highly infectious disease of Bovine causing huge economic loss to the farmers. The disease is common in the State. The year-wise outbreaks of the disease are as follows.

Table 4.13. Year-wise HS Outbreaks

Year	Districts	Village	Lab Y/N Confirm	Species	Population	Attack	Death
2005-06	12	32	Y-29, N-3	Bovine	11311	234	69
2006-07	16	39	27-Y, 12-N	Bovine	15686	499	136
2007-08	16	30	Y	Bovine	20215	366	129
2008-09	15	39	Y	Bovine	30117	701	201
2009-10	12	37	Y	Bovine	71279	455	152

A total 25 outbreaks of HS were reported from 13 districts of the State. Jabalpur district had maximum no of outbreaks followed by Balaghat and Betul, Indore, Dhar, Katni districts.

Table 4.14. Distribution of HS Outbreaks in different agro climatic zones Year 2010-11

Sl. No.	Agro climatic Zone	Crop zone	No. of OBs.	No. of Attacks	No. of Deaths
1	Chhattisgarh plains	Rice zone	3	14	3
2	Northern Hill Region of Chhattisgarh		1	12	5
3	Kymore Plateau & Satpura Hills	Wheat-Rice Zone	9	54	20
4	Central Narmada Valley	Wheat Zone	1	4	2
5	Vindhya Plateau		2	38	13
6	Gird Region	Wheat-Jowar	1	4	2
7	Bundelkhand		-	-	-
8	Satpura Plateau		2	16	2
9	Malwa Plateau	Cotton-Jowar	4	13	8
10	Nimar (Plains)		2	52	28
11	Jhabua Hills		-	-	-

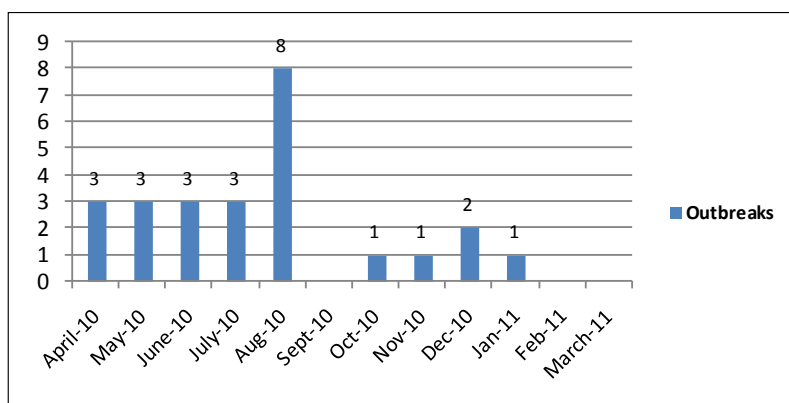


Fig. 4.6. Seasonal trend of HS outbreaks in 2010-11

The disease was reported almost throughout the year. The maximum no of outbreaks were reported in Aug month followed by April, May, June & July months.

Table 4.15. Correlation of HS seasonal outbreak with Temp, Humidity & Rainfall -Year 2010-11

Season	No. of Outbreaks	Temperature (Avg)		Humidity (Avg)		Rain fall (mm)
		Max	Min	Max	Min	
Summer (March- May)	6	39.44	24.00	35.59	18.55	3.6
Early monsoon (June-July)	6	35.21	25.67	70.98	55.08	320.1
Late monsoon (Aug- Oct)	9	35.98	21.81	79.51	64.09	414.2
Winter (Nov-Feb)	4	26.86	12.72	70.51	46.93	130.5

Black Quarter

Black Quarter an important bacterial disease causing economic losses to the farmers .This disease is common in State . The year-wise outbreaks of the disease are as follows.

Table 4.16. Year-wise wise Black Quarter Outbreaks

S. No.	Districts	Out breaks	Lab Confirm	Species	Population	Attack	Death
2005-06	06	10	Y-9, N-1	Bovine	4671	88	25
2006-07	09	21	16-Y,5-N	Bovine	5214	267	51
2007-08	05	05	5-Y	Bovine	1255	35	14
2008-09	04	10	10-Y	Bovine	5600	209	23
2009-10	04	04	Y	Bovine	7518	113	29

Total five outbreaks were reported from 2 districts in the year 2010-11. Chhindwara district had maximum outbreaks followed by Balaghat district.

Table 4.17. Distribution of BQ Outbreaks in different agro climatic zones Year 2010-11

Sl. No.	Agro climatic Zone	Crop zone	No. of OBs.	No. of Attacks	No. of Deaths
1	Chhattisgarh plains	Rice zone	1	4	3
2	Northern Hill Region of Chhattisgarh		-	-	-
3	Kymore Plateau & Satpura Hills	Wheat-Rice Zone	-	-	-
4	Central Narmada Valley	Wheat Zone	-	-	-
5	Vindhya Plateau		-	-	-

Sl. No.	Agro climatic Zone	Crop zone	No. of OBs.	No. of Attacks	No. of Deaths
6	Gird Region	Wheat-Jowar	-	-	-
7	Bundelkhand		-	-	-
8	Satpura Plateau		4	35	15
9	Malwa Plateau	Cotton-Jowar	-	-	-
10	Nimar (Plains)		-	-	-
11	Jhabua Hills		-	-	-

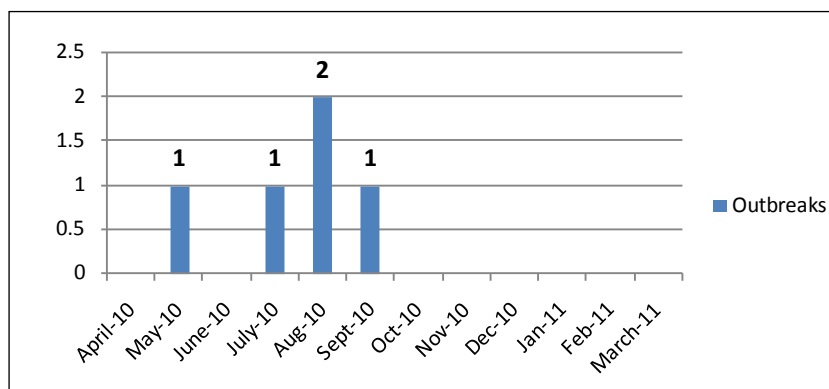


Fig. 4.7. Seasonal trend of Black Quarter -Year 2010-11

The maximum no of outbreaks were reported in Aug month followed by April, July and Sept month.

Table 4.18. Correlation of Black Quarter seasonal outbreak with Temp, Humidity & Rainfall - Year 2010-11

Season	No. of Outbreaks	Temperature		Humidity		Rain fall (mm)
		Max	Min	Max	Min	
Summer (March- May)	2	39.44	24.00	35.59	18.55	3.6
Early monsoon (June-July)	1	35.21	25.67	70.98	55.08	320.1
Late monsoon (Aug- Oct)	3	35.98	21.81	79.51	64.09	414.2
Winter (Nov-Feb)	-	26.86	12.72	70.51	46.93	130.5

Table 4.19. Correlation of BQ outbreaks with soil type - Year 2007-08, 2008-09, 2009-10 & 2010-11

S No	Soil type	No. of Outbreaks	No of Attack	Death
1	Red & Yellow (Medium)	03	14	06
2	Mixed red and black soil (Medium)	07	117	21
3	Alluvial (Light)	-	-	-
4	Deep black (deep)	05	58	19
5	Shallow black (Medium)	09	63	31
6	Medium black & deep black (Medium / Heavy)	05	229	31

An analysis of the relationship of soil type to outbreaks of Black quarter indicates that the disease is more in mixed red and Shallow black soil area and lowest in Red & Yellow (Medium).

Anthrax

The disease reported in some district in the state in Bovine population only. The year-wise outbreaks of the disease are as follows.

Table 4.20. Year-wise Anthrax Outbreaks

Year	Districts	Villages	Lab Y/N Confirm	Species	Population	Attack	Death
2005-06	05	9	9 Y	Bovine	2318	58	44
2006-07	04	5	5-Y	Bovine	1841	177	17
2007-08	02	5	5-Y	Bovine	1171	21	17
2008-09	04	6	6-Y	Bovine	6270	89	44
2009-10	01	01	Y	Bovine	311	01	01

In this year only one outbreaks of Anthrax disease was reported from Sidhi district in the State. The outbreak was reported in May month.

Table 4.21. Distribution of Anthrax Outbreaks in different agro climatic zones Year 2007-08, 2008-09, 2009-10 & 2010-11

Sl. No.	Agro climatic Zone	Crop zone	No. of Obs.	No. of Attacks	No. of Deaths
1	Chhattisgarh plains	Rice zone	-	-	-
2	Northern Hill Region of Chhattisgarh		09	58	47
3	Kymore Plateau & Satpura Hills	Wheat-Rice Zone	02	27	02
4	Central Narmada Valley	Wheat Zone	02	27	14
5	Vindhya Plateau		-	-	-
6	Gird Region	Wheat-Jowar	-	-	-
7	Bundelkhand		-	-	-
8	Satpura Plateau		-	-	-
9	Malwa Plateau	Cotton-Jowar	-	-	-
10	Nimar (Plains)		-	-	-
11	Jhabua Hills		-	-	-

Table 4.22. Correlation of Seasonal outbreak of Anthrax with Temp, Humidity & Rainfall - Year 2010-11

Season	No. of Outbreaks	Temperature		Humidity		Rain fall (mm)
		Max	Min	Max	Min	
Summer (March- May)	01	39.44	24.00	35.59	18.55	3.6
Early monsoon (June-July)	-	35.21	25.67	70.98	55.08	320.1
Late monsoon (Aug- Oct)	-	35.98	21.81	79.51	64.09	414.2
Winter (Nov-Feb)	-	26.86	12.72	70.51	46.93	130.5

Table 4.23 Correlation of Anthrax outbreaks with soil type Year 2007-08, 2008-09, 2009-10 & 2010-11

S No	Soil type	No. of Obs.	No of Attack	No of death
1	Red & Yellow (Medium)	09	58	47
2	Mixed red and black soil (Medium)	02	27	02
3	Alluvial (Light)	-	-	-
4	Deep black (deep)	02	27	14
5	Shallow black (Medium)	-	-	-
6	Medium black & deep black (Medium / Heavy)	-	-	-

An analysis of the relationship of soil type to outbreaks of Anthrax indicates that the disease is more in Red and Yellow soil area and lowest in Mixed red and black and deep black soil type areas.

Brucellosis

Brucellosis, a bacterial disease is one of the major abortion causing factor in large and small ruminants in the State. Sero-surveillance for brucellosis were routinely carried out in Govt. Breeding farms, private farms and villages. The suspected clinical cases of abortions were also tested for brucellosis.

Table 4.24. Year-wise testing of Brucellosis (RBPT)

Year	Districts	Cattle		Buffaloes		Other		Total Tested	Total Positive
		Tested	Positive	Tested	Posi	Tested	Positive		
2005-06	9	3417	24	1085	1	437	-	4939	36 (0.72%)
2006-07	12	7159	58	6178	10	1474	16	12894	84 (0.65%)
2007-08	09	3392	04	1789	-	466	-	5647	04 (0.07%)
2008-09	11	3420	15	1662	12	596	-	5678	27 (0.47%)
2009-10	14	6849	34	3706	10	1009	-	11564	44 (0.38%)

Table 4.25. Lab-wise testing (RBPT) of Brucellosis -Year 2010-11

S No	Districts	Cattle		Buffaloes		Other		Total Samples	Total Positive
		Tested	Positive	Tested	Positive	Tested	Positive		
1	Bhopal	778	4	209	-	-	-	987	04
2	Betul	231	-	95	-	-	-	326	-
3	Indore	720	-	550	-	-	-	1270	-
4	Ujjain	175	-	0	-	-	-	175	-
5	Sagar	750	-	92	-	50	-	942	-
6	Jabalpur	1262	5	1010	4	546	-	3364	09
7	Chhindwada	870	-	0	-	-	-	870	-
8	Balaghat	80	9	63	3	-	-	143	12
9	Mandla	387	-	283	-	-	-	670	-
10	Sidhi	507	-	193	-	-	-	700	-
11	Seoni	145	-	110	-	-	-	255	-
12	Khandwa	975	-	100	-	-	-	1075	-
13	Shivpuri	60	-	55	-	-	-	115	-
14	Satna	507	-	577	-	-	-	1084	-
15	Jhabua	60	-	0	-	-	-	60	-
G Total		7507	18	3337	7	596	-	11440	25 (0.21%)

Table 4.26. Year-wise Sero-prevalence of Brucellosis (ELISA)

Year	Dist.	Villages	Cattle			Buffallo			Goat			Total Test	Total +Ve
			Total	+Ve	-Ve	Total	+Ve	-Ve	Total	+Ve	-Ve		
2006-07	10	20	268	55	213	89	06	83	102	16	86	459	77 (17%)
2007-08	17	54	306	99	207	134	38	96	-	-	-	440	137(31.13%)
2008-09	8	42	558	85	473	89	15	74	-	-	-	647	100 (15.45%)

Blood Protozoan

Blood protozoan infections mainly caused by *Babesia spp.*, *Theileria spp.* and *Trypanosoma spp.* These diseases are common in the State.

Babesiosis

This disease is common in State among cross breed animals. Regular testing of clinical cases were conducted at DI laboratories and most of the districts were found positive for Babesiosis.

In this year, out of total 48 districts in the State 21 were found positive for Babesiosis. Incidence rate of Babesiosis is high in urban areas as compare to rural area, the reason may be higher crossbred population in urban area as compared to rural areas. The year-wise incidences of the disease is as follows

Table 4.27. Year-wise Incidence of Babesiosis

Year	Dis-tricts	Cattle		Buffaloes		Other		Total Tested	Total Positive
		Tested	Positive	Tested	Positive	Tested	Positive		
2006-07	22	10581	874	6979	752	1320	289	18880	1885 (9.96%)
2007-08	19	16136	1023	10987	567	3706	458	30829	2048 (6.64%)
2008-09	14	15261	604	9323	506	11402	270	35986	1380 (3.83%)
2009-10	16	16112	76 (4.71%)	10383	568 (5.47%)	7921	606 (7.65%)	34416	1934 (5.61%)

Out of total samples 41206 tested, 1219 (2.95%) animals were found positive for Babesiosis in 21 districts. In this year maximum incidences were found in Shivpuri district followed by Bhopal, Ujjain and Gwalior districts.

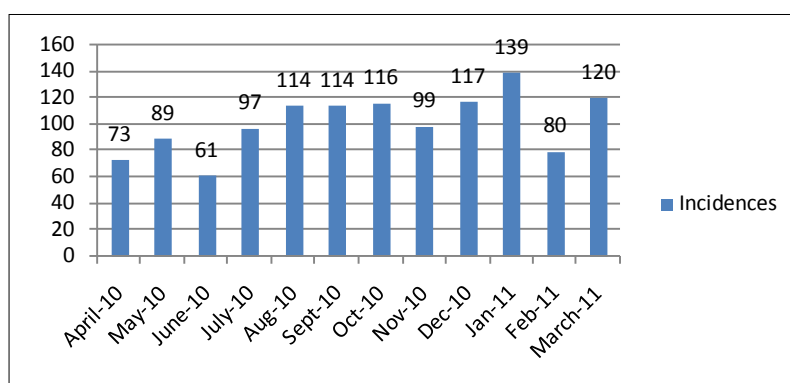


Fig. 4.8. Seasonal trend of Babesiosis in 2010-11

The disease is reported throughout the year with high incidences in January month followed by Aug, Sept, Jan and March months.

Theileriosis

Theileriosis is common protozoan infection in the State specially in crossbred animals. The year-wise incidences of the disease is as follows

Table 4.28. Year-wise Incidence of Theileriosis

Year	No. of districts	Cattle		Total tested	Total Positive
		Tested	Positive		
2006-07	09	7484	206	7484	206 (2.75%)
2007-08	08	4011	263	4011	263 (6.55%)
2008-09	04	7587	529	7587	529 (6.97%)
2009-10	07	9177	788	9177	788 (8.58%)

Maximum no of positive cases were recorded in Indore district followed by Jabalpur and Sagar district. Out of total samples tested 887 (8.70 %) samples of cattle were found positive for Theileria.

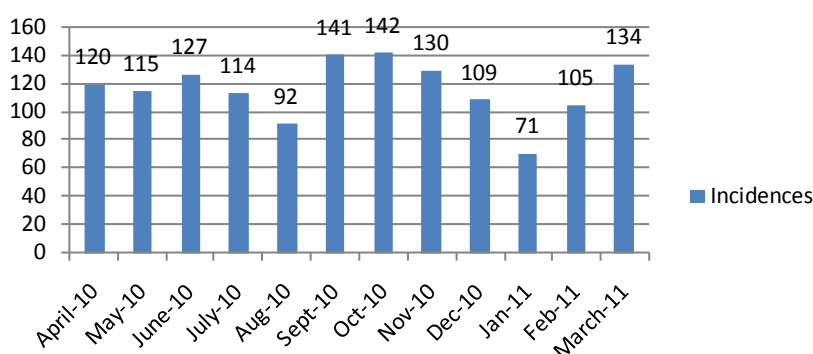


Fig. 4.9. Seasonal trend of Theileriosis in 2010-11

Maximum no of positive cases were reported in Sept, Oct, Nov and March months. The disease were reported throughout the year .

Trypanosomiasis

Trypanosomiasis is a common protozoan infection in the state. Most of the districts of the State were found positive for this disease. The year-wise incidences of the disease is as follows

Table 4.29. Year-wise Incidence of Trypanosomiasis

Year	Dis-tricts	Cattle		Buffaloes		Other		Total Tested	Total Positive
		Tested	Positive	Tested	Positive	Tested	Positive		
2006-07	19	8769	846	4640	634	1189	79	14598	1559 (10.67%)
2007-08	17	13335	563	7550	297	1784	36	22669	896 (3.95%)
2008-09	14	15704	605	9214	339	5529	73	30447	1017 (3.34%)
2009-10	15	17406	501 (2.87%)	10502	473 (4.50%)	8352	73 (0.87%)	36260	1047 (2.88%)

Maximum no of positive cases were reported in Shivpuri district followed by Gwalior and Rewa districts. Out of total 38686 samples tested 826 samples (2.13%) of animals were found positive for Trypanosomiasis .

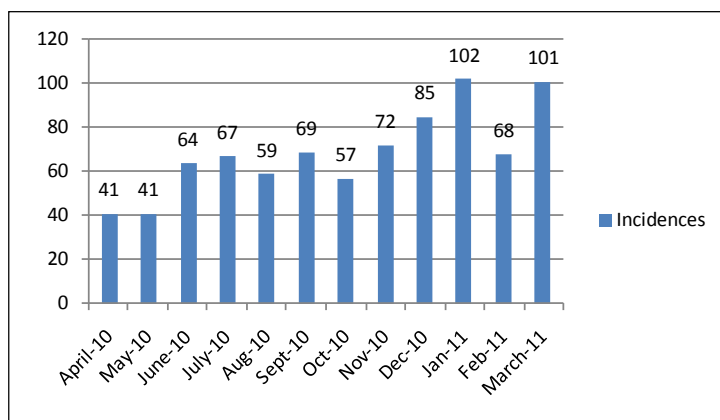


Fig. 4.10. Seasonal Trend of Trypanosomiasis in 2010-11

Maximum no of positive cases were reported in winter and rainy season. Though the disease is present throughout the year.

Anaplasmosis

Anaplasmosis is a common Rickettsial infection in local as well as crossbreed animals in State. The year-wise incidences of the disease is as follows

Table 4.30. Year-wise Incidence of Anaplasmosis

Year	Districts	Cattle		Buffaloes		Other		Total Tested	Total Positive
		Tested	Positive	Tested	Positive	Tested	Positive		
2006-07	11	7387	577	4002	255	1010	29	12399	861 (6.94%)
2007-08	17	10346	423	6821	246	879	03	18046	672 (3.72%)
2008-09	10	15081	387	7814	240	4589	33	27484	660 (2.40%)
2009-10	09	12072	452	6595	313	6401	36	25068	801 (3.91%)

Out of total samples 27748 samples tested (3.19 %) animals were found positive for Anaplasma. Cattle are more susceptible to the disease as compare to Buffalo.

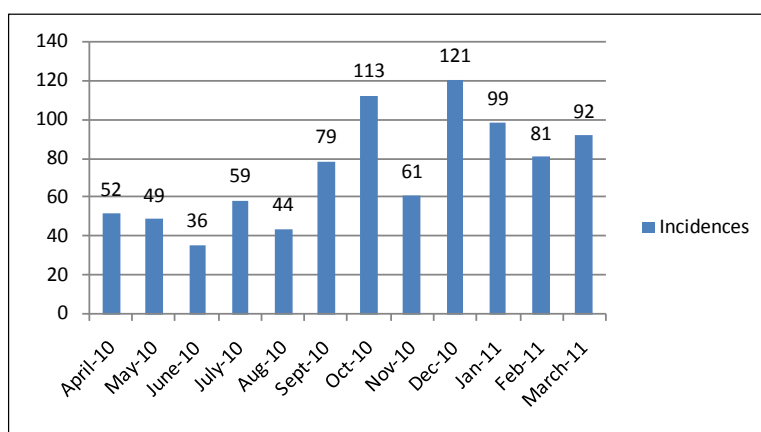


Fig. 4.11. Seasonal trend of Anaplasmosis in 2010-11

Max. no. of positive cases were reported in the month of December, and October months. The disease was present throughout the year.

Endo-parasitic infestation

Amphistomiasis

Amphistomiasis is a common infestation in State. Incidences of Amphistomiasis were reported from cattle, buffalo sheep and goat throughout the year. The year-wise incidences of the disease is as follows

Table 4.31. Year-wise Incidence of Amphistomiasis

Year	Districts	Cattle		Buffaloes		Other		Total Tested	Total Positive
		Tested	Positive	Tested	Positive	Tested	Positive		
2006-07	15	15977	783	9709	393	3662	69	29348	1245 (4.24 %)
2007-08	10	20947	741	7882	416	2641	54	31470	1211 (3.84%)
2008-09	09	26014	723	12027	374	14950	38	52991	1135 (2.14%)
2009-10	13	35908	852	17068	474	10734	64	63710	1390 (2.18%)

Out of total 56778 samples tested, (3.14% %) animals were found positive for Amphistome infestation. Ujjain & Jabalpur districts reported maximum number of positive cases followed by Satna district.

The district with higher incidence have huge marshy land which facilitates the intermediate host snail population and thus help in proliferation of parasite.

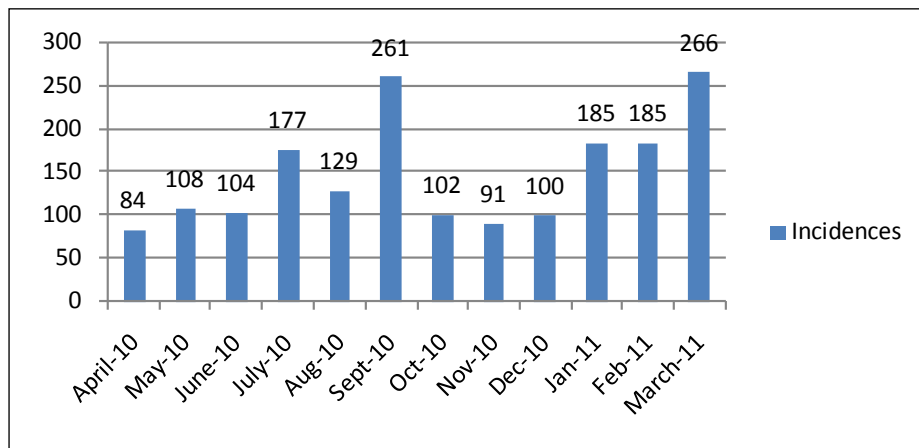


Fig. 4.12. Seasonal trend of amphistomiasis 2010-11

The Amphistome infestation is reported throughout the year. Maximum no of positiveve cases were reported in month of March followed by September and July months .

Fascioliasis

Incidence of Fasciola infestation were well reported in Cattle, Buffalo sheep and goat throughout the year. The year-wise incidences of the disease is as follows

Table 4.32. Year-wise Incidence of Fascioliasis

Year	Districts	Cattle		Buffaloes		Other		Total Tested	Total Positive
		Tested	Positive	Tested	Positive	Tested	Positive		
2006-07	23	23088	3216	11880	1685	3900	256	38868	5157 (13.26%)
2007-08	18	33240	2997	17556	2307	6481	407	57277	571 (9.97%)
2008-09	14	40039	2594	23103	1876	24769	333	87911	4803 (5.46%)
2009-10	18	39298	1629	21625	1150	12768	373	73691	3152 (4.27%)

Out of total 70057 samples tested and (3.53 %) animals were found positive for Fasciola infestation. Buffaloes were highly susceptible to this infestation; it was reported 4.53 % in Buffaloes as compare to 3.46 % in Cattle. Shahdol District reported maximum no. of cases followed by Jhabua and Gwalior.

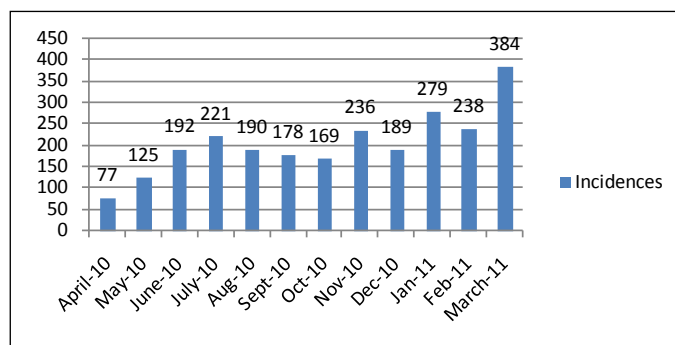


Fig. 4.13. Seasonal trend of Fascioliasis 2010-11

The fasciola infestation is reported throughout the year. Maximum no of positive cases were reported in month of March followed by Jan and February months.

Schistosomiasis

Incidences of Schistosoma infestation were observed in cattle, buffalo sheep and goat throughout the year. The year-wise incidences of the disease is as follows

Table 4.33. Year-wise Incidence of Schistosomiasis

Year	Districts	Cattle		Buffaloes		Other		Total Tested	Total Positive
		Tested	Positive	Tested	Positive	Tested	Positive		
2006-07	12	13447	384	6653	131	2455	10	22555	525 (2.32%)
2007-08	09	18148	214	10493	64	2166	38	30807	316 (1.02%)
2008-09	06	18847	104	12570	61	12681	15	44098	180 (0.40%)
2009-10	13	29705	83	16056	45	9461	-	55222	128 (0.23%)

Out of total sample 31202 tested (0.62%) animals were found positive for Schistosoma infestation. Buffalo were highly susceptible to infestation. The incidences in Cattle was 0.56 % as compare to 0.86 % in Buffalo. Maximum no of positive cases were found in Jhabua followed by Indore and Jabalpur districts.

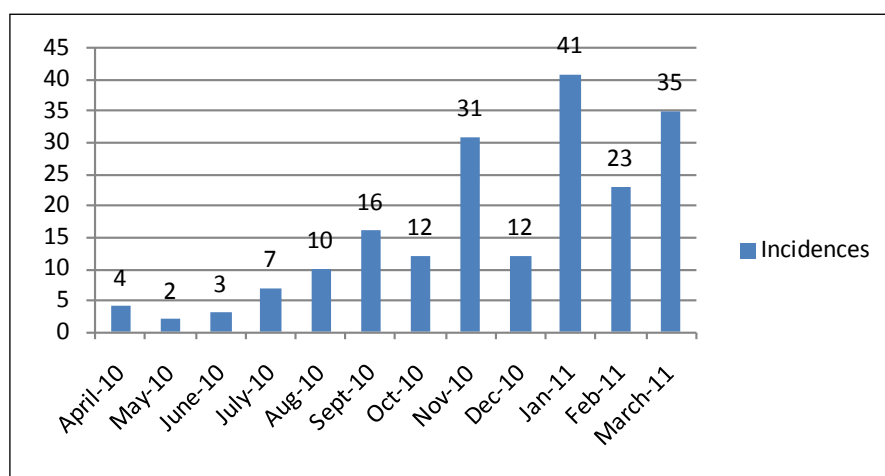


Fig. 4.14. Season-wise trend of Schistosomiasis in 2010-11

The disease is reported throughout the year. The seasonal pattern of the disease revealed that maximum no of positive cases were reported in January month followed by March and November months.

Constraints

1. Require ELISA kits for diagnosis of Swine fever, HS, and Leptospira, and other common diseases. There should be some system to provide these kits to the units on regular basis.
2. The financial support from ICAR is not sufficient to fulfill the requirement of ADMAS unit Bhopal. It is requested to increase funds 3 times.
3. Require training/refresher on latest disease diagnostic techniques for the officers working in State DI laboratory.
4. Identification of Vector samples collected from the field is pending.

5. AICRP on ADMAS Collaborating Unit: Cuttak, Orissa

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 crossbred milch animals take place at cattle markets. The animals are normally transported on road.

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, AP and Jharkhand from the Mayurbhanj, Balesore, Keonjhar and Sundergarh districts of the state.

Table 5.1. Names of the Districts and bordering states

Name of the Districts	Bordering state
Malkangiri, Koraput, Rayagada, Gajapati Ganjam	Andhra Pradesh
Mayurbhanj	West Bengal
Balesore	
Mayurbhanj	Jharkhand
Keonjhar	
Sundergarh	
Malkangiri, Koraput, Nabrangpur	Chhatishgarh
Nuapara, Bargarh, Jharsuguda	
Sundergarh	

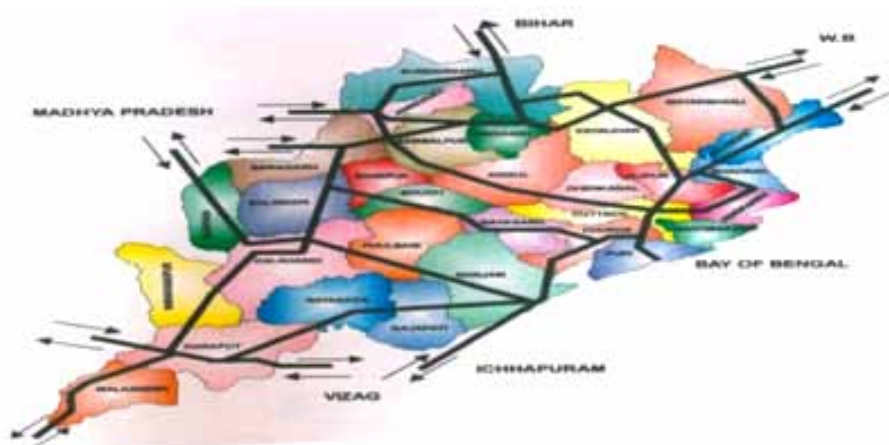


Fig. 5.1 Migration route of Livestock route

- 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-8** Dharmasala to Sujanpur & Bhadrak W.B.

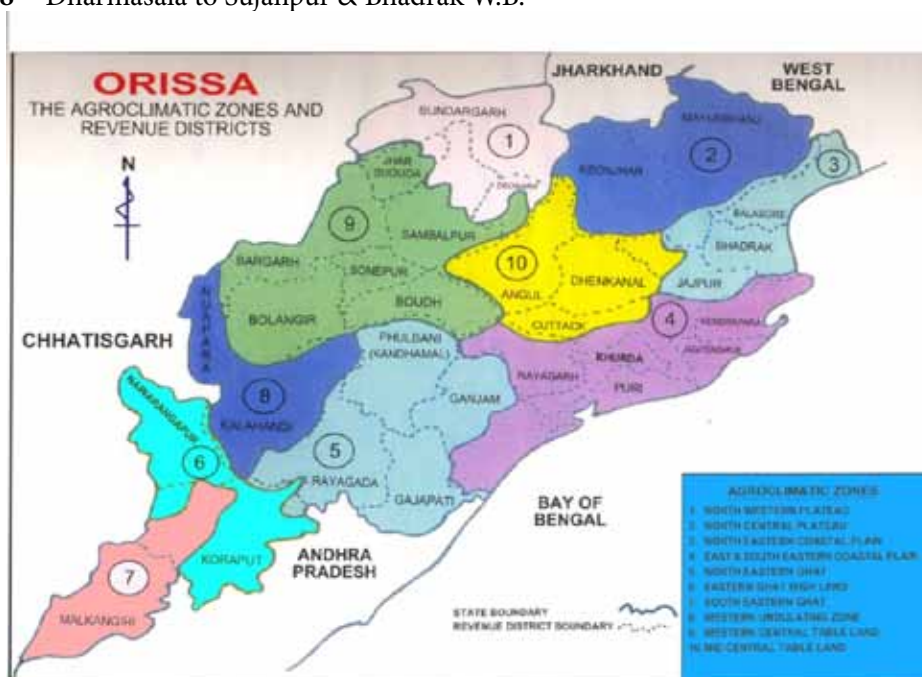


Fig. 5.2. Agro- Climatic Zones of Orissa

Table 5.2. Month wise Maximum Temp. Minimum Temp. Average relative humidity and Rainfall in Orissa

Sl. No.	Name of the Month	Max. Temp. in 0 Celsius	Min. Temp. in 0 Celsius	Average humidity in morning	% of Evening	Rainfall in mm.
1	April 09	38.82	24.27	58	48	101.1
2	May 09	38.18	26.02	65	56	1827.3
3	June 09	37.66	26.68	68	61	1590.7
4	July 09	30.52	24.37	87	83	11277.7
5	August 09	31.94	25.17	84	81	5174.0
6	September 09	32.66	24.74	83	81	3064.7
7	October 09	31.95	20.64	77	72	1857.2
8	November 09	30.06	18.02	76	70	718.0
9	December 09	28.0	13.85	76	64	5.8
10	January 10	27.11	12.61	73	59	151.6
11	February 10	31.80	16.92	71	54	43.9
12	March 10	36.13	22.43	70	58	220.0

Table 5.3. The livestock diseases recorded in the state for the year 2010-11

(Village wise)

Sl. No.	Name of the District * (Name of the Village)	Name of the Disease	Species affected (Cattle, Buffalo)	Year	Month	Number of outbreak	Number susceptible	Number attack	No. of death	Number of Vaccination
1	Cuttack (* Khairpanga, *Gopalpur)	B.Q.	Cattle	2010	4	2	840	31	17	700
2	Ganjam (*Khidingi)	H.S.	Goat	2010	4	1	135	27	16	0
3	Jajpur (*Sukinda)	H.S.	Goat	2010	4	1	91	10	5	0
4	Jajpur (*Sukinda)	H.S.	Sheep	2010	4	1	98	20	18	0
5	Sundargarh (*Panchera, Monaharpur, Deogaon)	Anthrax	Cattle	2010	5	3	4426	14	12	0
6	Sundargarh (* Panchera)	Anthrax	Goat	2010	5	1	1303	1	1	0
7	Keonjhar (*Barbil)	PPR	Goat	2010	5	1	106	17	3	0
8	Cuttack (*Niali)	Theileriosis	Cattle	2010	5	1	251	22	0	0
9	Keonjhar (*Keonjhar)	Theileriosis	Cattle	2010	5	1	206	4	0	0
10	Keonjhar (*Keonjhar)	Trypanosomiasis	Cattle	2010	5	1	108	1	0	0
11	Keonjhar (*Keonjhar)	Babesiosis	Cattle	2010	5	1	139	4	0	0
12	Cuttack (*Niali, *Kantapada, *Salepur)	Babesiosis	Cattle	2010	5	3	378	7	0	0
13	Bolangir (* Sindurabeda)	PPR	Goat	2010	6	1	170	42	18	0
14	Nayagarh (*Sangarh)	PPR	Goat	2010	6	1	51	19	9	0
15	Malkangiri (*Baliguda, *Tankamunda)	CCPP	Goat	2010	6	2	275	71	20	0
16	Puri (*Palanka)	B.Q.	Cattle	2010	6	1	314	10	8	200
17	Dhenkanal (*Balijhodi, *Samal)	B.Q.	Cattle	2010	6	2	328	6	3	240
18	Angul (*Para)	H.S.	Cattle	2010	6	1	147	9	6	100
19	Puri (*Akhuria, *Patapur)	Anthrax	Cattle	2010	6	2	355	6	6	0
20	Sundargarh (*Lepripada)	Anthrax	Goat	2010	6	1	87	1	1	0
21	Koraput (*Parajakhudi, *Beleiguda)	Anthrax	Cattle	2010	6	2	1122	2	2	872
22	Koraput (*Mahada)	Anthrax	Goat	2010	6	2	200	3	3	0
23	Bargarh (*Salepali)	PPR	Goat	2010	7	1	83	9	3	60
24	Bargarh (*Salepali)	Goat Pox	Goat	2010	7	1	83	17	3	60
25	Malkangiri (*Khatiguda)	Goat Pox	Goat	2010	7	1	200	70	30	100
26	Sundargarh (*Pamra)	H.S.	Cattle	2010	7	1	1300	9	7	900
27	Puri (*Ostapur, *Khandashi, *Olanga)	H.S.	Cattle	2010	7	3	580	40	25	400
28	Ganjam (*Babanapur)	Mange	Goat	2010	7	1	118	18	2	0
29	Cuttack (*Kasarda, *Kantapada)	Trypanosomiasis	Cattle	2010	7	2	375	18	0	0
30	Cuttack	Babesiosis	Cattle	2010	7	1	218	12	0	0
31	Cuttack (*Gobindpur, *Adaspur)	Theileriosis	Cattle	2010	7	2	198	53	3	0
32	Puri (*Nimapada, *Astaranga)	Theileriosis	Cattle	2010	7	2	272	22	0	0
33	Jagatsinghpur (*Alipingal)	Theileriosis	Cattle	2010	7	2	372	25	0	0
34	Jajpur (*Dharmasala)	Theileriosis	Cattle	2010	7	2	478	35	0	0
35	Khurda (*Bankoidesh, *Bhubaneswar)	Theileriosis	Cattle	2010	7	2	522	32	0	0
36	Jagatsinghpur (*Sandhakuda)	H.S.	Pig	2010	8	1	219	149	133	0
37	Khurda (*Banguari)	H.S.	Sheep	2010	8	1	45	10	10	0
38	Sundargarh (*Hatibari, *Rajabasti)	Anthrax	Cattle	2010	8	2	1734	7	7	1500
39	Nayagarh (*Dianpada)	B.Q.	Cattle	2010	8	1	143	10	4	50
40	Nayagarh (*Routrapur)	CCPP	Goat	2010	8	1	88	15	6	0
41	Ganjam (Aladigaon)	Theileriosis	Cattle	2010	8	1	208	1	1	0

Sl. No.	Name of the District * (Name of the Village)	Name of the Disease	Species affected (Cattle, Buffalo)	Year	Month	Number of outbreak	Number susceptible	Number attack	No. of death	Number of Vaccination
42	Sambalpur (*Khapdardera)	H.S.	Cattle	2010	9	1	35	5	4	30
43	Jharsuguda (*Rampur, *Kalinganagar, *G.M. Complex)	H.S.	Pig	2010	9	3	250	45	45	0
44	Nayagarh (*Routrapur)	Goat Pox	Goat	2010	9	1	60	18	6	0
45	Dhenkanal (*Mathakaragola)	B.Q.	Cattle	2010	9	1	1397	16	12	600
46	Ganjam (*Rambha)	CCPP	Goat	2010	9	1	84	14	5	0
47	Nayagarh (*Bhapur)	CCPP	Goat	2010	9	1	62	25	9	0
48	Nawarangpur (*Daspur)	B.Q.	Cattle	2010	10	1	250	16	13	250
49	Jajpur (*Khanduali)	B.Q.	Cattle	2010	10	1	227	1	1	100
50	Deogarh (*Koradapasi)	B.Q.	Cattle	2010	10	1	498	13	8	200
51	Deogarh (*Purunagarh)	H.S.	Cattle	2010	10	1	446	11	7	300
52	Deogarh (*Purunagarh)	H.S.	Buffalo	2010	10	1	74	9	5	50
53	Cuttack (*Jaripada, *Rangamunde, *Balarampur, *Malasasan)	B.Q.	Cattle	2010	11	4	590	37	32	200
54	Angul (*Bagedia, *Bamanali)	B.Q.	Cattle	2010	11	2	1887	12	10	850
55	Khurda (*Andhoti, *Sutanagar)	B.Q.	Cattle	2010	11	2	532	9	9	400
56	Sambalpur (*Orampada)	Goat Pox	Goat	2010	11	1	40	8	5	0
57	Khurda (*Ransinghpur)	PPR	Goat	2010	11	1	132	96	96	0
58	Sambalpur (*Chiplima Goat Farm)	CCPP	Goat	2010	11	1	140	11	7	0
59	Khurda (*Ransinghpur)	CCPP	Goat	2010	11	1	132	92	50	0
60	Ganjam (*Brahmansahi)	B.Q.	Cattle	2010	12	1	342	3	3	200
61	Cuttack (*Totasahi)	B.Q.	Cattle	2010	12	1	150	14	12	84
62	Khurda (*Bankoi)	B.Q.	Cattle	2010	12	1	304	3	3	0
63	Bargarh (*Sarkanda, *Sirigida)	B.Q.	Cattle	2010	12	2	1237	8	5	400
64	Jajpur (*Sukinda)	PPR	Goat	2010	12	1	90	29	23	0
65	Keonjhar (*Pandapada)	PPR	Goat	2010	12	1	371	17	5	0
66	Boudh (*Madarandha, *Jalapali, *Jhagadapalli)	PPR	Goat	2010	12	3	532	54	19	0
67	Cuttack (*Kasarda)	Enterotoxaemia	Sheep	2010	12	1	120	12	9	0
68	Puri (*Udayagiri, *Talatola)	Trypanosomiasis	Cattle	2010	12	2	900	8	4	0
69	Bargarh (*Patharla)	B.Q.	Cattle	2011	1	1	633	5	3	300
70	Cuttack (*Sanamundali, *Thoriapatna, *Baharana)	B.Q.	Cattle	2011	1	3	838	33	21	350
71	Dhenkanal (*Ranzagola)	B.Q.	Cattle	2011	1	1	370	15	8	350
72	Kalahandi (*Gopalpur, *Dakota, *Badachataranga, *Dhamanguda, *Terengaseal, *Kusabera)	H.S.	Cattle	2011	1	6	2075	55	10	1200
73	Nuapada (*Punjipada)	Goat Pox	Goat	2011	1	1	133	19	8	0
74	Boudh (*Samakupa)	PPR	Goat	2011	1	1	416	40	28	0
75	Cuttack (*Jaganathpur, *Rasiknagar, *Paiguan)	B.Q.	Cattle	2011	2	3	1000	16	14	500
76	Gajapati (*Routsahi)	H.S.	Buffalo	2011	2	1	143	13	13	130
77	Balasore	PPR	Goat	2011	2	1	472	36	14	0
78	Cuttack (*Tikira)	B.Q.	Cattle	2011	3					
79	Koraput (*Manjahandi)	H.S.	Cattle	2011	3	1	230	7	5	200
80	Sambalpur (*Tampargad)	B.Q.	Cattle	2011	3	1	200	4	2	0
81	Dhenkanal (*Balisahi)	B.Q.	Cattle	2011	3	1	350	4	3	0
82	Sambalpur (*Tentelkurla, *Gaidharpali, *Bhardol)	PPR	Goat	2011	3	3	978	44	17	0

Epidemiology of bacterial diseases

Haemorrhagic septicaemia (HS)

During the year under report HS occurred in different species like Cattle, Buffalo, Sheep, Goat and Pig. A total of 14 outbreaks have occurred in bovines in which 136 animals were affected and 64 animals died. No outbreaks were recorded in the month of April, May, August, November, December and February which may be due to less stress as well as due to regular vaccination. The outbreaks were recorded in the month of June, July, September, January and March. The temporal pattern of HS outbreaks is given in Fig-5.3, 5.4 & Spatial pattern in Fig 5.5. The month wise details given in table 5.4.

Distribution of the disease

Out of 30 districts of the State the incidence has been recorded in 7 districts only. Solitary outbreaks were reported in Angul, Deogarh, Koraput, Sambalpur and Sundargarh. Maximum number of outbreaks occurred in Kalahandi (6) followed by Puri (3). The reduced number of outbreaks in the State is mainly due to vaccination coverage. The detailed district wise given in table 5.5 & Fig. 5.6.

An attempt was made to relate the incidence of HS to the agro-climatic zones in the state. However it was observed that these agro-climatic zones *per se* can not form the basis for analysis of disease incidence because data are generally reported on district basis and a particular district can form the part of more than one agro-climatic zone and because of overlapping agro-climatic features. However, the districts whose major area falls into a particular agro-climatic zone was classified under that zone and considered for analysis. Details are given in table 5.6 & Fig. 5.7.

The confirmation of disease is being done by clinical picture, post-mortem findings & cultural tests.

Table 5.5 District wise incidence of HS for the year 2010-11 (Cattle)

District	Number of Outbreaks	Number of Animals Affected	Number of Animals Died
Angul	01	09	06
Deogarh	01	11	07
Kalahandi	06	55	10
Koraput	01	07	05
Puri	03	40	25
Sambalpur	01	05	04
Sundargarh	01	09	07
Total	14	136	64

Table 5.4 Month wise incidence of HS for the year 2010-11

Month	Number of Outbreaks	Number of Animals Affected	Number of Animals Died
April 10	0	0	0
May 10	0	0	0
June 10	1	9	6
July 10	4	49	32
August 10	0	0	0
September 10	1	5	4
October 10	1	11	7
November 10	0	0	0
December 10	0	0	0
January 11	6	55	10
February 11	0	0	0
March 11	1	7	5
Total	14	136	64

Table 5.5. Agro-climatic zone wise incidence of H.S. for the year 2010-11.

Sl. No.	Agro-climatic zone	Number of Outbreaks	Number of Animals Affected	Number of Animals Died
1	North western plateau	3	25	18
2	North central plateau	0	0	0
3	North eastern coastal plain	0	0	0
4	East and south eastern coastal plain	3	40	25
5	North eastern ghat	0	0	0
6	Eastern ghat high land	1	7	5
7	South eastern ghat	0	0	0
8	Western undulating zone	6	55	10
9	Western central table land	0	0	0
10	Mid central table land	1	9	6
Total -		14	136	64

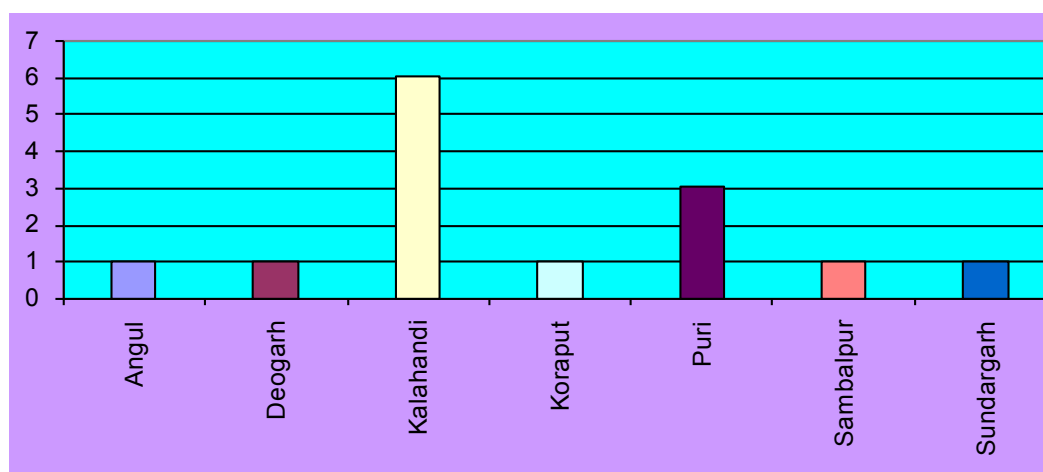


Fig. 5.3 District wise HS outbreaks recorded during the year 2010-11

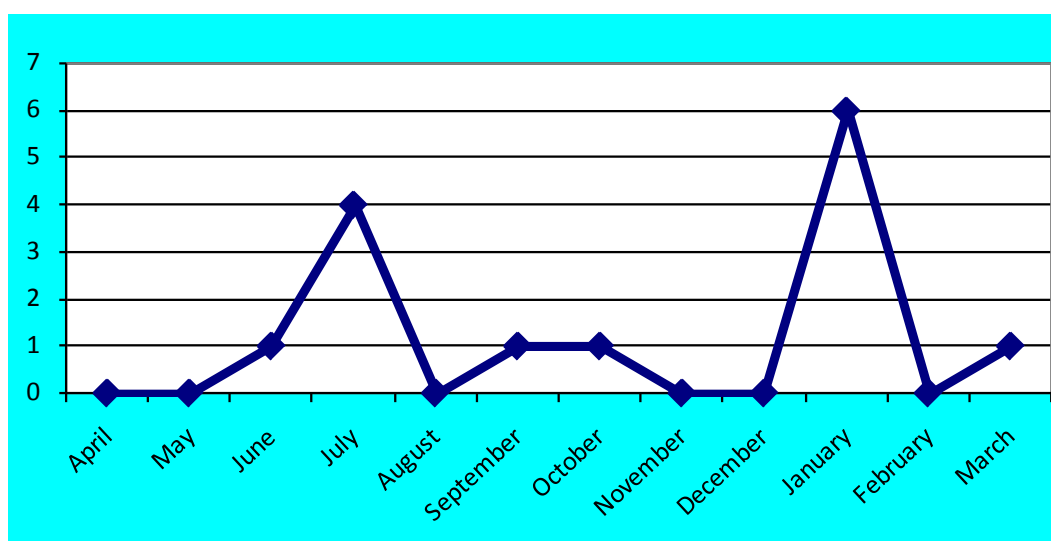


Fig. 5.4. Temporal Pattern of HS outbreaks in Orissa during the year 2010-11

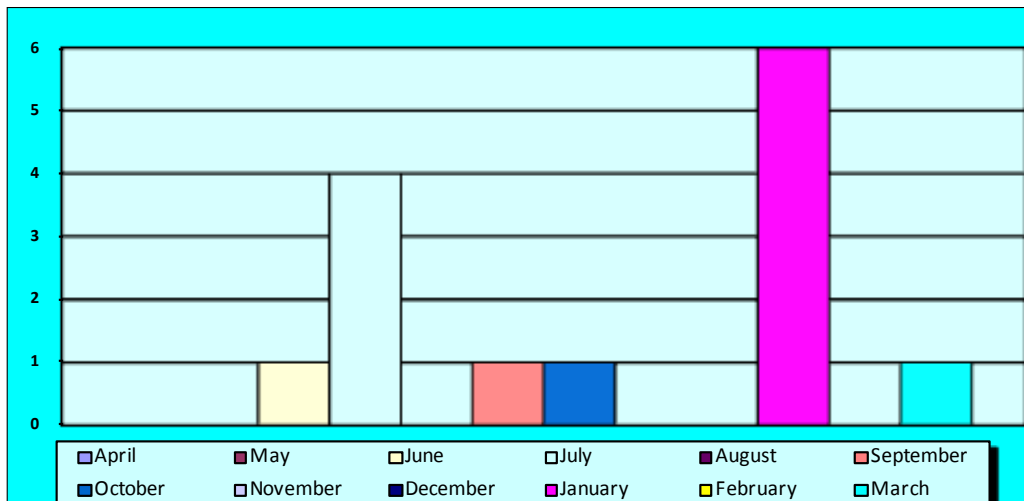


Fig. 5.5. Temporal Patterns of HS outbreaks in Orissa during the year 2010-11

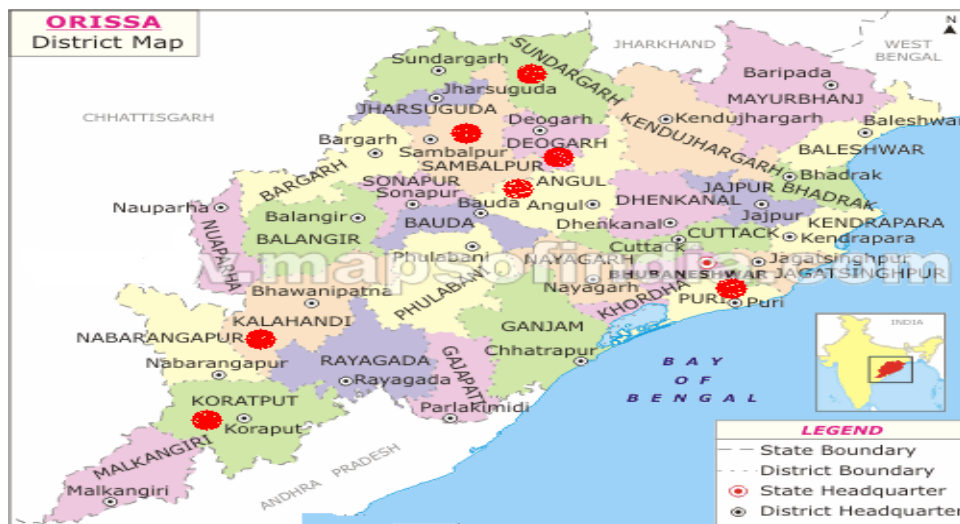


Fig. 5.6. Haemorrhagic Septicaemia - Spatial Pattern in Orissa during the year 2010-11



Fig. 5.7. Agro-climatic zone wise H.S Outbreaks in Orissa during the year 2010 - 11

Table 5.7. Species wise incidence of H.S. in Orissa during the year 2010 – 11

Sl. No.	District	Month	Species	Outbreak	Attack	Death
1	Deogarh	October -10	Buffalo	1	9	5
2	Gajapati	February-11	Buffalo	1	13	13
			Total	2	22	18
3	Ganjam	April -10	Goat	1	27	16
4	Jajpur	April - 10	Goat	1	10	5
			Total	2	37	21
5	Jajpur	April – 10	Sheep	1	20	18
6	Khurda	August - 10	Sheep	1	10	10
			Total	2	30	28
7	Jagatsinghpur	August – 10	Pig	1	149	133
8	Jharsuguda	September - 10	Pig	1	45	45
			Total	2	197	178

HS outbreaks (2) occurred in Buffaloes in Deogarh and Gajapati districts in the month of October and February, affecting 27 animals out of which 18 animals died. They are nomadic in nature and outbreak occurred due to improper vaccination as well as non-vaccination.

HS outbreaks (2) in goats occurred in Jajpur and Ganjam districts in the month of April affecting 37 out of which 21 animals died. The disease occurred due to non-vaccination.

HS outbreaks (2) in sheep occurred in Jajpur and Khurda district in the month of April and August affecting 30 animals out of which 28 animals died. The disease occurred due to non-vaccination.

Two outbreaks of HS in pigs occurred in Jagatsinghpur and Jharsuguda districts during the month of August and September affecting 194 animals out of which 178 animals died. The disease occurred due to non-vaccination and non cooperation of pig owners.

The confirmation of the above disease is done by clinical picture, post-mortem finding as well as cultural examination.

Black Quarter

During the year under report a total of 37 outbreaks have occurred in bovines in which 286 animals were affected and 206 have died. The disease was encountered throughout the year except May and July. The details are given in table 5.8.

Table 5.8. Month wise incidence of BQ for the year 2010-11

Month	Number of Outbreaks	Animals Affected	Animals Died
April 10	2	31	17
May 10	0	0	0
June 10	3	16	11
July 10	0	0	0
August 10	1	10	4
September 10	1	16	12
October 10	3	30	22
November 10	8	58	51
December 10	5	28	23
January 11	5	53	32
February 11	3	60	14
March 11	6	28	20
Total	37	286	206

Distribution of the Disease

During the year the disease was reported in 12 districts out of 30 districts in the State. Solitary outbreaks were reported in Deogarh, Ganjam, Jajpur, Nayagarh, Nawarangpur, Puri and Sambalpur. Highest no. of outbreaks was reported in Cuttack district (17) followed by Dhenkanal (5), Khurda (3), Bargarh (3), and Angul (2) detailed in table 5.9.

Table 5.9. District wise incidence of BQ for the year 2010-11

District	Number of Outbreaks	Animals Affected	Animals Died
Angul	2	12	10
Bargarh	3	13	08
Cuttack	17	151	111
Deogarh	1	13	08
Dhenkanal	5	41	26
Ganjam	1	03	03
Jajpur	1	01	01
Khurda	3	12	12
Nabarangpur	1	16	13
Nayagarh	1	10	04
Puri	1	10	08
Sambalpur	1	04	02
	37	286	206

An attempt was made to relate the incidence of B.Q to the agro-climatic zones in the state. However it was observed that these agro-climatic zones *per se* cannot form the basis for analysis of disease incidence because data are generally reported on district basis and a particular district can form the part of more than one agro-climatic zone and because of overlapping agro-climatic features. However, the districts whose major area falls in to a particular agro-climatic zone was classified under that zone and considered for analysis. Details are given in table 5.10. Highest number of outbreaks was reported in East and South Eastern coastal plain (23) followed by Mid central table land (7), Western Central Table Land (3), North Western Plateau (2) and solitary outbreaks in North Eastern Coastal Plain and Eastern Ghat High Land.

Table 5.10. Agro-climatic zone wise incidence of BQ for the year 2010-11

Zone No.	Agro-climatic zone	Number of Outbreaks	Animals Affected	Animals Died
1	North western plateau	2	17	10
2	North central plateau	0	0	0
3	North eastern coastal plain	1	1	1
4	East and south eastern coastal plain	23	186	138
5	North eastern ghat	0	0	0
6	Eastern ghat high land	1	16	13
7	South eastern ghat	0	0	0
8	Western undulating zone	0	0	0
9	Western central table land	3	13	8
10	Mid central table land	7	53	36
	Total	37	286	206

Confirmation of disease is being done by clinical picture, PM findings and cultural tests and bio-chemical tests both at our Lab as well as CADRAD unit of IVRI.

Table 5.11. The soil wise analysis of incidences of BQ was given below.

District	Common Name	Modern Taxonomy	Number of Outbreaks	Animals Affected	Animals Died
Angul	Red, late rite	Alfisols	2	12	10
Bargarh	Mixed Red and yellow	Alfisols, Inceptisols, Vertisols	3	13	08
Cuttack	Deltaic, Alluvial, Saline and Late rite	Inceptisols, Entisols and Alfisols	17	151	111
Deogarh	Mixed Red and yellow	Inceptisols, Alfisols	01	13	08
Dhenkanal	Red, late rite	Alfisols	05	41	26
Ganjam	Deltaic, Alluvial, Saline and Late rite	Inceptisols, Entisols and Alfisols	01	03	03
Jajpur	Coastal Alluvial and Saline	Inceptisols, Entisols	01	01	01
Khurda	Late rote, Red Loam and Brown forest soil	Alfisols, Entisols and Inceptisols	03	12	12
Nabarangpur	Red and Brown forest soil	Alfisols, Entisols	01	16	13
Nayagarh	Late rite, Red Loam and Brown forest soil	Alfisols, Entisols and Inceptisols	01	10	04
Puri	Deltaic, Alluvial, Saline and Late rite	Inceptisols, Entisols and Alfisols	01	10	08
Sambalpur	Mixed Red & Yellow soil	Alfisols, Inceptisols, Vertisols	01	04	02
Total			37	286	206

Saline, Late rite, Alluvial, Red Mixed and Red Black soil had maximum number of outbreaks (23) followed by Alluvial, Red Late rite, Mixed Red and Black (5), Saline, Late rite, Alluvial, Red Mixed and Black (3), Red and Yellow, Red & Black, Black and Brown forest Late rite (3), Alluvial, Red Late rite, Mixed Red & Black (2).

6. AICRP on ADMAS Collaborating Unit: Guwahati, Assam

Progress during 2009-2010

The collaborating unit of All India Coordinated Research Project on “Animal Disease Monitoring & Surveillance” located at College of Veterinary Science, Assam Agricultural University, Khanapara was sanctioned in the month of August 2009 vide ICAR’s Order No.1-05/2008-IA-1(Pt) dated 18.08.09 with total budgetary allocation of Rs.33 lakhs. However the Collaborating Unit started functioning in real sense from 27th January 2010 in the Deptt. of Microbiology of the Faculty of Vety, Science, Guwahati. Dr.S.K.Das, Professor, Deptt of Microbiology was nominated as Principal Investigator of the Project. Three faculty members one each from the Deptt. of Microbiology, Deptt. of Pathology and Deptt. of Public Health and Hygiene were nominated as Co-Principal Investigators of the Project. During that financial year immediately after establishment of Guwahati Centre, the Project Director, the PD_ADMAS, Bangalore organized an Workshop-cum-Training Programme on Epidemiological Analysis from 1st February to 6th February and in a very short notice Dr. T.Rahman, Senior Co-PI of the Project participated in the said Training Programme .During this short period of two months, the Project staff collected State level Epidemiological data like Livestock population, Veterinary Infrastructure facilities, main livestock migratory routes etc. Similarly, Meteorological data located in different centres of Assam were collected. In order to create better co-ordination between State Animal Husbandry Department and AICRP on Animal Disease Monitoring & Surveillance, Guwahati centre, a meeting was convened at the initiative of Director of Research, Assam Agricultural University where it was decided that Regional Disease Diagnostic Centre Guwahati will exchange the information on occurrence of different epidemics in Assam and in possible cases members from both the centres will move together to attend the epidemic. The Centre collected some data from the State Veterinary and Animal Husbandry Department and attended very few outbreaks during that financial year. While collecting the data from State Animal Husbandry Department, it was observed that the Animal Disease Reporting System in the state of Assam is very poor and not systematic. It was observed that almost all important bacterial, viral and parasitic diseases were rampant in Assam but the local Veterinarians hardly send reports of diseases to the Head Quarter.

Black Quarter

In the year 2009-10, Black Quarter was found to dominate the bacterial diseases of cattle. The total number of outbreaks being 110 affecting mainly cattle and buffalo. Out of total 27 districts of Assam, the disease was recorded in 9 districts only. In 7 districts both cattle and buffaloes were affected whereas only cattle were affected in Dhemaji and Kamrup District. The highest incidence of Black Quarter was observed in cattle in Kamrup district followed by Goalpara, Sonitpur, Karimganj, Dhemaji, Barpeta, Lakhimpur, Sibsagar, Tinsukia, Nowgong and Bongaigaon. The case fatality rate in cattle was 44.75 % and in Buffalo it was 36 %.

HS

Haemorrhagic Septicaemia with 97 outbreaks was the 2nd ranked bacterial disease in Assam. The disease was recorded in 16 districts. No reports of outbreaks were recorded from 11 districts of Assam. The highest number of outbreaks were recorded from Goalpara district(18), followed by Lakhimpur (13), Darang(11), Dhubri (9), Dhemaji (9), Chirang (8) and Kamrup Rural (7). The species affected were cattle, buffaloes and pigs. Maximum number of outbreaks were recorded in summer season (50), followed by spring and autumn (19 each) and only 9 outbreaks were recorded in winter season.

Anthrax

Anthrax was found to be confined to Dhemaji, Lakhimpur and Sonitpur districts only. The highest number of outbreaks were recorded in Dhemaji (10), followed by Lakhimpur (5) and Sonitpur district (1). It may be mentioned that all the 3 districts are located contiguously on the northern side of the river Brahmaputra and the first two districts are flood affected district. Incidence of other bacteriological diseases like Bovine-tuberculosis, Bovine-brucellosis were also confirmed by Tuberculin test and Serum Tube Agglutination Test(SAT). On the basis of Tuberculin test conducted by the Deptt. of Microbiology and RDDL Guwahati, out of 217 animals tested, only 7 were found to be positive. Similarly in case of Bovine-brucellosis, out of 435 serum samples of cattle, buffalo and pig tested, only 68 were found to be positive for brucellosis. All three species of animals were found to be positive for brucellosis.



In Assam, Swine fever is an important viral disease. Twentyfive outbreaks occurred in 11 different districts in the year 2009-10 .Highest number of outbreaks occurred in Lakhimpur district (5),followed by Dhemaji (4), Kokrajhar (3) and Kamrup Rural, two outbreaks each in Bongaigaon, Goalpara, Morigaon and only one outbreak in rest of the districts.

Orf

Contagious ecthyma was found to be an emerging disease of goats in Assam. Out of 244 serum samples collected from clinically affected animals, 176 showed positive reaction.

PPR

The most important findings of the AICRP on Animal Disease Monitoring & Surveillance, Guwahati is the confirmation of serological evidence of Peste-des-petits ruminants(PPR) in goats of Assam. The clinical disease in the forms of abortion and high rise of fever, diarrhoea was recorded in a Government Sheep and Goat Farm in Karbi-Anglong district. Most of the affected animals died. It may be mentioned that the disease first occurred in some newly introduced Sirohi goats brought from Rajasthan. The serum samples were collected and sent to IVRI, Mukteswar for testing and it was found that out of 9 and 18 serum samples collected from kids and adult goats,7 and 16 showed positive reaction to PPR.

Parasitic Diseases

Most of the livestock population of Assam are infected with different kinds of parasites because of the hot and humid climate of the state. Fascioliasis, Ascariasis, Coccidiosis and Amphistomiasis are the major parasitic diseases affecting different species of animals. No reports on prevalence of any protozoal disease could be collected from any veterinary dispensary or from disease diagnostic laboratory during this period..

Progress during 2010-2011

In the beginning of the 2nd financial year of the existence, the Guwahati centre of AICRP_ADMAS successfully organized the Annual Scientist Meet at Guwahati.

In the financial year 2010-11, the basic epidemiological data including the meteorological data were updated. Some more migratory routes of the animals were identified. It was observed that animals brought from Northern Parts of the country are frequently smuggled to Bangladesh through different routes of Assam. The Border security sources revealed that a total of 16,990 cattle were seized by Border Security Forces from porous border of Dhubri district alone in the year 2010 and the value of the seizure has been put around Rs. 30.69 crores.

HS

In contrast to the previous year, in the year 2010-11, Haemorrhagic Septicaemia outbreak occupied the first position pushing Black Quarter to the 2nd position. Month-wise distribution of the HS revealed that highest number of outbreaks occurred in the month of July (26) followed by May (24). No outbreaks were recorded in the month of February and only one outbreak was recorded in the month of January. District-wise, highest number of outbreaks were recorded in Dhemaji and Barpeta districts (12 each), followed by Goalpara and Golaghat (11 each), Sonitpur, Nowgong, Kamrup and Dhubri district (9 each) and only 1 outbreak was recorded from Hailakandi district.No outbreaks were recorded from Baska, Udalguri, Jorhat, Dibrugarh and North Cachar Hill Districts.

BQ

Although Black Quarter slipped to the second position, the number of outbreaks in the year 2010-11 surpassed the total number of outbreaks of the previous year. Golaghat district topped the list with highest number of 12 outbreaks; Jorhat district recorded only one outbreak although the two districts are contiguous. No reports of outbreak of Black Quarter was received from Kokrajhar, Bongaigaon, Baska, Udalguri, Karbi-Anglong, North Cachar Hills, Cachar and Hailakandi district. Highest no. of outbreaks were recorded in the month of August (21) followed by May and June (15 each), followed by April (13). Only one outbreak was recorded in the month of January.

Anthrax

Outbreak of Anthrax was recorded from five different districts of Assam. It may be mentioned that Sonitpur, Dhemaji and Lakhimpur district experienced the outbreak of Anthrax in the previous years also. Barpeta and Morigaon which is located in central and lower Assam recorded one outbreak each. The disease was sporadic in nature. Other bacterial diseases like Bovine-tuberculosis did not show any positive reaction when tested by single intradermal Tuberculin test. Serum sample collected randomly from five (5) different districts of Assam showed positive reaction in Serum Agglutination test. The percentage (%) of prevalence were found to be 36.36% in cattle of Sonitpur district to 3.57% in pigs of Goalpara district.

CSF

Swine fever outbreak also out numbered, the previous record, totalling 159 outbreak in 13 districts of Assam. Highest number of outbreak were recorded in Goalpara (19) followed by Dhemaji, Lakhimpur, Chirang and Kokrajhar districts respectively.

Orf and PPR

Contagious ecthyma and Peste-des-petis-ruminants (PPR) were the two important diseases of small ruminants. Out of 285 serum samples collected from suspected cases of Contagious ecthyma 208 were found to be positive. Peste-des-petis-ruminants was also recorded in Govt. goat farm of Panbari in Dhubri district. Out of 56 goats, 8 were found to be affected and 6 animals died due to PPR infection. Sixteen serum samples were send to the IVRI, Mukteswar for demonstration of PPR antibody and 5 samples were found to be positive.

Fund utilisation

The project was sanctioned in the financial year 2009-2010, Rs. 9.5 lakhs under Recurring Head and expenditure of Rs.8.96227.00 was made, the unspent balance was mostly under TA head as the center completed only two months during that financial year. The fund under Non- Recurring Head Rs. 10 lakhs allocated for purchase of equipments could not be spent except Rs. 16,000.00 spent for purchase of a Fax-machine as the time was very short to follow the statutory purchase procedure followed in Assam Agricultural University Rs. 3.5 lakhs allocated for purchase of furniture fixture and renovation works were fully ulitised for renovating and furnishing two rooms in the Deptt. of Microbiology to be used exclusively for PD_ADMAS laboratory works .

In the current financial year out of Rs.4.5 lakhs sanctioned under Recurring Head, Rs. 4,41,020.00 could be utilised. Rs. 9.84 thousand revalidated in the financial year 2010-11, Rs.6,67,810.00 was spent for purchase of a Gradient-Thermocycler and an ELISA-Reader, a Submarine Gel Electrophoresis, a Camera , a Mobile Data Recorder and two Refrigerators. The project has requested to revalidate Rs.3,16,190.00 for purchase of some small laboratory equipments.

Constraints

- The major constraint by this center is poor reporting or no reporting of various outbreaks of diseases from different parts of the states. Inspite of holding many awareness meetings, most of the outbreaks goes unreported.
- Lack of supporting staff in the form of contractual labour and Research Associates/ Senior Research Fellow.
- Lack of sufficient budgetary allocations for procuring commercial diagnostic kits / equipments etc.

Future strategy of research

- To continue the research programme as per mandate of the PD_ADMAS.
- To develop /create a complete epidemiological map of major livestock diseases prevalent in the state of Assam.
- To screen the serum samples against some emerging diseases like PPR, Swine Influenza etc.
- To develop some user friendly diagnostic tests.

7. AICRP on ADMAS Collaborating Unit: Hyderabad, Andhra Pradesh

Andhra Pradesh state is having 23 districts and all the districts except Ranga Reddy, has Animal Disease Diagnostic Laboratories located in the district head quarters. There is a good reporting system regarding the incidence of contagious and infectious diseases. The disease reporting which originate from Veterinary Dispensaries will be compiled by district authorities and Animal Disease Diagnostic Laboratories at district level and feed the data to the Monitoring and Surveillance cell located at Directorate of Animal Husbandry. This cell will further make epidemiological analysis and forward to various end users at district, state and National level. Animal Disease Diagnostic Laboratories at District level and at Veterinary Biological Research Institute at State level will process the morbid material from the outbreaks using both conventional and Molecular Biological techniques for confirmation of disease.

Animal Husbandry Department in the state due to its constant good efforts is able to control most of the Livestock and Poultry diseases. But due to certain environmental factors and other socio-economic activities in the state, numbers of emerging and re emerging diseases are occurring which require constant monitoring and Surveillance. The constant monitoring and surveillance work in this particular direction only can lead to formulation of control policies.

There is a good reporting system regarding the incidence of contagious and infectious diseases. The disease reporting which originate from Veterinary Dispensaries will be compiled by district authorities and Animal Disease Diagnostic Laboratories at district level and feed the data to the Monitoring and Surveillance cell located at Directorate of Animal Husbandry. This cell will further make epidemiological analysis and forward to various end users at district, state and National level. Animal Disease Diagnostic Laboratories at District level and at Veterinary Biological Research Institute at State level will process the morbid material from the outbreaks using both conventional and Molecular Biological techniques for confirmation of disease outbreaks.

The endemic diseases in the state include viral diseases: Peste des Petits Ruminants, Sheep Pox, and bacterial diseases: Black quarter, Brucellosis, Haemorrhagic septicaemia and Enterotoxaemia. Some of these diseases are seasonal and the state A.H department actively undertakes prophylactic vaccinations though the vaccination coverage is limited to the outbreak and surrounding areas.

During the year 2010-11 a total of 311 outbreaks have been reported in the state in which 2464 animals were affected and 947 animals have died. Most of the attacks and deaths are due to HS, BQ, ET, PPR, and Sheep pox.

During the year under report, a total of 103 outbreaks have occurred in the Large Ruminants of the state in which 508 animals were affected and 191 animals have died. Likewise in 208 outbreaks in small ruminants 1976 animals were affected and 756 animals have died where most of the attacks and deaths are due to H.S, BQ, Anthrax in Large Ruminants and Anthrax, ET, PPR, and Sheep pox in small ruminants..



Fig. 7.1 Livestock Trade Routes in AP

The cattle movement and sheep & goat population migrations are also important factors in disease epidemiology. The economic considerations, drought, agricultural operations, epidemics resulting in large scale migration and movement of animals from one region to other and from one state to another state adds to the fast spread spread of diseases.

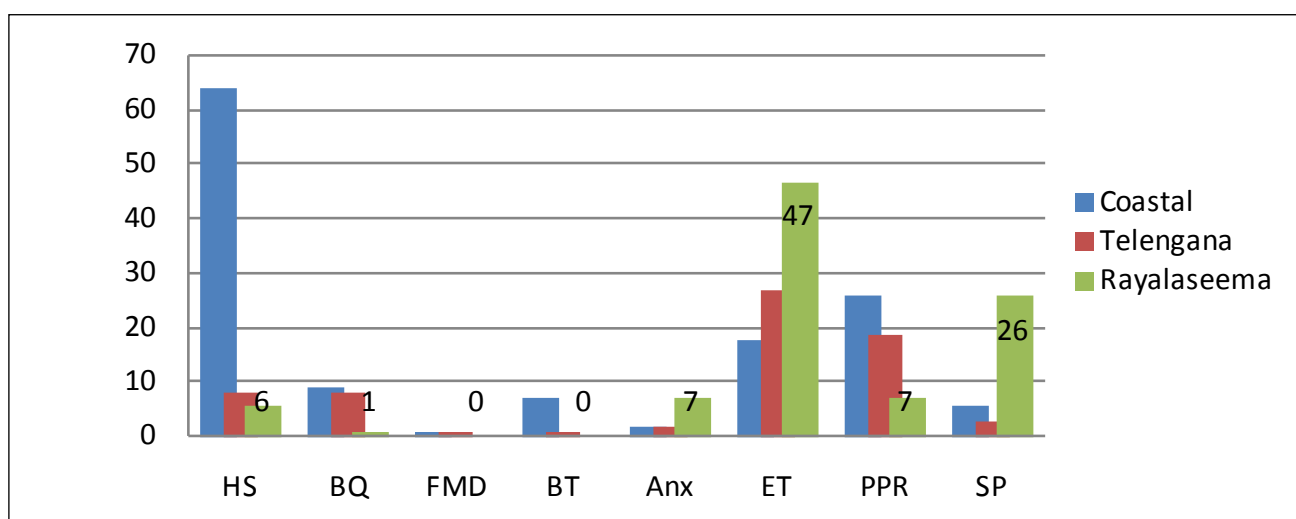


Fig. 7.2 Disease incidence in different agro-climatic regions of AP during 2010-11

Economically Important diseases prevalent in Andhra Pradesh during 2010 -11

1. Hemorrhagic Septicemia
2. Enterotoxemia
3. PPR
4. Black quarter
5. Sheep pox
6. Blue tongue
7. Pasteurellosis
8. Fasciolasis

Table 7.1 Disease Incidence in AP During 2010-11

Disease	Outbreaks	Attacks	Deaths	V O B
HS	78	369	137	74265
BQ	18	100	43	17811
ET	92	561	378	215621
BT	8	217	15	0
SP	35	281	105	82166
PPR	52	727	189	92098
Anthrax	11	44	41	28538
Pasteurellosis	7	108	25	4558
Theileriosis	1	3	1	45
Hydatidosis	1	2	2	0
Goatpox	1	5	0	0
Trypanosomiasis	3	13	6	0
Total	311	2464	947	302053

Bacterial Diseases of Bovines

Haemorrhagic Septicemia

Haemorrhagic Septicemia is a highly infectious disease of bovines caused by *Pasteurella multocida*. This is the most economically important bacterial disease of cattle and buffaloes. The disease assumes importance as the causative organism is present as a commensal in the upper respiratory tract and stressful conditions often related to post monsoon conditions precipitate the outbreaks. This process is repetitive and vaccination is the only prophylactic measure considering the habitat of the bacteria. The disease was reported in 13 districts out of 23 districts of the state such as Nellore, Chittoor, Prakasam, Visakhapatnam, East Godavari, West Godavari, Anantapur, Guntur, Medak, Krishna, Kadapa, Nalgonda and Mahabubnagar. Highest number of outbreaks were recorded in Guntur district (28 outbreaks with 123 attacks & 40 deaths & followed by East Godavari district (20 outbreaks with 81 attacks & 19 deaths). Total Outbreaks recorded are 78, Attacks 369 and Deaths : 137. More OBRs (64 OBs) recorded in Coastal Andhra Region followed by Telangana (8 OBs) & Rayalaseema (6) regions. The disease is in decreasing trend when compared to previous years because of mass vaccinations conducted in all the endemic areas.

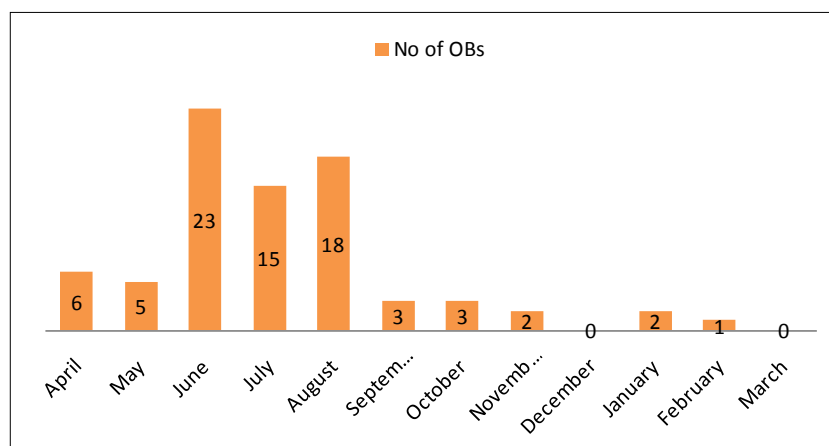


Fig. 7.3 Seasonal incidence of Haemorrhagic Septicaemia (2010-11)

The disease was reported in all the months in the year except December and March without any seasonality. Highest outbreaks reported in the months of June and August.

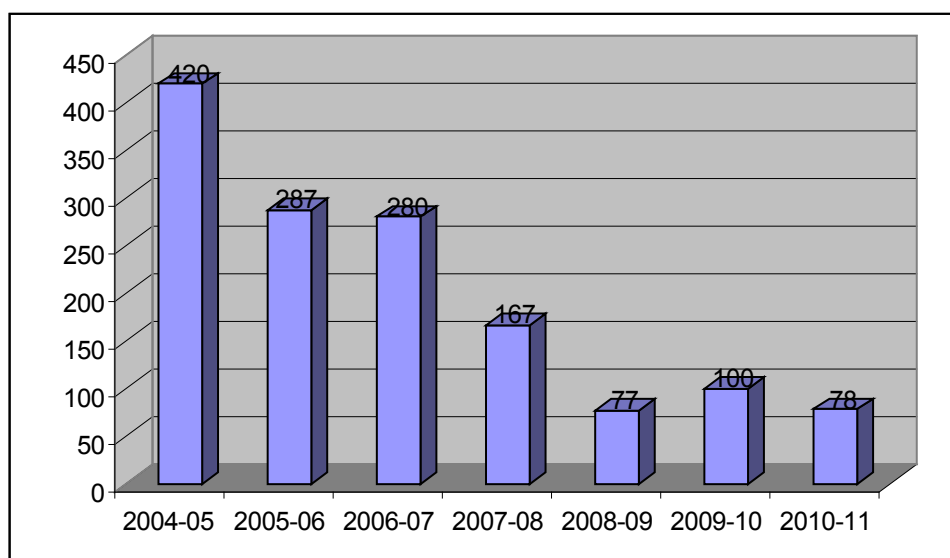


Fig. 7.4 Comparative Incidence of Haemorrhagic Septicaemia for the last 7 years

The disease was showing decreasing trend in the last 5 years and this may be due to campaign mode of vaccinations in all the endemic areas of the districts every year.

Black Quarter

The Black Quarter disease also known as black leg and is caused by *Clostridium chauvoei*. The disease occurs mostly in white cattle especially in young animals and the disease ranks fourth as economically important disease of livestock.

During the year 2010-11 the disease was reported in 6 districts (Adilabad, Chittor, East Godavari, Medak, Visakhapatnam and Nalgonda) and no outbreaks reported in the remaining 16 districts.

Total OBRs: 18, Attacks: 100, Deaths:43

Highest OBRs (8) reported in Visakhapatnam dist followed by Adilabad (4).

More OBRs (9) recorded in Coastal Andhra Region followed by Telangana (8) & Rayalaseem (1) regions.

Table 7.2. Incidence of BQ during 2010-11

District	No of OBRs	Attacks	Deaths	VOB
Adilabad	4	11	0	13765
Chittor	1	1	1	102
East Godavari	1	4	4	579
Medak	3	20	10	1365
Visakhapatnam	8	58	27	0
Nalgonda	1	6	1	2000
Total	18	100	43	17811

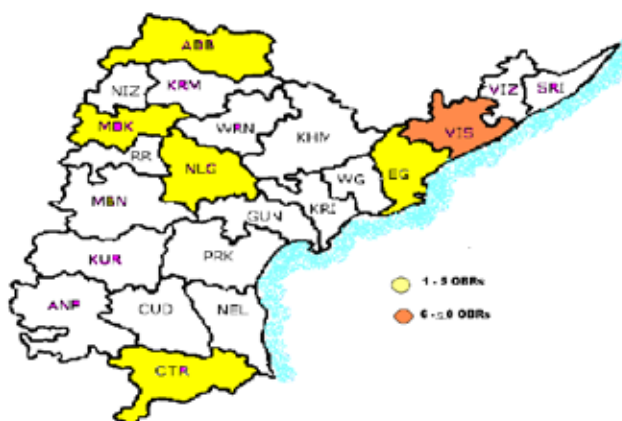


Fig. 7.5. Geographical distribution of Black Quarter in 2010-11

During the year 2010-11 the disease was reported in 6 districts (Adilabad, Chittor, East Godavari, Medak, Visakhapatnam and Nalgonda) and no outbreaks reported in the remaining 16 districts.

The disease incidence is more in Visakhapatnam district (8 OBRs) followed by Adilabad (4). More OBRs recorded in Coastal Andhra Region followed by Telangana & Rayalaseema regions.

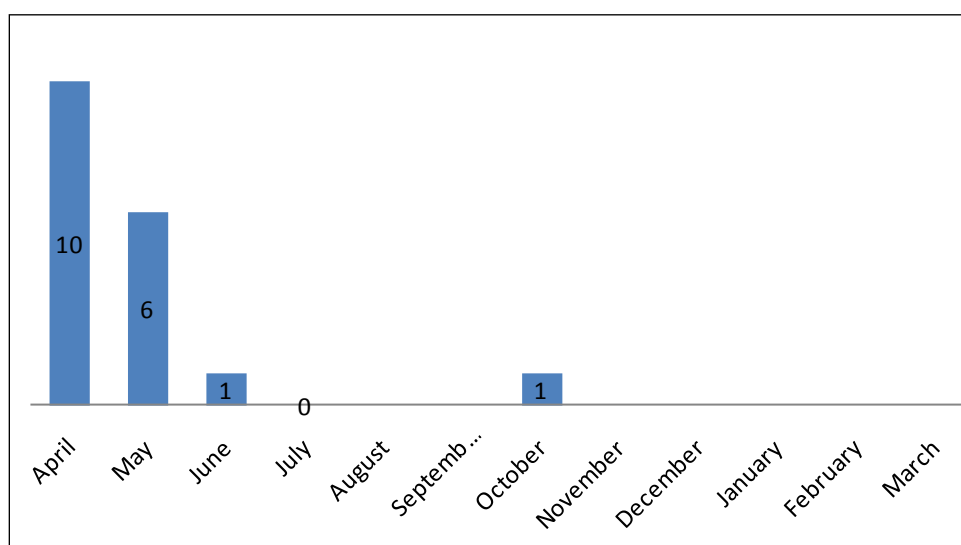


Fig. 7.6. Seasonal incidence of BQ for the year 2010-11

The disease was reported in the months of April, May, June and October. Highest outbreaks reported in the months of April and May.

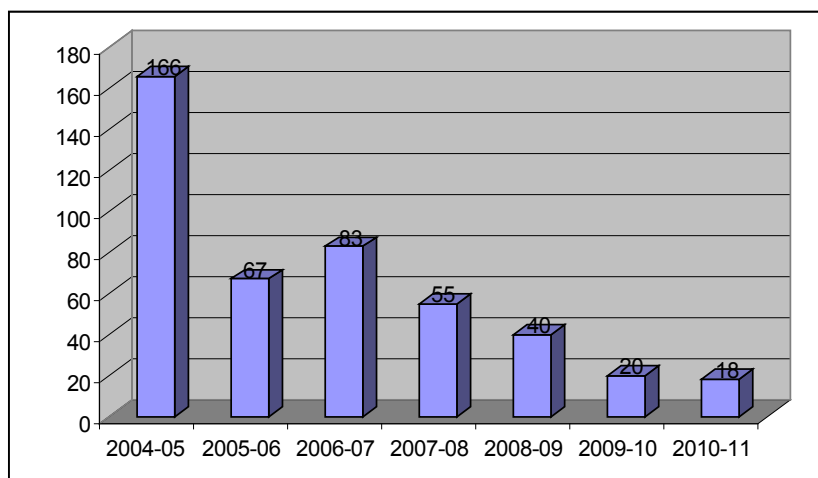


Fig. 7.7. Comparative incidence of Black Quarter for the last 7 years

* The disease is in decreasing trend when compared to previous years because of protection of all susceptible white cattle in all the endemic areas of the districts by campaign mode.

Anthrax in Bovines

Anthrax is a highly septicaemic disease caused by *Bacillus anthracis* organism and the mortality is almost 100 %.

There is no incidence of Anthrax in Bovines during the year 2010-11.

The disease was in reducing trend due to mass vaccinations in all endemic areas & due to awareness created to farmers in control of the disease.

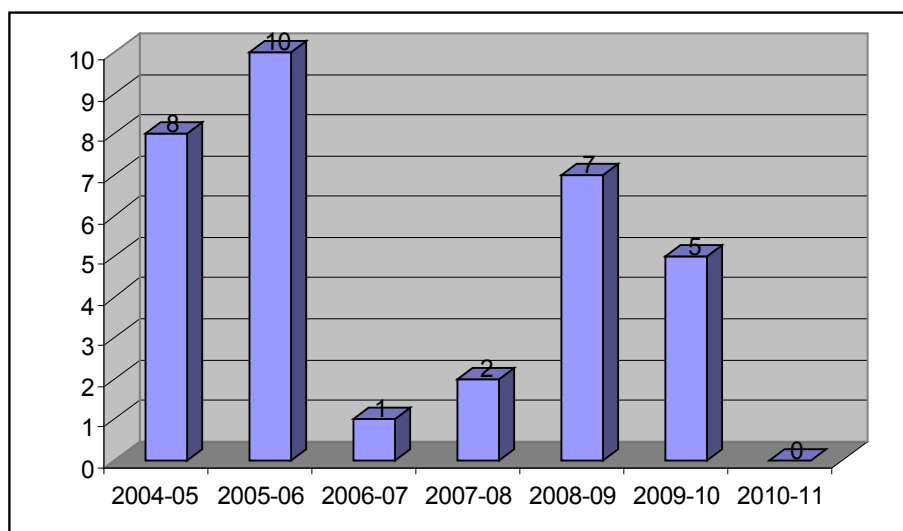


Fig. 7.8 Comparative incidence of anthrax (bov) for the last 7 years

The incidence of Anthrax (Bovines) is in decreasing trend when compared to previous years and only one outbreak was reported in the year 2006-07, 2 outbreaks in 2007-08 and 7 outbreaks in 2008-09. No outbreaks were reported during the year 2010-11. This may be due to protection of all the susceptible animals in all the endemic areas in the districts and awareness created by the staff among the farmers regarding the precautions to be taken to control the disease.

Bacterial Diseases of Sheep & Goat

Enterotoxaemia

Enterotoxaemia (ET), a clostridial toxæmic disease of sheep and goats causes high mortality and economic loss. The toxin-producing organisms are present in the intestines and 'favourable' grazing / nutritional conditions trigger toxin production resulting in the disease. ET rated as the fifth most prevalent disease and it is an acute highly fatal disease of sheep caused by absorption of epsilon toxin produced by *Clostridium perfringens* type 'D' and characterized by cerebral symptoms, convulsions and sudden death.

- Enterotoxaemia reported in 13 Districts.
Total OBRs: 92, Attacks: 561, Deaths: 378.
Highest outbreaks reported in Anantapur, followed by Medak and Prakasam districts
- The disease was in reducing trend due to mass vaccinations in all endemic areas by campaign mode.

Geographical distribution of Enterotoxaemia

The disease was reported in 13 districts such as Anantapur, Chottor, Krishna, Mahabubnagar, Medak, Nizamabad, Prakasam, West Godavari, Nalgonda, Visakhapatnam, Guntur, Kurnool and Adilabad. and no incidence in the remaining 10 districts. highest outbreaks reported in Anantapur followed by Medak and Prakasam districts

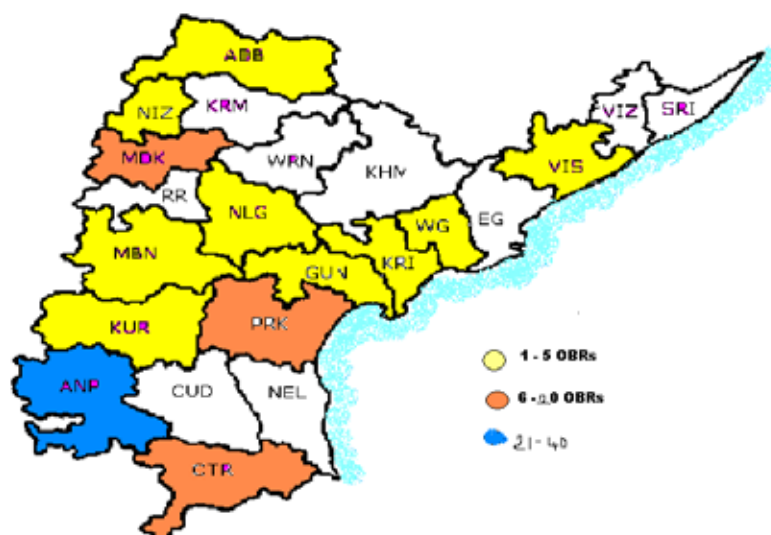


Fig. 7.9. Geographical distribution of Enterotoxaemia

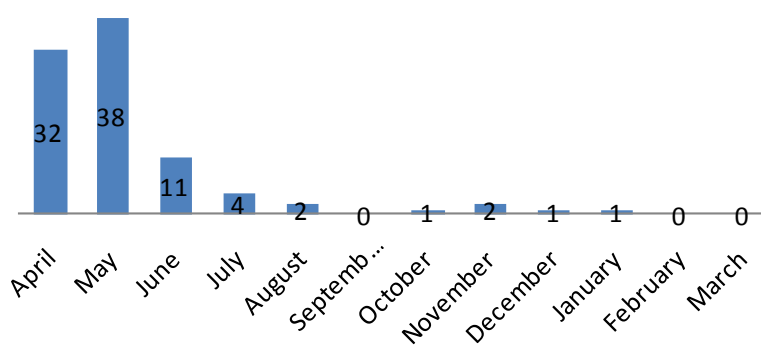


Fig. 7.10. Seasonal incidence of enterotoxaemia 2010-11

The disease incidence is reported through out the year except September, February and March without any seasonality and being high in the months of April and May. Seasonal incidence of disease varies from district to district. There were less number of ET outbreaks in late monsoon season and reveals no correlation between rainfall and disease incidence. Preventive vaccination is practiced in pre monsoon season depending upon the disease endemicity.

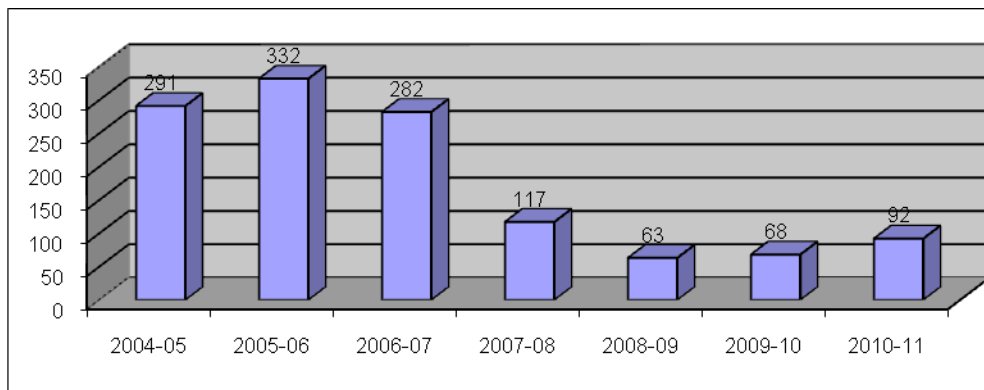


Fig. 7.11 Comparative incidence of enterotoxaemia for the last 7 years

The disease is in reducing trend when compared to previous years due to mass vaccination of all sheep in all the endemic areas every year

Anthrax in Sheep & Goat 2010-11

Anthrax is a highly septicaemic disease caused by *Bacillus anthracis* organism and the mortality is almost 100%. In Andhra Pradesh Anthrax is mostly reported in small ruminants when compared to large ruminants.

Total OBRs : 11 , Attacks: 44 , Deaths: 41& vaccinations conducted during the outbreak= 28538

More incidence in Rayalaseema (7 OBs) followed by Telangana (2 OB) and Coastal Andhra regions (2 OBs).

The disease is in reducing trend when compared to last 5 years.

Geographical distribution of Anthrax in small ruminants during the year 2010-11

Anthrax in sheep & goats reported in only 5 districts (Chittoor, Nalgonda, Guntur, Prakasam and Kadapa). and no incidence in the remaining 18 districts. More outbreaks in Rayalaseema (7) followed by Telangana (2) and Coastal andhra regions (2).

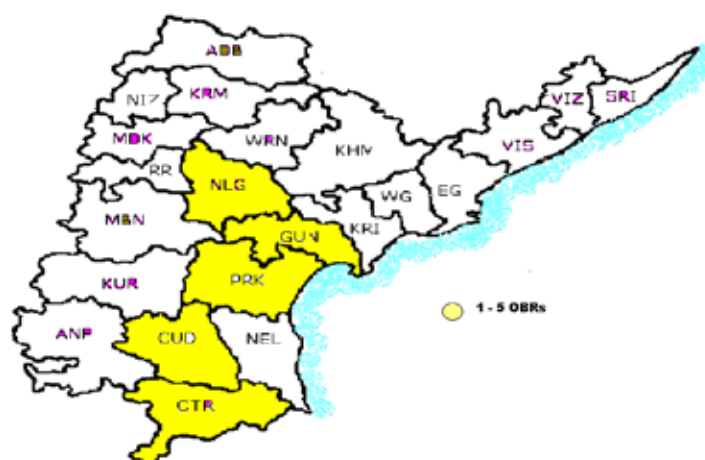


Fig. 7.12 Geographical distribution of Anthrax in small ruminants during the year 2010-11

Disease incidence appeared during the months of April, May, June, July October and February.

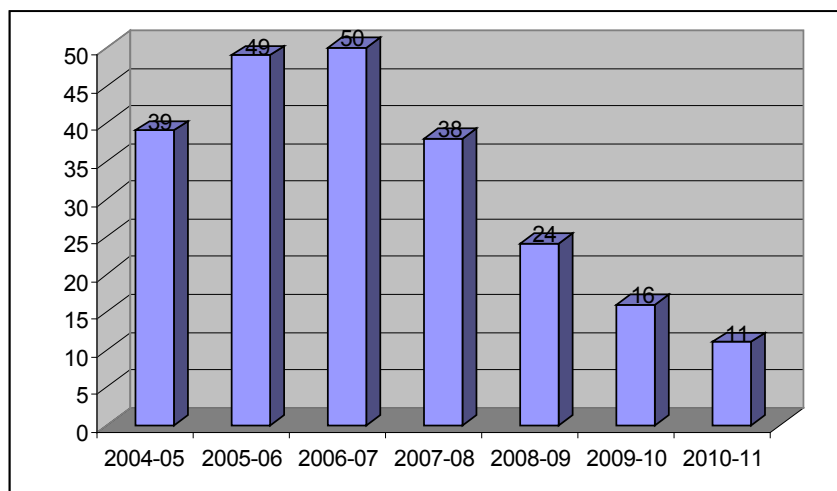


Fig. 7.13. Comparative incidence of Anthrax in small ruminants for the last 7 years

The disease is in reducing trend when compared to previous years due to mass vaccination of all susceptible animals in all the endemic areas every year and also due to creation of awareness among farmers by field staff in all the endemic villages in the districts in control and containment of Anthrax.

Mass awareness campaigns are being carried out to educate farmers and shepherds and vaccinations are being launched in large scale in border areas and endemic pockets. Positive response is noted in all the Anthrax-endemic districts. All the susceptible livestock in all the endemic villages are protected against Anthrax every nine months continuously for five years for control of Anthrax.

Viral Diseases of Sheep & Goat: PPR

A total of 52 outbreaks of Peste des petits ruminants were recorded during 2010-11 in the state. The disease incidence was reported throughout the year, however maximum numbers were recorded from January to April i.e. early summer. The reason being the stress conditions like higher temperature and more drought conditions in sheep populated districts.

- 590 Samples collected from the above PPR outbreaks were subjected to Sandwich ELISA and out of which 150 samples were found positive for PPR.
- The disease was in reducing trend due to mass vaccinations in all endemic areas by campaign mode.

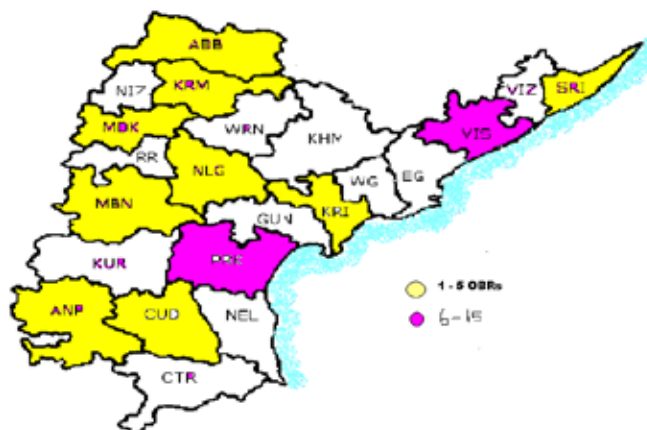


Fig. 7.14 Geographical distribution of PPR in 2010-11

- PPR reported in 11 districts out of 23 districts of AP such as Anantapur, Visakhapatnam, Mahabubnagar, Prakasam, Kadap, Nalgonda, Krishna, Karimnagar, Srikakulam, Medak and Adilabad. Highest outbreaks reported in Prakasam & Visakhapatnam districts.

Seasonal Incidence of PPR

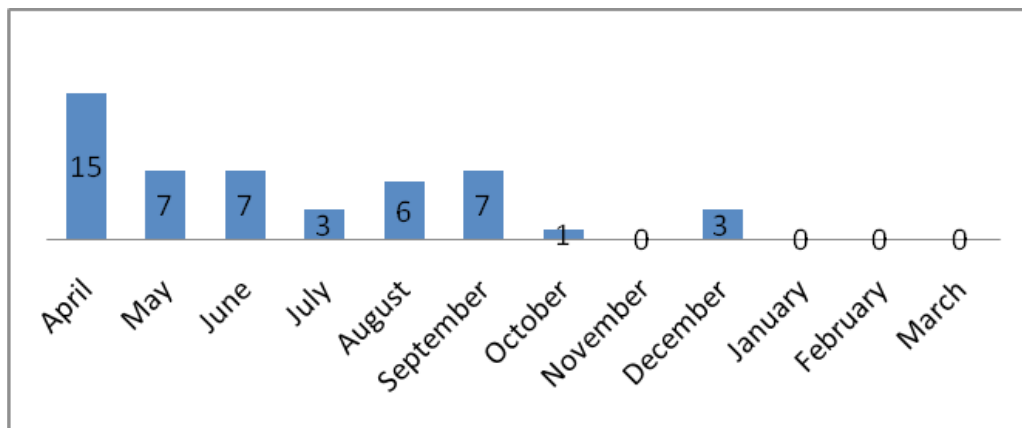


Fig. 7.15. Seasonal Incidence of PPR for the year 2010-11

The PPR disease outbreaks were noticed throughout the year except November, January, February and March and the incidence is high during the months of April, May, June and September.

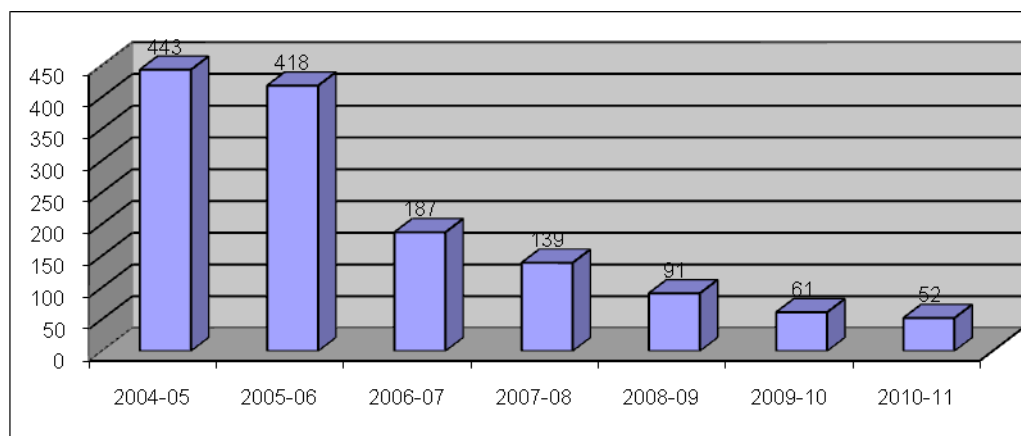


Fig. 7.16. Comparative incidence of PPR for the last 7 years

The incidence of PPR disease was showing decreasing trend from the year 2005-06 onwards and it may be due to protection of all susceptible sheep and goats in all the endemic areas of the districts every year by campaign mode.

Sheep Pox

Sheep pox is a serious and often fatal viral disease characterized by wide spread skin eruptions with high morbidity and low mortality rates.

Sheep Pox disease is reported in Nalgonda, Prakasam, West Godavari, Anantapur, Mahabubnagar, Chittoor, East Godavari, Kurnool and Kadapa districts during the year 2010-11. About 35 OBRs of Sheep pox with 281 attacks and 105 deaths are reported during the year. The incidence of Sheep pox was reported in only 9 out of 23 districts of the state. There were no reports of sheep pox in the remaining 14 districts.

- Confirmation of disease is being done by clinical picture, PM findings and Sero-diagnosis (AGID).
- 34 Samples collected from the above Sheep Pox outbreaks were sent to the Division of Virology, Indian Veterinary Research Institute, Mukteswar for confirmation and all the samples were positive for Sheep Pox.

Geographical distribution of sheep pox in 2010 -11

The disease was reported in only 9 districts out of 23 districts such as Nalgonda, Prakasam, West Godavari, Anantapur, Mahabubnagar, Chittoor, East Godavari, Kurnool and Kadapa. More OBRs recorded in Rayalaseema Region (26) followed by Coastal Andhra region (6) & Telangana region (3) .

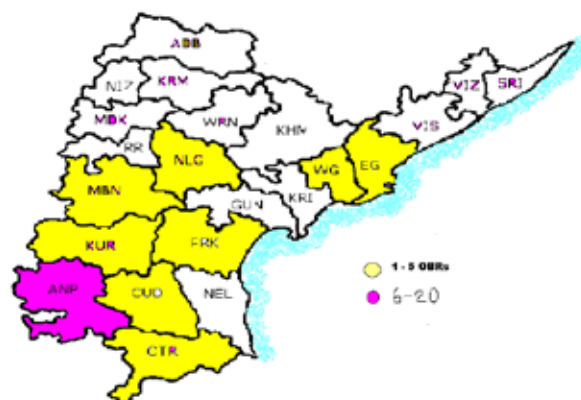


Fig. 7.17. Geographical distribution of sheep pox in 2010 -11

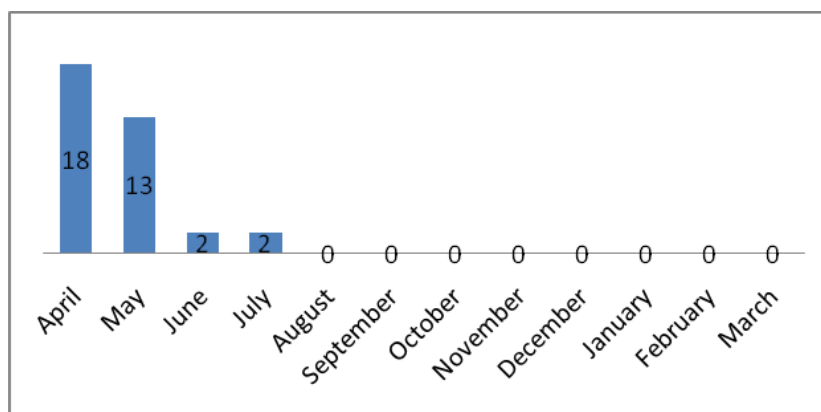


Fig. 7.18. Seasonal Incidence of Sheep Pox for the year 2010-11

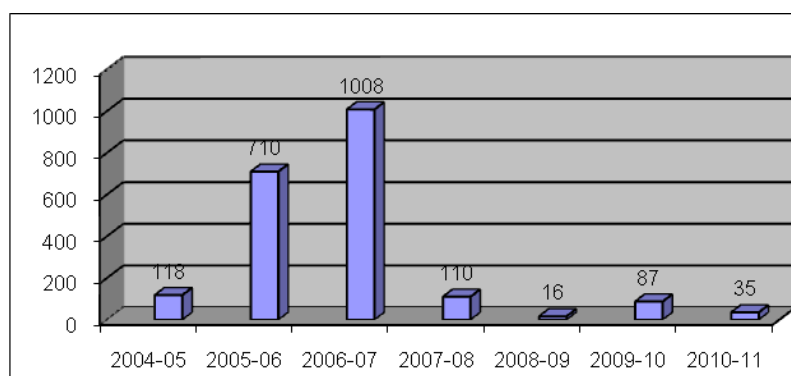


Fig. 7.19. Comparative incidence of Sheep pox for the last 7 years

The incidence of Sheep pox disease was showing in decreasing trend and only 35 outbreaks were reported during the year when compared to previous years and this may be due to protection of all susceptible sheep against Sheep pox in all the endemic areas of the districts every year by campaign mode.

Goat pox

The disease is common in young and lactating animals. Compared to previous year the disease incidence is reduced and only one outbreak of Goat pox was reported during the year 2010-11, in Srikakulam district in the month of August, 2010 with 5 attacks and no deaths.

- No incidence of Goat pox in the remaining 22 districts.
- Confirmation of the disease is being done by clinical picture, PM findings and sero-diagnosis.



Fig. 7.20. Geographical distribution of Goat Pox in 2010-11

The disease incidence is in decreasing trend when compared to previous years and only one outbreak was reported during the year 2010-11.

Brucellosis

Brucellosis, a bacterial disease is identified as the major abortion causing factor in large and small ruminants of the state. The Brucellosis control Unit established during 1964 in VBRI regularly screen Livestock of different organized, and Government farms including breeding bull population of the state. Brucellosis disease is noticed in all the districts of the state more so in organized farms causing great public health problem. Sheep flocks of West Godavari, Prakasam, Nalgonda, Krishna, Warangal and Rangareddy districts were having brucellosis infection

During the year under report 4796 serum samples were examined for brucellosis out of which 536 samples are found positive (11.17%). During the year 416 serum samples from breeding bulls of semen banks were screened against brucellosis & IBR and out of which 3 breeding bulls were found positive for IBR and all are negative for brucellosis. 1276 animals in Govt. Livestock Farms were screened against brucellosis and 8 were found positive for brucellosis (0.626%). 2628 animals in Private farms were screened against brucellosis and 8 (0.626%) in Govt. Livestock farms & 381 (14.49%) in private farms are found positive.

Table 7.3. Status of Brucellosis in different managerial practices

Sl.No.	Areas	Tested	Positives	%Positives
1	Govt. Farms	1276	8	0.626
2	Private Farms	2628	381	14.49
3	Others	712	53	11.78
	Total	4616	536	10.92

Table 7.4 Species wise prevalence of Brucellosis during 2010-11

Species	Tested	Positives	% Positives
Exotic Cattle	48	4	8.33
Zebu	1228	68	5.53
Buffaloes	2628	381	14.49
Sheep	602	38	6.31
Goats	28	3	10.71
Pigs	82	12	14.49
Horses	0	0	0
Dogs	0	0	0
Humans	180	30	16.66
Total	4796	536	11.17

Brucellosis in Government Livestock farms

During the year 2010 -11, 1276 animals (cattle 371, buffaloes 295, sheep 528 and 82 pigs) were screened in Govt. farms. Out of them 8 animals were found positive for brucellosis i.e. 0.626%.

Brucellosis in private farms

During the year 34 private livestock farms have been screened for brucellosis. Out of 2628 animals tested 347 were found positive for brucellosis i.e. 13.2%. A total of 549 cattle, 96 sheep and 1983 buffaloes were screened against brucellosis. It was observed that, there is increase in the incidence of brucellosis compared to last year may be because of lack of regular screening in the private farms.

Brucellosis in Animals

Since inception of the scheme, 1,19,926 cattle and buffaloes were screened against brucellosis and 5,633 have been found positive brucellosis i.e. 4.72%. 34,917 sheep and goat sera samples were screened against brucellosis. Out of which 1,495 were found positive for brucellosis i.e. 4.28%. 3,138 pig sera samples were screened against brucellosis. Out of which 190 were found positive for brucellosis i.e. 6.05%.

Table 7.5. Status of Brucellosis in AP for the last three years

Species	2010-11			2009-10			2008-09		
	Tested	Positive	% +ve	Tested	Positive	% +ve	Tested	Positive	% +ve
Cattle	1276	72	5.64	1252	70	5.59	669	5487	4.37
Buffaloes	2628	381	14.49	2560	363	14.17	2623	2841	6.02
Sheep	602	38	6.31	706	35	4.95	943	867	10.26
Goats	28	3	10.71	21	3	14.28	31	48	8.33

Table 7.6 Screening of Breeding Bulls against Brucellosis & IBR

Name of the	Bulls screened for	Positive	Bulls screened for	Positive
FSBS	Brucellosis		I.B.R	
Kareemnagar	54	0	54	0
Banvasi	54	0	54	0
Vizag	67	0	67	0
Nandyala	86	0	86	0
YBS Nakirekalu	155	0	155	7

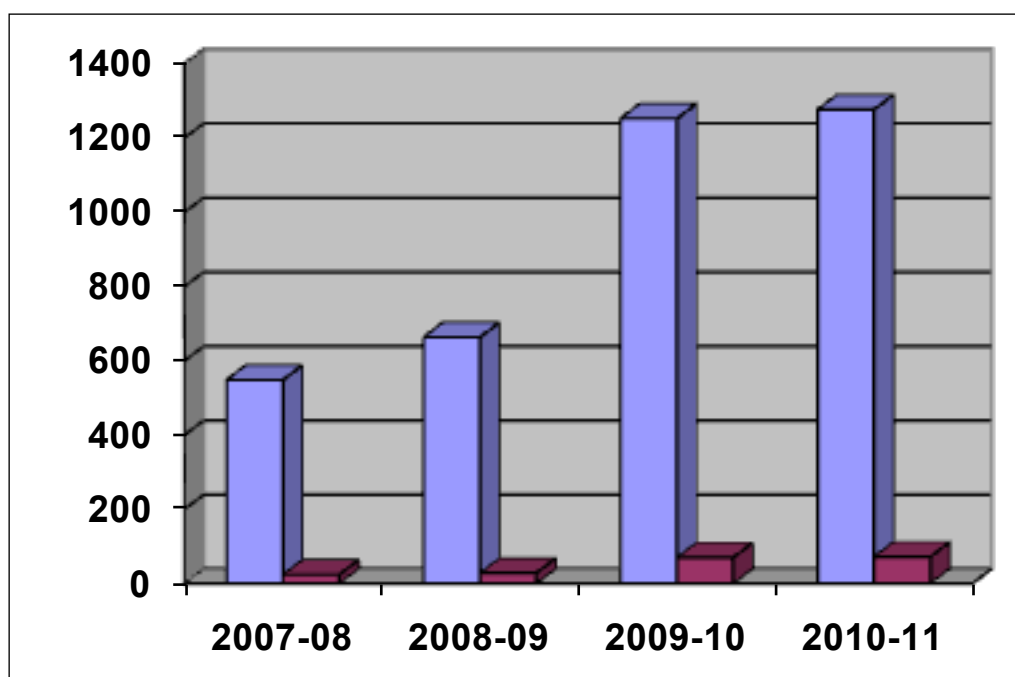


Fig. 7.21 Incidence of Brucellosis among cattle for the past four years

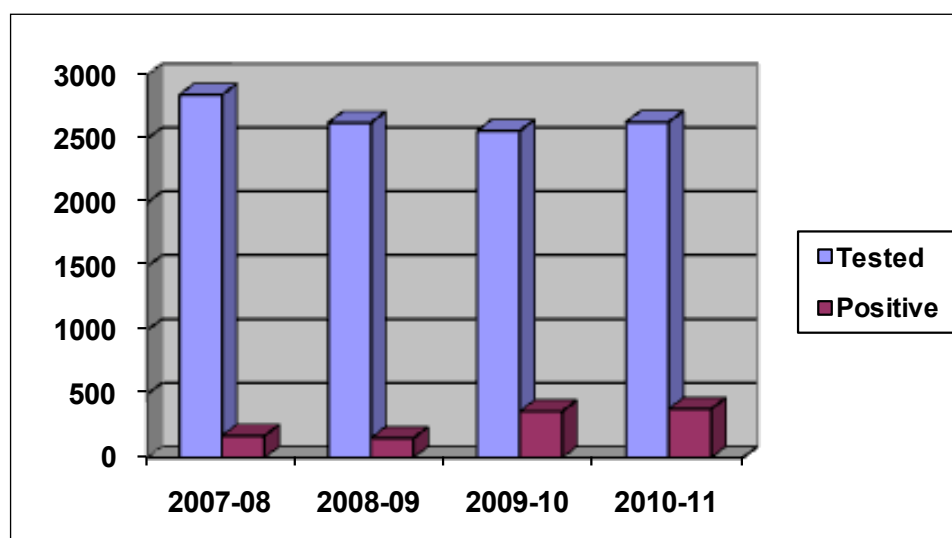


Fig. 7.22 Incidence of Brucellosis among buffaloes for the past four years

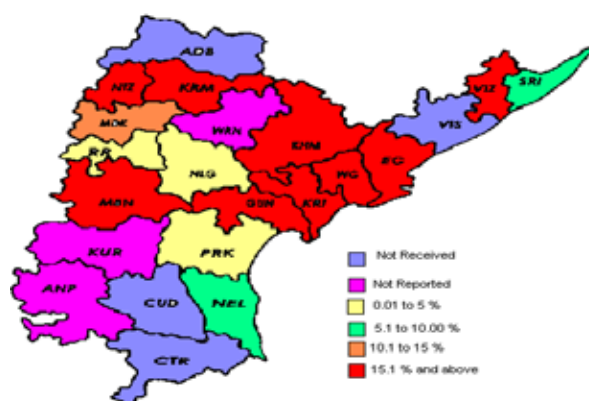


Fig. 7.26. Sero prevalence of Brucellosis in sheep and goat in AP from 2006- 07 to 2010–11

Table 7.7. Incidence of bacterial diseases in Andhra Pradesh

Name of the disease	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11
Haemorrhagic septicaemia	420	287	280	167	77	100	78
Black Quarter	166	67	83	55	40	20	18
Enterotoxaemia	291	332	282	117	63	68	92
Anthrax (in Bovines)	8	10	1	2	7	5	0
Anthrax (in Small Ruminants)	39	49	50	38	24	16	11

Table 7.8. Incidence of viral diseases in Andhra Pradesh

Name of the disease	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11
Foot & Mouth disease	28	599	145	68	19	26	2
Peste Des Petits Ruminants	443	418	187	139	91	61	52
Sheep pox	118	710	1008	110	16	87	15
Goat pox	31	32	0	34	0	0	1
Buffaloe pox	0	0	3	3	3	4	0

Parasitic diseases

Parasitic diseases cause great economic losses in livestock especially, sheep and goats. The infections are generally noticed throughout the year in the sporadic form. During the year under report Trypanosomiasis and Amphistomiasis were reported in bovines from different districts of AP. In sheep & goat apart from Amphistomiasis, Fasciolosis was also recorded.

Table 7.9. Budget utilization during the year 2010-11

Head of A/c	Balance from 2009-10	Amount released during 2010-11	Progress-ive Total	Expenditure	Unspent Balance for Revalidation
T.A	1033	73,967	75000	74964	36
Cont.	199	2,74,801	2,75,000	2,74,982	18
Total	1232	3,48,768	3,50,000	3,49,946	54

8. AICRP on ADMAS Collaborating Unit: Imphal, Manipur

Table 8.1. Monthly average record of temperature, relative humidity and rainfall of Manipur during 2010-11

Month	Average Temperature (°C)		Average Relative Humidity (%)		Average Rainfall (mm)	Wind Speed (Km/hr)
	Maximum	Minimum	Morning	Evening		
April, 2010	29.0	18.4	88.2	80.6	7.7	3.7
May, 2010	27.9	20.1	89.7	83.8	6.2	3.7
June, 2010	27.3	22.7	94.5	75.5	6.2	3.7
July, 2010	29.0	22.7	92.9	83.3	9.6	-
August, 2010	29.6	22.6	92.8	86.2	0	2.9
September, 2010	28.6	21.6	93.6	87.4	3.7	2.0
October, 2010	27.6	18.5	92.4	87.2	6.3	2.0
November, 2010	25.3	12.7	90.1	83.8	0.4	1.7
December, 2010	21.6	7.3	83.5	79.8	1.9	-
January, 2011	20.8	5.4	80.8	77.8	0.6	-
February, 2011	23.2	7.2	77.5	69.0	0.1	-
March, 2011	26.0	11.8	82.8	76.2	1.5	-

Table 8.2. Vaccination record of livestock and poultry population of Manipur during the year, 2010-11

Sl. No.	Vaccine	Total
1	BQ+HS Combined Vaccine	3,24,200
2	Swine Fever Vaccine	1,01,950
3	Cholera Vaccine	1,56,800
4	RD-F1(Lasota Strain) ineVaccine	5,70,800
5	RD-R2B Vaccine	7,84,200
6	IBD Vaccine	8,25,000
7	Fowl Pox Vaccine	5,20,400

Table 8.3. Black quarter outbreaks in Manipur during the year, 2010-11

Sl. No	Month	District	Village affected	O.B. No.	Species affected	Attack	Death	Mortality (%)	Population at risk	Vaccination Status of animal
1	April, 2010	Imphal-East	Telou	1	Cattle	58	12	20.7	Cattle-230 Buff-42	Un-vaccinated
2	June, 2010	Bishnupur	Utlou Langpok	1	Cattle	4	2	50.0	Cattle-220 Buff-32	-do-
3	October, 2010	Imphal-West	Lainingkhul	1	Cattle	3	2	66.7	Cattle-230 Buff-Nil	-do-
4	November, 2010	Imphal-East	Leishangkong	1	Cattle	14	10	71.4	Cattle-220 Buff-Nil	-do-
5	February, 2011	Imphal-East	Bamol Kampu	1	Cattle	12	7	58.3	Cattle-205 Buff-Nil	-do-
6		Imphal-East	Kalika	1	Cattle	32	20	62.5	Cattle-450 Buff-Nil	-do-
7		Imphal-West	Phayeng	1	Cattle	17	11	64.7	Cattle-350 Buff-Nil	-do-
8	March, 2011	Imphal-East	1. Awang Potsangbam 2. Andro Khunou 3. Shambei	3	Cattle	37	14	37.8	Cattle-916 Buff-54	-do-
9		Imphal-West	1.Loitang Khunou 2.Chaphou	2	Cattle	12	8	66.7	Cattle-700 Buff-72	-do-
10		Senapati	1.Purul 2.Wilong	2	Cattle	18	14	77.8	Cattle-450 Buff-94	-do-
Total				14		207	100	41.2	Catt-3971 Buff-294	

Table 8.4 Districtwise Black quarter outbreaks in Manipur during, 2010-11

Sl. No.	District	Villages affected	O.B. No.	Species affected	Attack	Death	Mortality (%)	Remarks
1	Imphal-East	1.Telou 2.Leishangkhang 3.Bamon Kampu 4.Kalika 5.Awang Potsangbam 6.Andro Khunou 7.Shambei	7	Cattle	153	63	41.2	All affected animals were un-vaccinated however few vaccinated animals were also affected.
2	Bishnupur	1. Utlou	1	Cattle	4	2	50.0	
3	Imphal-West	1.Lainingkhn 2.Phayeng 3.Loitang Khunou 4.Chaphou	4	Cattle	32	21	65.6	
4	Senapati	1.Purul 2.Wilong	2	Cattle	18	14	77.8	
Total			14		207	100		

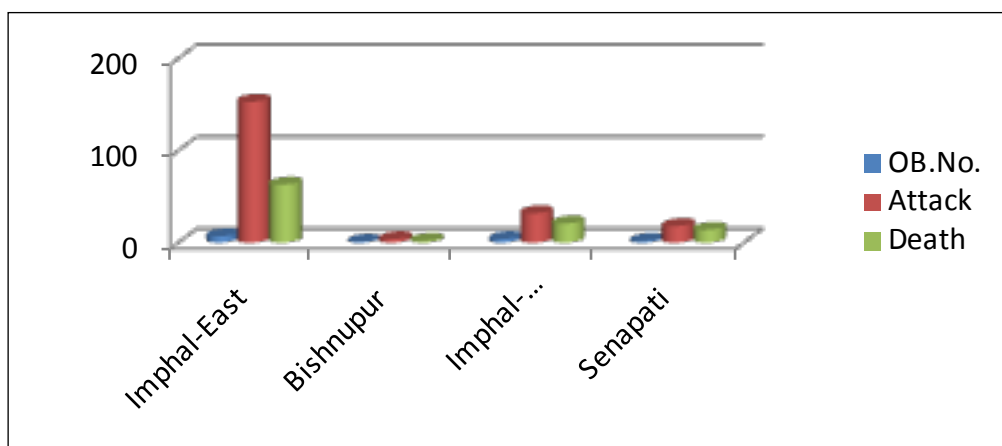


Fig. 8.1 Graphical representation of Black quarter outbreaks in Manipur during 2010-11

Table 8.5. Retrospective incidences of Black quarter in Manipur during the last five years (2006-07 to 2010-11)

Year	District affected	O.B.No.	Species	Attack	Death	Mortality %	Remarks
2006-07	1.Tamenglong	4	Cattle	34	8	23.5	Ukhrul district had highest number of BQ incidence in 2007-08.
	2.Imphal-West	1	Cattle	14	3	21.4	
	3.Ukhrul	1	Cattle	17	8	47.1	
2007-08	1.Imphal-East	1	Cattle	14	9	64.3	
	2.Imphal-West	2	Cattle	27	16	59.3	
2008-09	1.Imphal-East	4	Cattle	25	21	84.0	
	2.Imphal-West	2	Cattle	16	11	68.7	
	3.Tamenglong	2	Cattle	26	23	88.5	
	4.Ukhrul	10	Catt & Buff	35	28	80.0	
2009-10	1.Thoubal	3	Cattle	32	21	65.6	
	2.Ukhrul	1	Cattle	6	3	50.0	
	3.Senapati	2	Catt & Buff	11	8	72.7	
2010-11	1.Imphal-East	7	Cattle	153	63	41.2	
	2.Imphal-West	4	Cattle	32	21	65.6	
	3.Bishnupur	1	Cattle	4	2	50.0	
	4.Senapati	2	Cattle	18	14	77.8	
Total		47		464	259		

Table 8.6 Swine fever outbreaks in Manipur during the year, 2010-11.

Sl. No.	Month	District	Village affected	No. of outbreaks	No. of attack	No. of death	Mortality (%)	Population at risk
1	August 2010	Imphal-West	1.Langol &	1	18	11	61.1	142
			2.Sagnaiparou	1	10	7	70.0	210
2	September 2010	Imphal-West	1.Langol	1	12	5	34.2	965
			2.Lamphel	1	18	6	33.3	380
			3.Kangchup	1	20	11	55.0	250
			4.Naoremthong	1	15	7	46.7	186
			5.Kakwa	1	8	4	50.0	240
3	November 10	Chendel	Komlathabi	1	12	8	66.7	215
		Ukhrul	1.Lambui	1	14	6	42.9	325
			2.Sanshak	1	10	4	40.0	450
4	December 10	1.Thoubal	1.Khangabok	1	8	6	75.0	380
			2.Athokpam	1	9	6	66.7	310
		2.Ukhrul	1.Riha	1	16	5	31.3	450
			2.Shokpao	1	12	3	25.0	650
5	January 2011	Imphal-West	1.Langthbal	1	15	10	66.7	175
			2.Langjing	1	10	7	70.0	245
6	Febreuary 2011	Thoubal	Kiyam	1	38	14	36.8	180
Total				17	245	120	51.3	5753

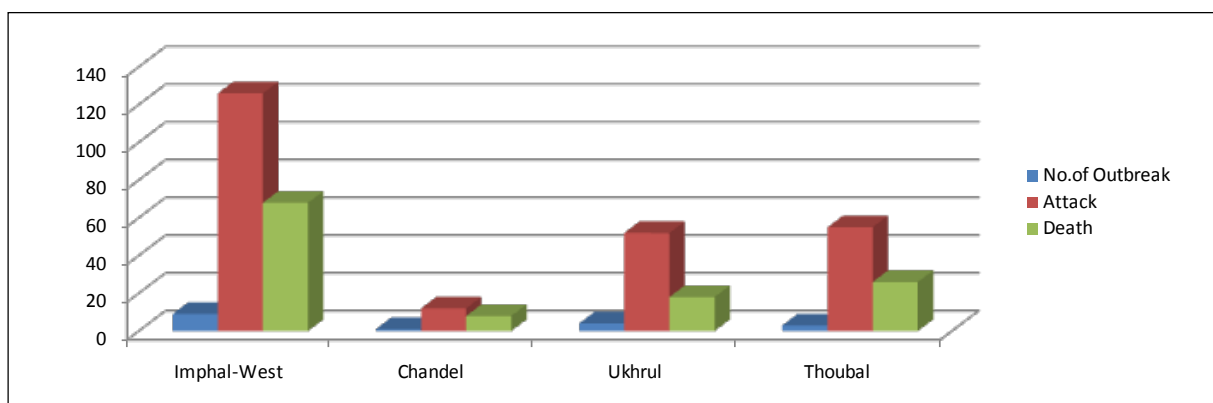


Fig. 8.2. Graph showing Swine fever outbreaks in Manipur, during 2010-11

Table 8.7. Retrospective incidences of Swine fever in Manipur during the Last five years (2006-07 to 2010-11)

Year	O.B.No.	Species	Attack	Death	Mortality %	Remarks
2006-07	5	Porcine	52	32	61.5	
2007-08	6	Porcine	76	38	50.0	
2008-09	7	Porcine	319	55	17.2	
2009-10	5	Porcine	135	54	46.7	Want of required vaccine doses
2010-11	17	Porcine	245	120	51.3	
Total	40		827	299	36.2	

Table 8.8. Sero-surveillance of Swine fever in Manipur during 2010-11

Sl.No.	District	EPI-Unit	No. of Sera samples tested	Positive Sera samples
1	Imphal-East	1. Nongdam	5	1
2	Churachandpur	1. Sangaikot	4	1
3		2. Panglian	10	2
4	Senapati	1. Thanglunpa	5	0
5		2. Thingsat	5	0
6	Chandel	1. Beru Anth	5	0
7		2. H.Mongjang	5	0
	Total		39	4

Overall positive percentage in the state from these samples was only 10.3%.

Table 8.9. Haemorrhagic septicaemia outbreaks in Manipur during the year, 2010-11

Sl. No.	Month	District	Village affected	Species	No. of outbreak	Attack	No. of death	Mortality (%)	Population at risk
1	June, 2010	Thoubal	Leishangthem	Cattle	1	6	2	Nil	Cattle-180 Buff-26
2	February, 2011	Imphal-West	Loitang Chaphou	Cattle	1	3	1	33.3	Cattle-250 Buff-44
Total					2	9	3	33.3	500

Table 8.10. Districtwise sero-surveillance of Brucellosis & IBR in cattle of Manipur using AB-Elisa kit during 2010-11

Sl. No.	District	Sera samples tested	Brucella Positive Samples	IBR positive samples
1	Imphal-East	140	98(70%)	52(37.1%)
2	Imphal-West	140	57(40.7%)	38(27%)
3	Thoubal	100	64(64%)	38(38%)
4	Bishnupur	100	29(29%)	22(22%)
5	Senapati	100	85(85%)	28(28%)
6	Ukhrul	100	58(58%)	8(8%)
7	Chandel	100	26(26%)	11(11%)
8	Churachandpur	100	77(77%)	18(18%)
9	Tamenglong	100	22(22%)	9(9%)
Total		980	516(52.7%)	224(22.9%)

* Out of the 980 cattle sera samples, 200 sera samples were tested at the PD_ADMAS, Hebbal, Bangalore during the year under report.

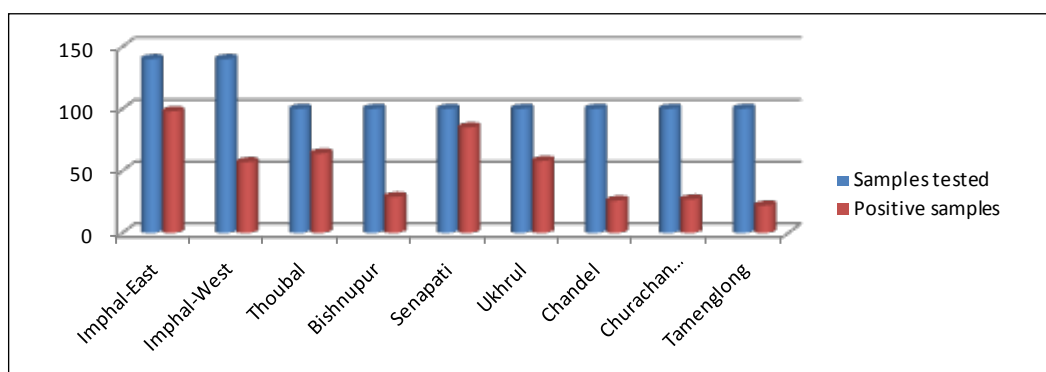


Fig. 8.3. Graphical representation of sero-surveillance of bovine brucellosis in Manipur in 2010-11

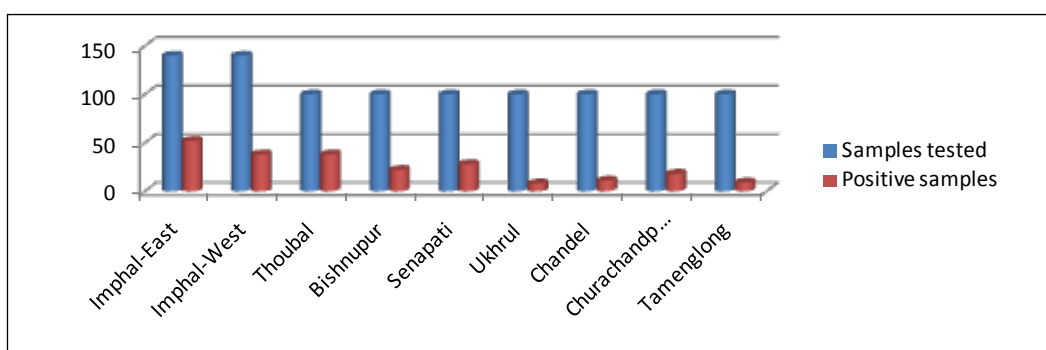


Fig. 8.4. Graphical representation of sero-surveillance of IBR in Manipur in 2010-11

Table 8.11. Sero-surveillance of Brucellosis in goat and sheep of manipur during 2010-11

Sl.No.	District	Species	No.of samples tested	No.of Positive samples	Prevalence rate
1	Senapati	Goat and Sheep	104	03	2.88
2	Imphal-East	Goat	20	Nil	-
3	Imphal-West	Goat	56	Nil	-
4	Thoubal	Goat	10	01	0.10
		Total	190	04	2.10

Table 8.12. Surveillance of bovine tuberculosis in Manipur during the year, 2010-11

Sl.No.	District	No. of animals tested	No. of positive animals
1	Imphal-East	52	All animals were not sensitive to Tuberculin PPD intradermal test
2	Imphal-West	64	
3	Thoubal	58	
4	Bishnupur	30	
5	Senapati	42	
6	Churachandpur	22	
	Total	268	

Table 8.13. Surveillance of Jhone's disease in Manipur during 2010-11

Sl.No.	District	No. of animals tested	No. of positive animals
1	Imphal-East	52	All animals were not sensitive to Jhonin PPD intradermal test
2	Imphal-West	64	
3	Thoubal	58	
4	Bishnupur	30	
5	Senapati	42	
6	Churachandpur	22	
	Total	268	

Table 8.14. Detection of leptospires from blood and urine samples of Manipur by staining examination during the year 2010-11.

Sl.No.	Species	No. of Blood samples examined	No. of urine samples examined	No. of positive samples	Prevalence rate
1	Canine	34	20	Nil	-
2	Caprine	11	8	Nil	-
3	Feline	4	-	Nil	-
Total		49	28	Nil	-

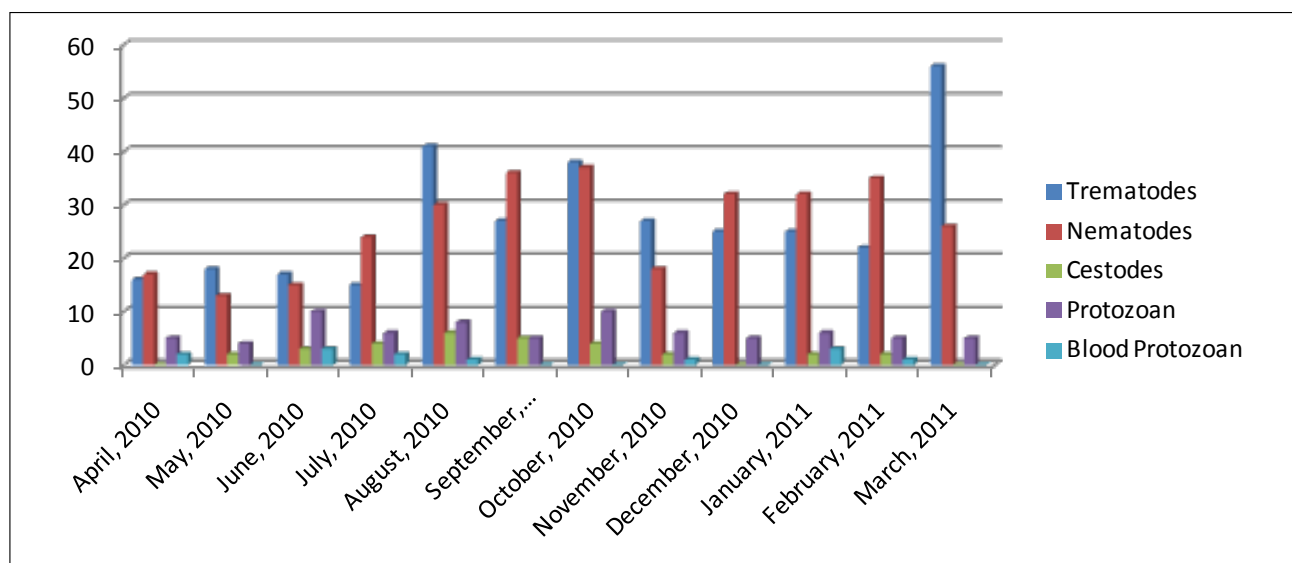


Fig. 8.5. Graphical representation of monthwise parasitic infestations In livestock animals in Manipur during the year 2010-11

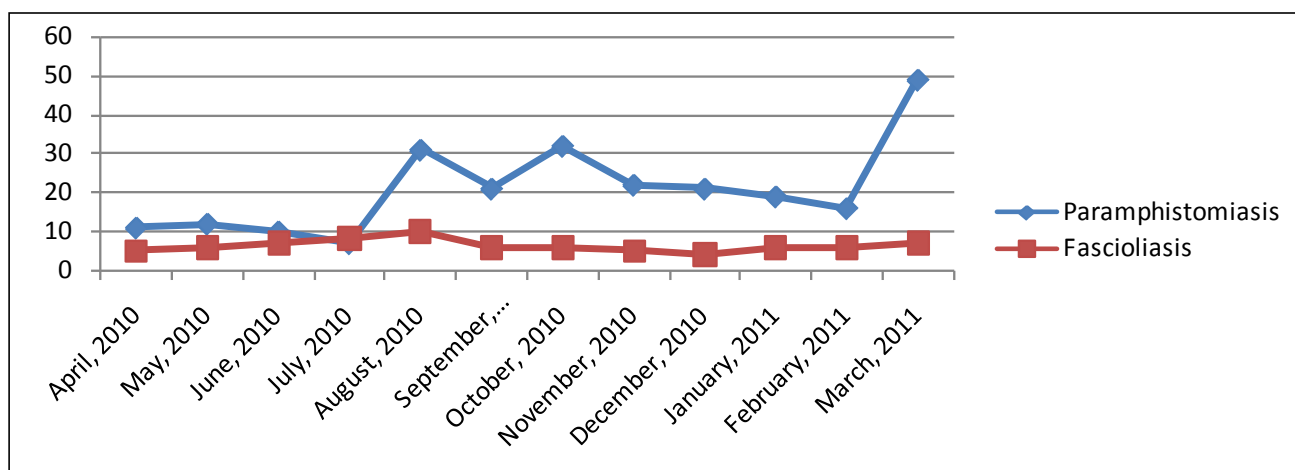


Fig. 8.6. Monthwise incidence of fascioliasis and paramphistomiasis in cattle of Manipur during 2010-11

Table 8.15 Assessment of economic losses in livestock resources due to major livestock disease outbreaks during 2010-11

Sl.No.	Livestock Disease outbreak	Assessed Economic loses (both direct +Indirect)
1	Black Quarter 14 outbreaks	Appx.Rs.15,10,500.00
2	Swine Fever 17 outbreaks	Appx.Rs.5,56,000.00
3	Haemorrhagic Septicaemia 2 outbreaks	Appx.Rs.63,000.00
4	Major poultry diseases	Appx.Rs.11,36,700.00
	Total	Appx. Rs.33,36,950.00

Table 8.16. ICAR fund allocation and expenditures of collaborating unit of ADMAS, Imphal, Manipur for the year 2010-11

ICAR Fund	Heads	Remittance by PD_ADMAS (Rs. In lakhs)	Actual Expenditure	Closing Balance
1. Grant-in-aid received from PD-ADMAS, Bangalore	1. T.A	Rs.0.80	Rs.0.80	Nil
	2. Contingency	Rs.2.25	Rs.2.25	Nil
Total		Rs.3.05	Rs.3.05	Nil

During the year, 2010-11, a sum of Rs.3.05 lakhs was allotted as the grant-in-aid in respect of the Collaborating Unit, Imphal, Manipur and this fund was completely utilized for executing various activities such as purchase of laboratory chemicals, equipments, plastic wares, emergency medicines, organization of awareness programme, miscellaneous courier/postal freight charges and for other office sundry items from contingency fund and for travel expenses, payment of TA/DA for staff for sample collection, field visits, attending disease outbreaks and for submission of laboratory samples to diagnostic laboratories etc. from the TA fund. The AUC of various expenditures of the Unit had already submitted to the Project Directorate on PD_ADMAS, Bangalore.

9. AICRP on ADMAS Collaborating Unit: Jaipur, Rajasthan

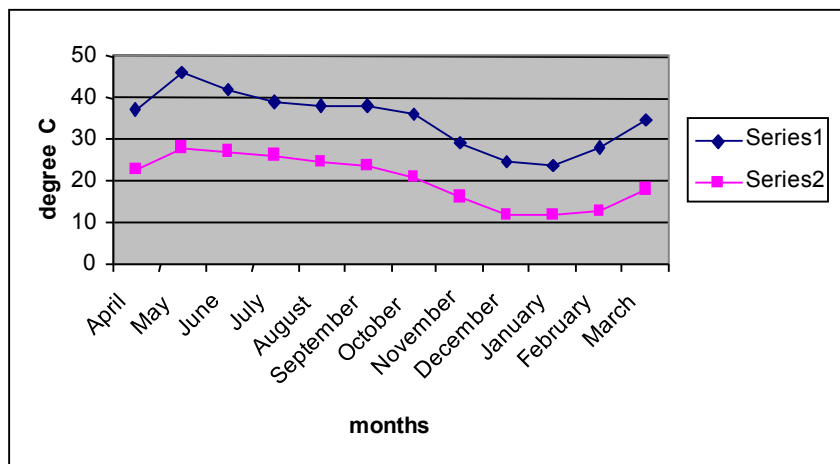


Fig. 9.1. Monthwise average meteorological parameters: Maximum and minimum temperature

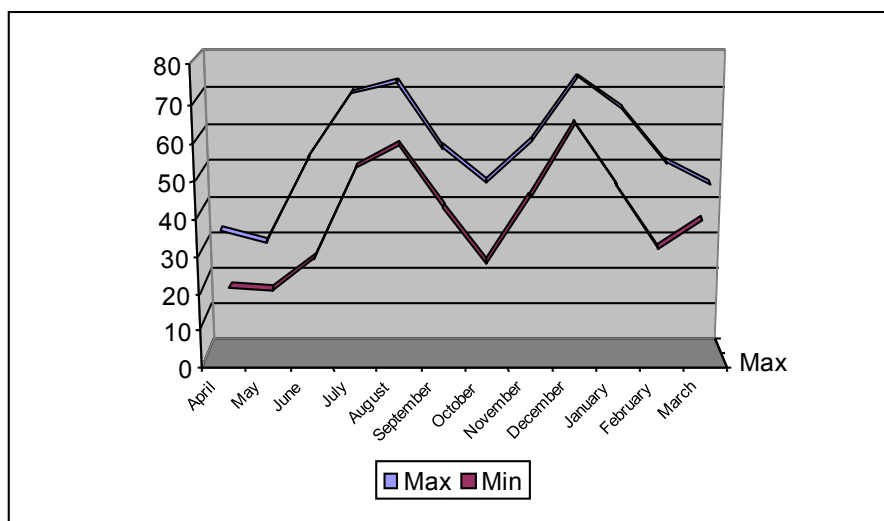


Fig. 9.2. Monthwise average meteorological parameters: Average humidity

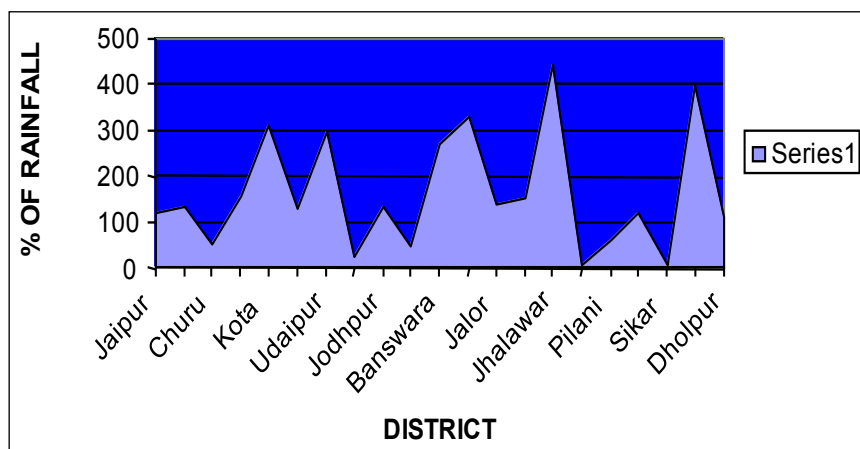


Fig. 9.3. Monthwise average meteorological parameters: Seasonal average rainfall

Disease profile of Rajasthan for the year 2010-11

In the year 2010-2011, Foot & Mouth Disease was the major disease that affected livestock in Rajasthan followed by HS with 9 outbreaks followed by Swine fever

In the state there were reported cases of Equine Influenza. In 5 outbreaks, 44 animals were affected but there was no death reported from the disease in the state.

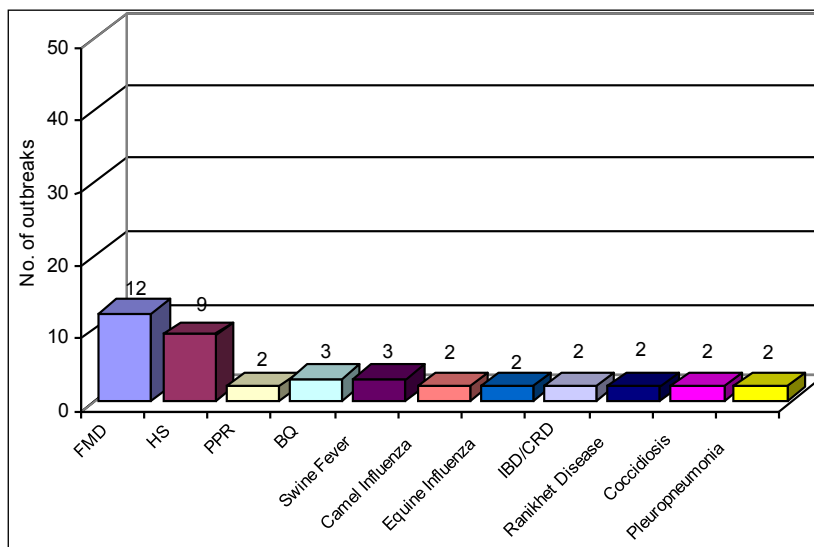


Fig. 9.4. Number of outbreaks of different diseases

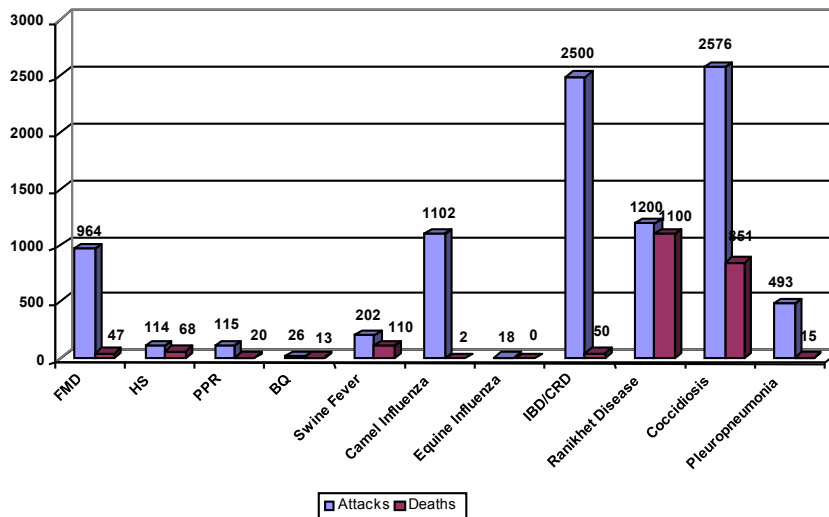


Fig. 9.5. Number of Attacks & deaths of animals

Haemorrhagic Septicemia

In the total nine outbreaks reported there was 114 attacks & 68 casualties found during year 2010-11. This is against 7 outbreaks reported in last year.

Jaipur district was most affected with 4 outbreak & 38 animals affected with 21 animals died. In Dholpur case fatality rate in the HS outbreaks was 100%. Other district affected were Alwar, Baran and Dausa where outbreaks occurred.

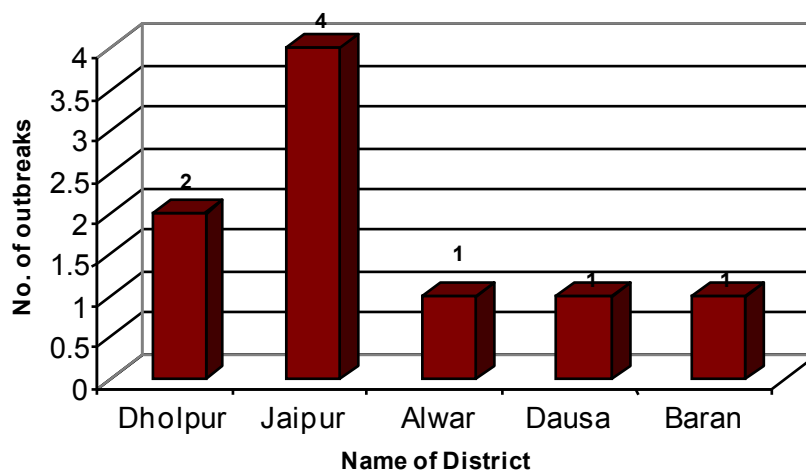


Fig. 9.6. District wise outbreaks of HS (2010-11)

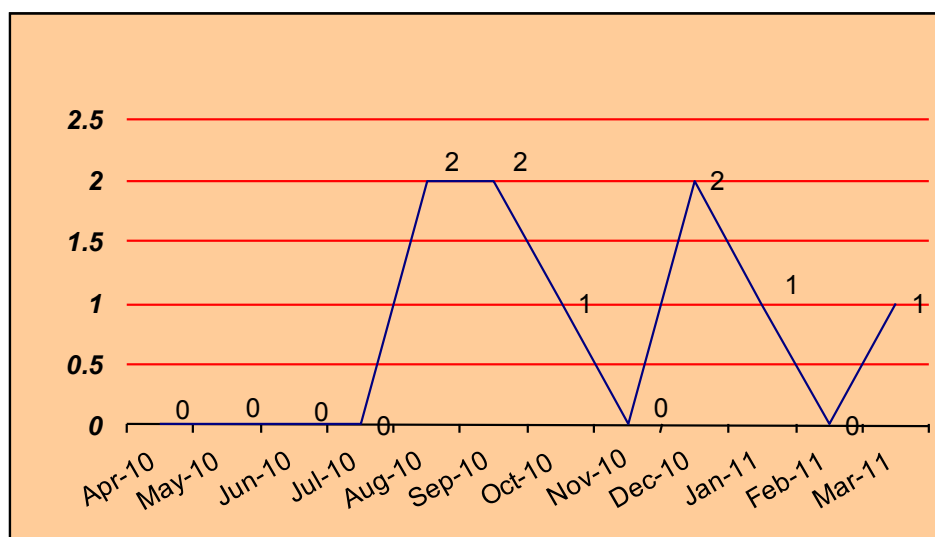


Fig. 9.7 Monthwise HS outbreaks data for 2010-11

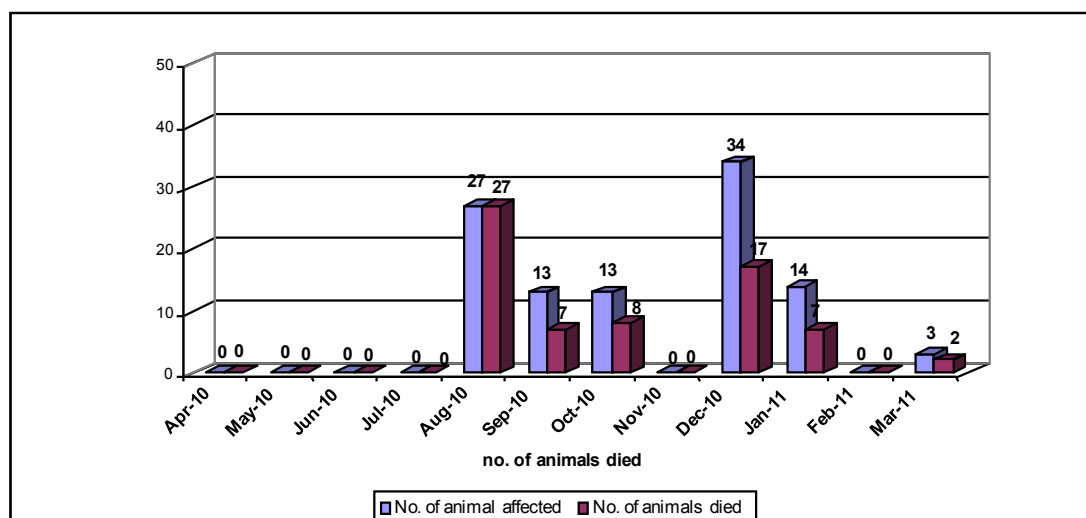


Fig. 9.8. Monthwise attack and mortality in HS outbreaks

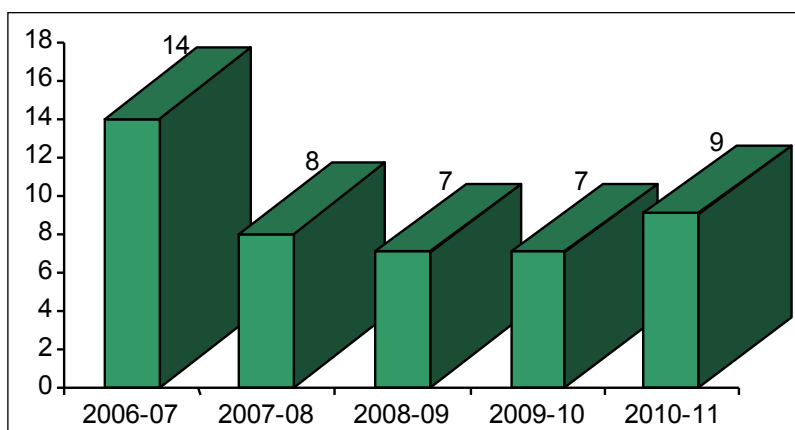


Fig. 9.9. Comparison of HS outbreaks from 2006-11

PPR

In the reported year 2010-11 two outbreaks of PPR were reported from Kota & Baran districts in April 2010 & March 2011 respectively.

In Kota dist. in one outbreak 60 goats were affected out of which 20 died.

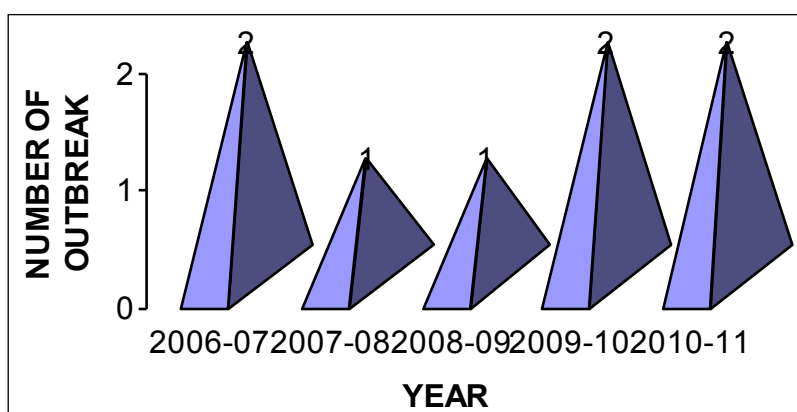


Fig. 9.10. Comparison of PPR outbreaks from 2006-11

Black Quarter

In the year 2010-11 three outbreaks of BQ were reported in Rajasthan. In the two consecutive previous years i.e. 2007-08, 2008-09 & 2009-10 one outbreak was reported, However in the year 2006-07 there were two outbreaks of BQ one each at Ganganagar & Hanumangarh district.

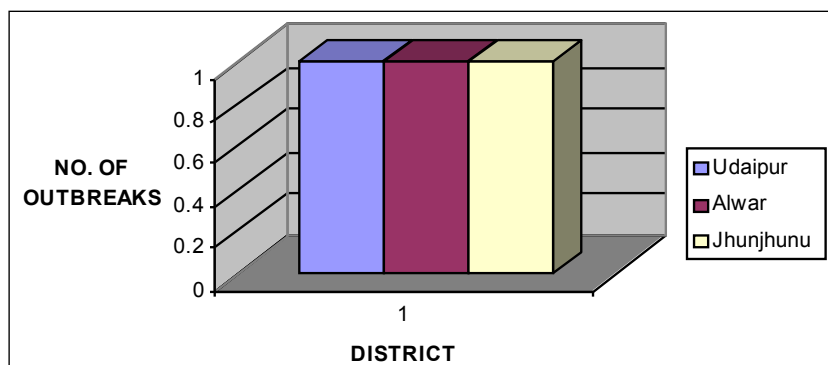


Fig. 9.11. District-wise outbreaks of BQ (2010-11)

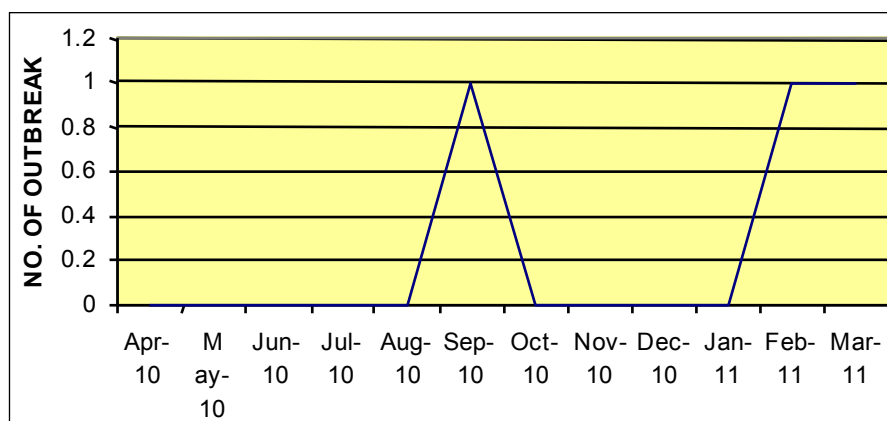


Fig. 9.12. Monthwise BQ outbreaks in 2010-11

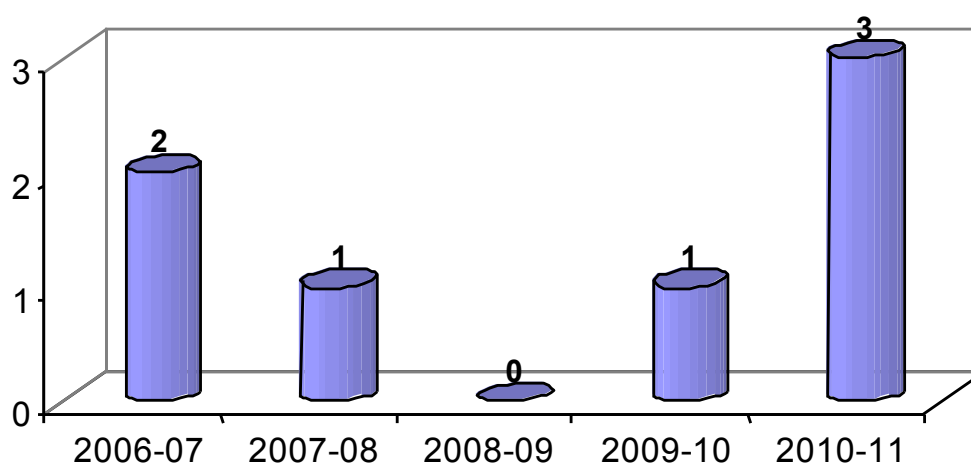


Fig. 9.13. Comparison of BQ outbreaks from 2006-11

Brucellosis

Brucellosis is an important zoonotic disease which causes undulant fever in humans & is an important disease in animals. Efforts are being directed at detection & prevention because no practical treatment is available. Vaccination as the sole means of disease control has been effective. Vaccination of calves with *Brucella abortus* strain 19 increases resistance to infection.

In the state laboratory RBPT & STAT are performed for screening of dairy herds & also for testing of individual animal for brucellosis.

Table 9.1 Samples screened for brucellosis

Sl. No.	Source	No. Tested	Positive
1	Govt. Livestock farm/Gausala	104	-
2	Breeding Bull Station	Nil	Nil
3	Private Organized farm & unorganized Farm	119	53
Total		223	53

Table 9.2 Species wise sample testing for brucellosis

Sr. No.	Species	Tested	Positive
1	Cow	178	31
2	Buffalo	31	22
3	Dog	01	-
4	Camel	13	-
Total		223	53

Swine Fever

The disease has been reported in the previous year i.e. one outbreak each in year 2006-07 & 2007-08 but there was no outbreak of swine fever in the year 2008-09. In the year 2006-07 mortality was to the tune of 80 % which occurred in Kota district while in the year 2007-08 it was 10%.

In the year 2009-10 there were three outbreaks of Swine fever from the Kota region only. In the year 2010-11 there were 3 outbreaks out of 202 affected animals 110 died due to disease showing about 55% mortality. Control of disease was achieved through effective immunization of animals.

Table 9.3. District-wise outbreaks of Swine Fever (2010-11)

Sr. no.	District	Outbreak	Attack	Death
1	Baran	01	105	85
2	Kota(Sept. 2009)	01	02	02
3	Kota(Nov. 2009)	01	95	23
Total		03	202	110

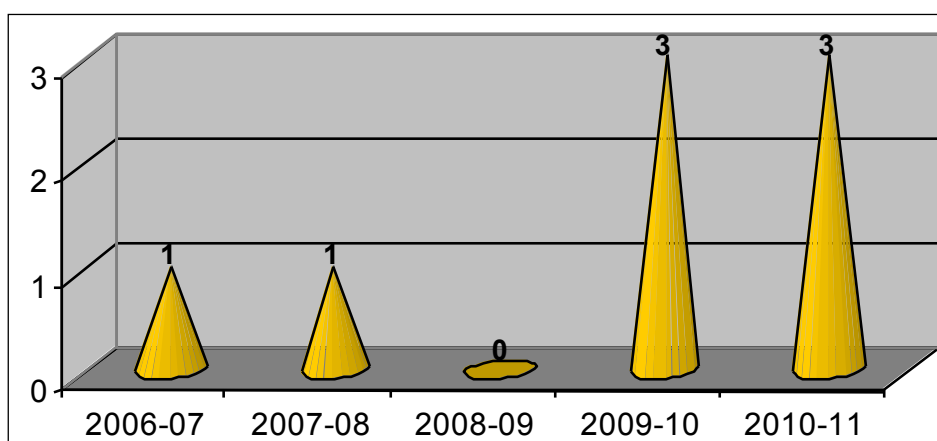


Fig. 9.14. Comparison of Swine fever outbreaks from 2006-11

Parasitic Diseases

In the laboratory samples were received for the blood parasitic examination from different sources. The samples were diagnosed in parasitology section of laboratory. Major diseases reported were Babesiosis, Trypanosomiosis, Theileriosis, and Anaplasmosis. In total 1672 samples were received in the laboratory of Cattle/ Buffalo, Sheep, Horse and Swine from various outbreaks throughout the year. Out of which 25 samples were found positive for Theileria. 66 samples were recorded positive for Babesiosis. Trypanosomes were found positive to tune of 125 samples which was major concern. For the Anaplasmosis 12 were positive. All these infections were recorded in cattle & buffalo. In almost all the cases the incidences occur throughout the year. Among 52.74 % samples

found positive for blood parasites, trypanosomes were the matter of concern in livestock followed by Babesia, and Theileria Anaplasma spp. In canines, *E. canis* was the important species to be noticed.

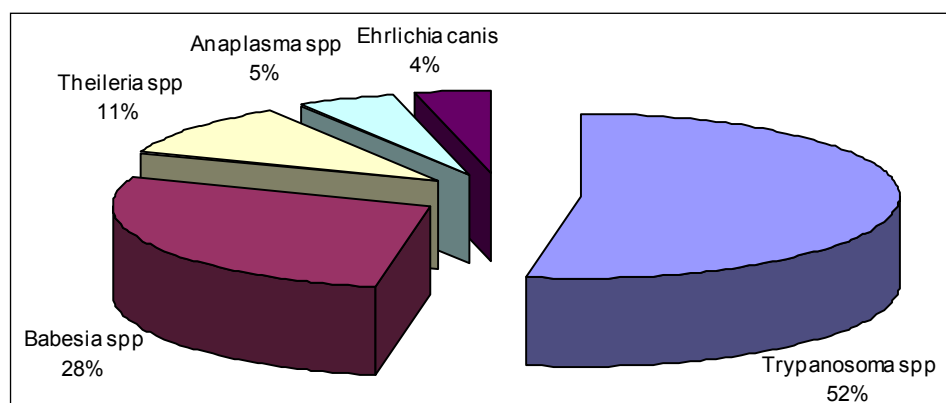


Fig. 9.15. Percentage contribution of various blood parasitic diseases

A total of 2386 samples were examined against the annual target of 2100 for presence of any gastrointestinal parasites. Out of these samples 356 samples found positive for presence of infestation. In the area, the roundworms were found to be the cause for most of the gastrointestinal disturbances. The examples include Ascarids, Strongyloides, *Trichuris*, *Haemonchus* and *Toxocara* spp.

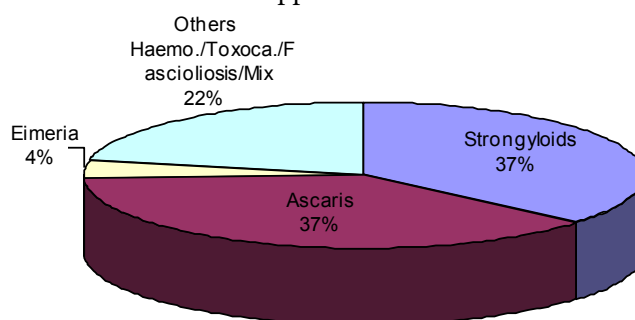


Fig. 9.16 Percentage contribution of various gastro intestinal parasitic diseases

Table 9.4 Livestock diseases confirmed in the disease diagnostic lab of the state

Sr. no.	Month	District	Species Affected	Etiological agent	Disease
1	April 2010	Jaipur	Cattle	Pasteurella	H.S.
2		Sikar	Sheep	Pasteurella	H.S.
3		Jaipur	Peahen	Pasteurella	H.S.
4	May	Nagore	Cattle	Staphylococci	Mastitis
6	July 2010	Ajmer	Bull calf	Klebsiella	Pneumonia
7		kota	Swine	S.F. Virus	Swine Fever
8	August 2010	Jaipur	Buffalo	Pasteurella	HS
9	September 2010	Jaipur	Buffalo	Pasteurella	HS
10		Jaipur	Cattle	Staphylococci	Mastitis
11	October 2010	Alwar	Swine	Pasteurella	HS
12	November 2010	Jaipur	Buffalo	Staphylococci	Mastitis
13		Chittore	Sheep	Pasteurella, E. coli	HS

Sr. no.	Month	District	Species Affected	Etiological agent	Disease
15	December 2010	Jaipur	Buffalo	Pasteurella	HS
16		Jodhpur	Camel	Pasteurella	HS
17		Sikar	Sheep	Pasteurella	HS
18	January 2011	Jaipur	Buffalo	Pasteurella	HS
19	February 2011	Jaipur	Cattle	Staphylococci	Mastitis
21		Dungarpur	Buffalo Cattle	Clostridium	BQ
22	March 2011	ShriGanga Nagar	Camel	Pasteurella	HS
23		Barn	Sheep	PPR Virus	PPR
24		Udaipur	Poultry	Coccidia	Coccidiosis

Table 9.5 Expenditure statement for the year 2010-11 (in Rs.)

Head of Account	Amount allotted	Expenditure up to 31-03-11	Balance Amount as on 31-03-11
TA	50,000=00	49,338=00	662=00
Contingency	1,50,000=00	149,653=00	347=00
Total	2,00,000=00	198,991=00	1009=00

10. AICRP on ADMAS collaborating Unit: Kolkata, West Bengal

Table 10.1. Average Temperature Rainfall Relative Humidity of West Bengal for the year 2010-2011

Sl No	Months	Temperature (°C)	Rainfall (mm)	Relative Humidity (%)
1.	April'10	32.05	0.68	71.0
2.	May'10	31.15	5.80	74.0
3.	June'10	30.85	11.8	79.5
4.	July'10	30.15	8.40	80.5
5.	August'10	29.95	5.20	81.5
6.	Sept.'10	29.4	12.80	82.5
7.	Oct.'10	28.70	2.80	79.0
8.	Nov.'10	26.40	-	72.0
9.	Dec.'10	20.40	0.60	69.0
10.	Janu.'11	19.40	-	67.5
11.	Feb.'11	23.90	0.50	61.5
12.	March'11	28.25	0.80	63.5

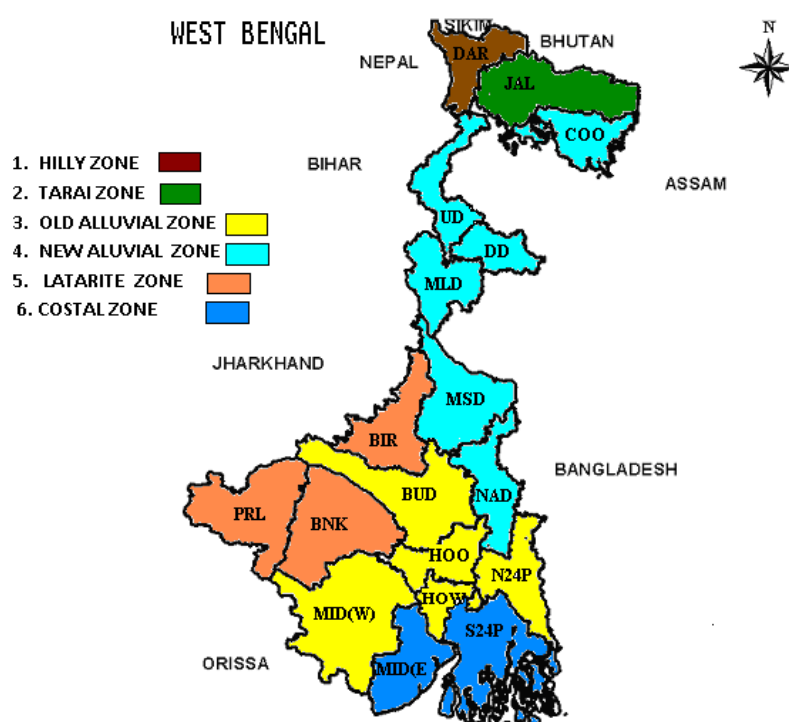


Fig. 10.1. Agroclimatic zones of West Bengal

Prevalence of important Animal Diseases in West Bengal, 2010-11

Anthrax

The disease reported in some districts in the state in bovine population only, although it is more prevalent in certain hot and humid parts of the state

Table 10.2. Outbreaks of anthrax during last six years

Year	No. of outbreak	Attack	Death	Morbidity (%)	Mortality (%)
2005-2006	42	198	177	0.89	0.80
2006-2007	30	116	114	0.75	0.73
2007-2008	31	134	131	0.65	0.63
2008-2009	21	71	70	0.78	0.77
2009-2010	23	78	73	0.43	0.40
2010-2011	23	85	85	0.85	0.85

In the reporting year, number of reported incidence (23) is same as previous year. The morbidity rate (0.85%) and mortality rate (0.85%) increased in comparison to last year. Incidence reported only from 5 (five) districts out of 19 (Nineteen) districts.

The incidences were reported throughout the year except May and June. Highest number of incidence (5) has been reported in the months of October followed by 3 in the months of July, August, September and November. In this year most of the incidence reported were during post-monsoon period. In the current year, maximum outbreaks were reported from Murshidabad district and single outbreak was reported from Nadia, Hooghly, Burdwan and Coochbehar districts. Most of the incidence was sporadic in nature.

In West Bengal, cattle were mainly affected, but in this Murshidabad District, Anthrax in goat species was also recorded. The vaccination was conducted in the face of outbreaks area.

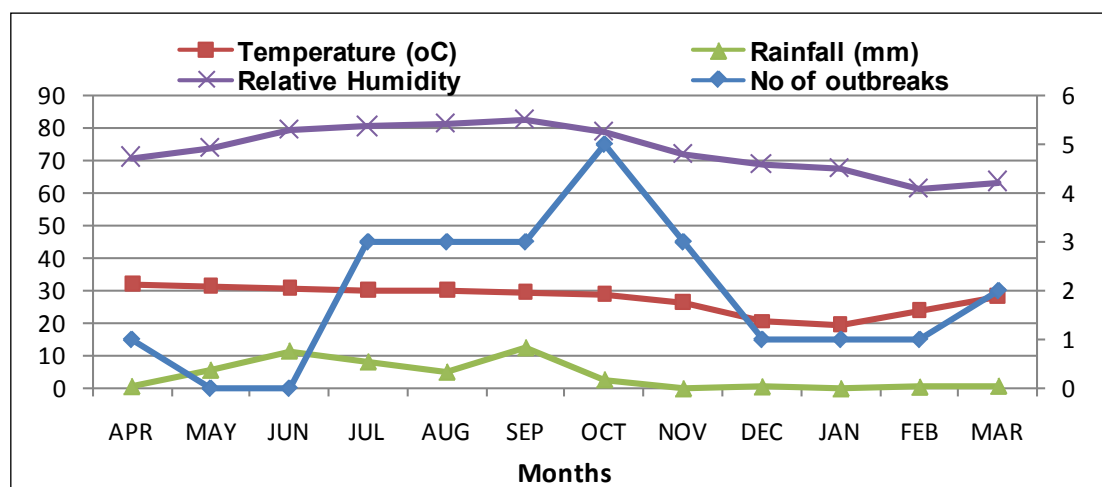


Fig. 10.2. Outbreaks of Anthrax in relation to Rainfall, Humidity and Temperature, 2010-11

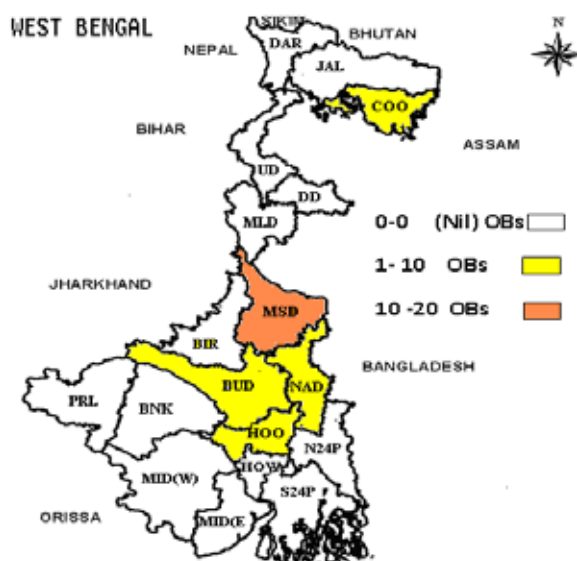


Fig. 10.3. Spatial Distribution of Anthrax in West Bengal, 2010-11

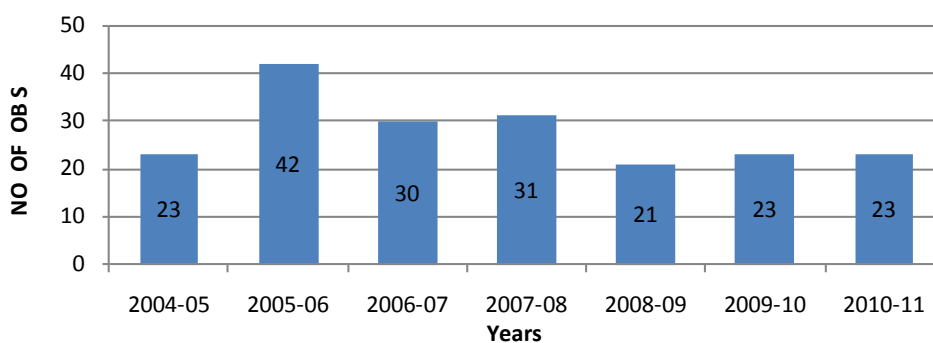


Fig. 10.4. Trend of Anthrax outbreaks in the last 7 years

Haemorrhagic Septicemia

Hemorrhagic Septicemia is one of the important bacterial diseases of cattle and buffalos in West Bengal. The organism may be picked up by adult cattle and buffalo and act as carriers, and harbor the organism frequently in their upper respiratory tract and sometimes in the intestine without showing any clinical signs. Since the bacteria are relatively susceptible to chemical and physical agents, the carrier animal would seem to play an essential role in the life history of these bacteria and in their distribution from one host to another. The rapid multiplication of the bacteria in the respiratory tract in groups of animals when these are subjected to certain stresses and environments, particularly among working animals during the rainy season, resulting into outbreaks of the disease. The affected animals may also contaminate the environment by excreting large number of bacteria in the saliva and faeces.

In the year 2010-2011, eleven outbreaks have been reported in the West Bengal. The outbreaks were decreased as comparison with the previous year. The case fatality rate (50%), morbidity rate (1.18%) and mortality rate (0.54%) were also decreased as compared to previous years.

So far geographic variation is concerned; Incidence reported only from 7 (seven) districts out of 19 districts of West Bengal. Most of the outbreaks were reported from old and new alluvial zone. In this year maximum (4) number of outbreaks were reported from Midnapur(West) district followed by 2 from Burdwan district. Other affected districts were Jalpaiguri Bankura, Howrah, Malda and Coochbehar where single outbreaks were occurred in each districts.

It can be interpreted from last five years observation that there are some endemic zones in the districts of Burdwan where outbreak occurred in every year. It is recommended to the Burdwan district to conduct vaccination before monsoon for controlling of the disease effectively.

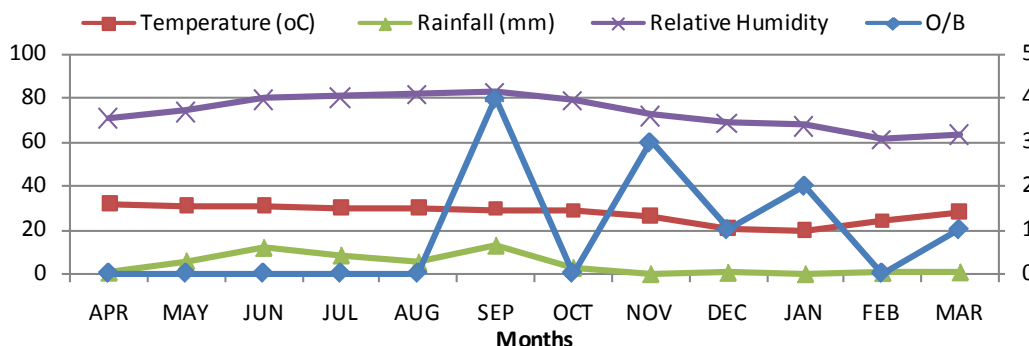


Fig. 10.5. Outbreaks of HS in relation to Rainfall, Humidity and Temperature

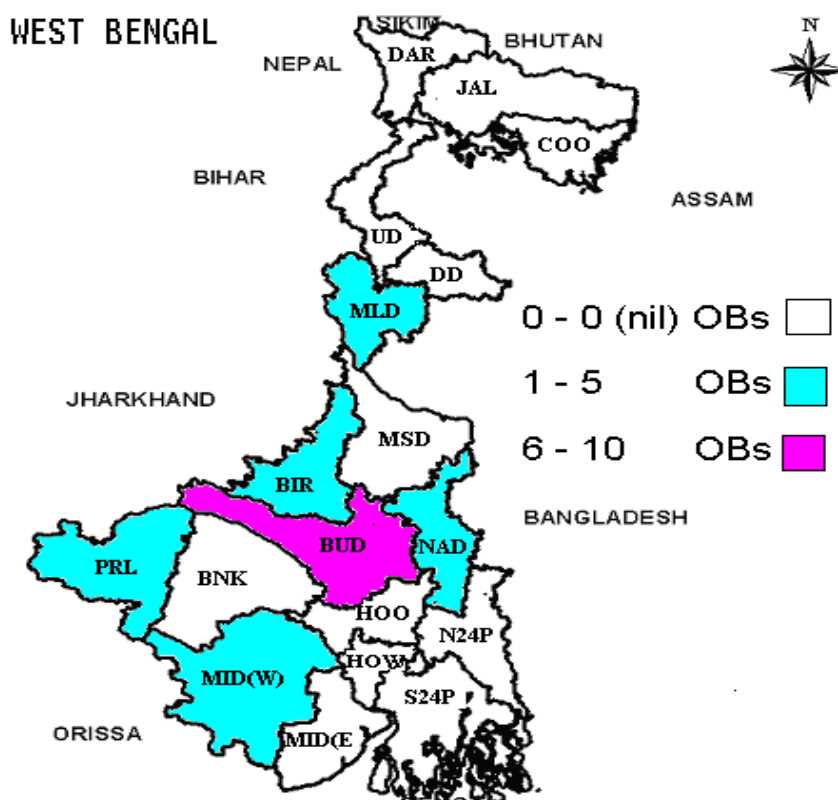


Fig. 10.6. Spatial Distribution of outbreaks of HS in West Bengal, 2010-11

In the year 2010 -2011 the maximum number of outbreaks were noticed in the month of September (4) followed by November (3) and January (2) i.e. following monsoon and winter period

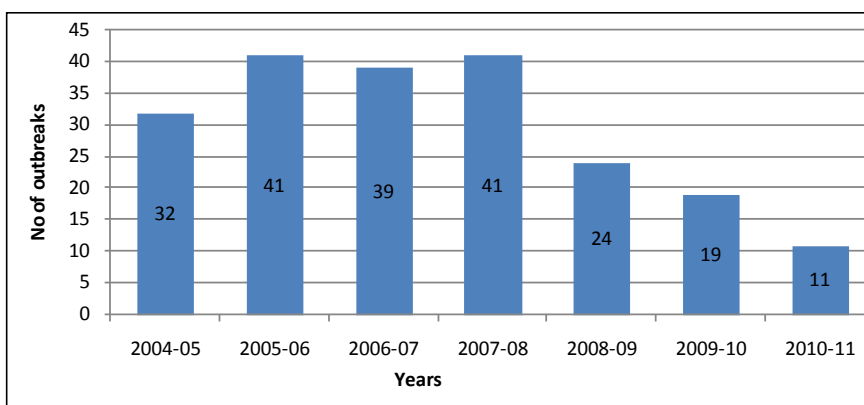


Fig. 10.7. Trend of HS outbreaks in the last 7 years

Black Quarter

In West Bengal, Black Quarter (B.Q.) is an important bacterial disease mostly affecting young stocks of the cattle and produces gas gangrene. The clinical symptoms are characterized by sudden onset of acute fever with a crepitating swelling in the limbs or loins. It is a common disease in areas with moderate rainfall and where dry crop cultivation is common. The disease spreads rapidly after heavy rainfall by contamination of soil with spores of the organism. Areas where previous death occurs from *Clostridium* infection have a higher incidence or risk of disease because of increased environmental contamination. The disease occurs most commonly during the warmer season, but the disease occurs sporadically throughout the year.

The outbreaks of Black Quarter (100) increased remarkably in comparison to the previous years. Morbidity (1.19 %) and Case fatality rate (42.54%) increased but Mortality rate (0.50%) decreased.

The incidence of Black quarter occurred throughout the year. Highest incidence were recorded in the month of July (13) involving five districts, followed by nine in the months of May involving five districts, eight in the month of December involving seven districts. Highest incidence (21) occurred in the 2nd quarter (July to September) of the year, followed by 17 in the 1st quarter

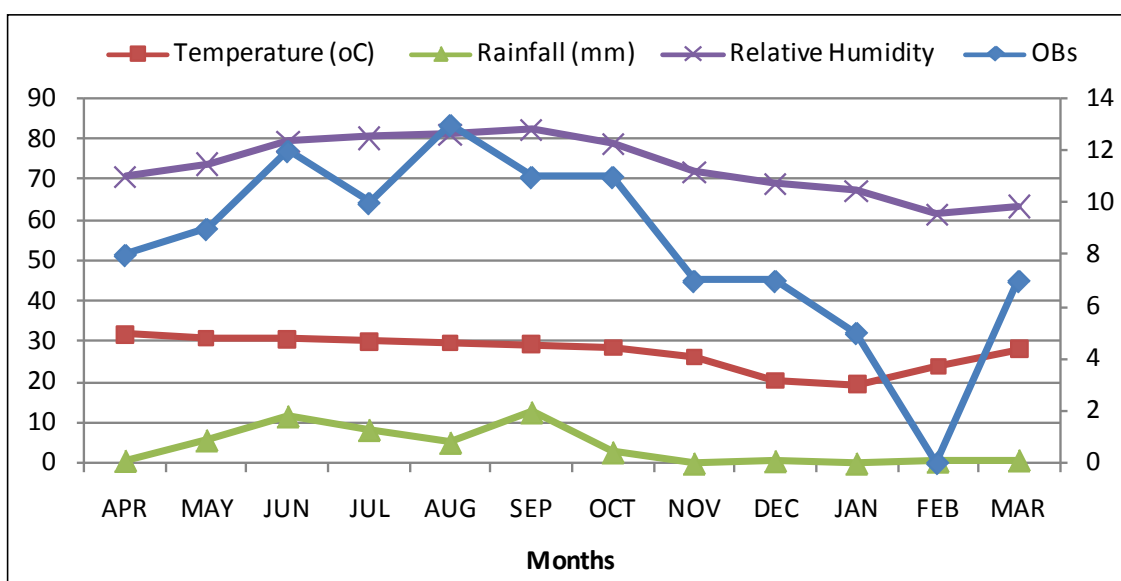


Fig. 10.8. Outbreaks of BQ in relation to Rainfall, Humidity and Temperature

Geographical Variation

So far geographical variation is concerned, highest incidence (16) was reported from Nadia district followed by Howrah (14), Hooghly(11) and Malda(10) throughout the year. All 19 districts are affected except, Darjeeling, Uttar Dinajpur, Murshidabad and Kolkata. So disease is endemic in West Bengal and vaccination is adopted in all epidemic spot in each year.

It is observed that the reported incidence decreased gradually during last five years. It might be due to regular vaccination in the endemic zone. But last year the outbreaks were increased due to less vaccination was given as compared to last year due to less availability of vaccines from the institute of animal Health and Veterinary Biologicals .

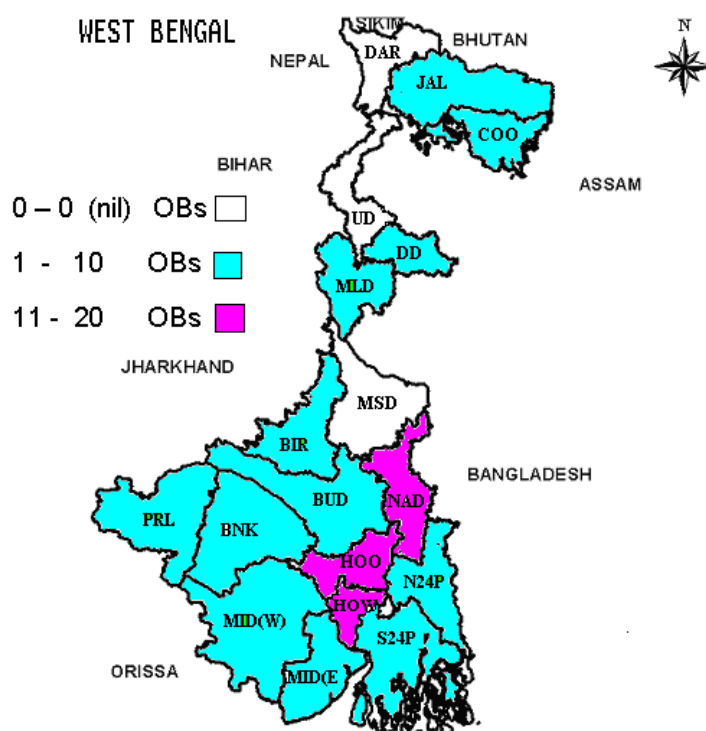


Fig. 10.9 Spatial Distribution of outbreaks of BQ in West Bengal, 2010-11

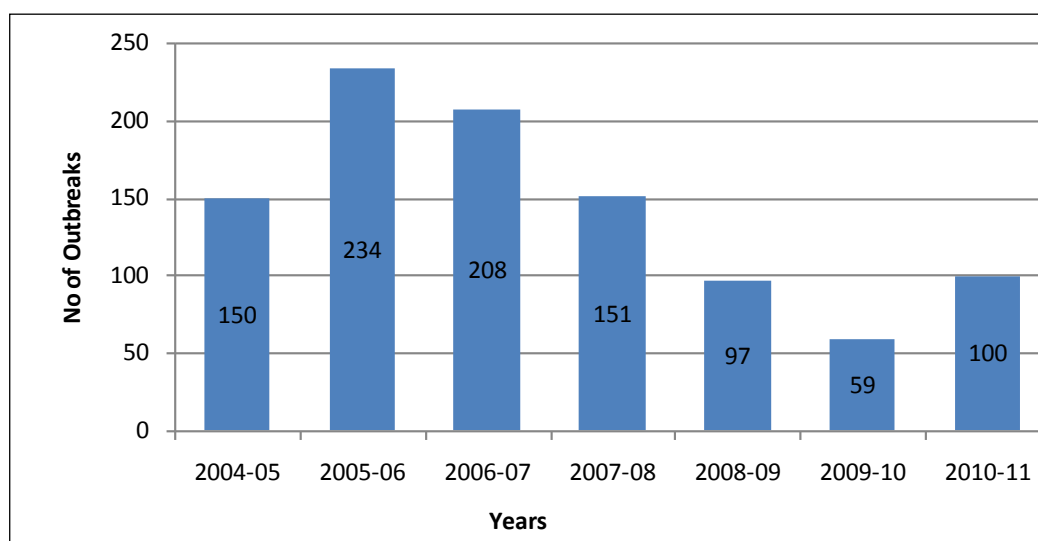


Fig. 10.10. Trend of BQ outbreaks in the last 7 years

Peste Des Petits Ruminants (PPR)

In the year 2010-2011 the number of outbreaks (194) increased in comparison with last year. Case fatality rate (14.31%) , Morbidity rate (11.63 %) and Mortality rate (1.66%) decreased. The highest number of PPR outbreaks reported from Malda district (59), followed by Burdwan (18), Dakshin Dinajpur (12) and Birbhum (11) district

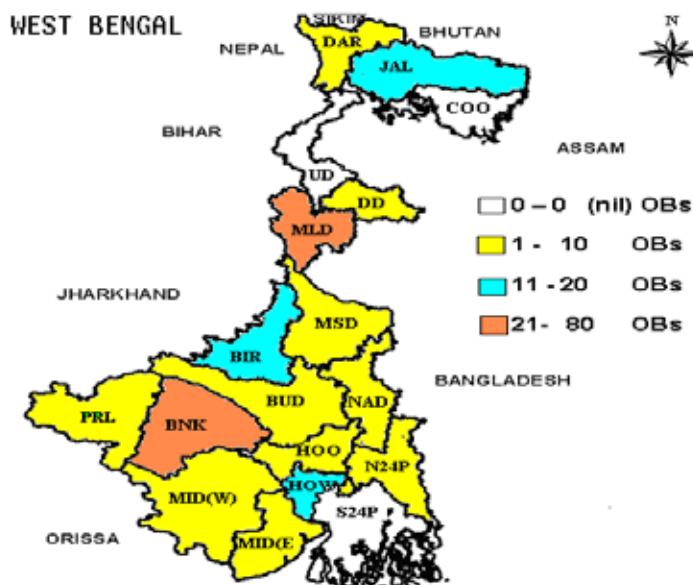


Fig. 10.11. Spatial Distribution of outbreaks of PPR in West Bengal, 2010-11

In the year 2010-2011, out of 19 (nineteen) districts in the state, the disease was reported from fifteen (15) districts. No PPR incidence reported from South 24 Parganas, Uttar Dinajpur, Coochbehar and Kolkata districts.

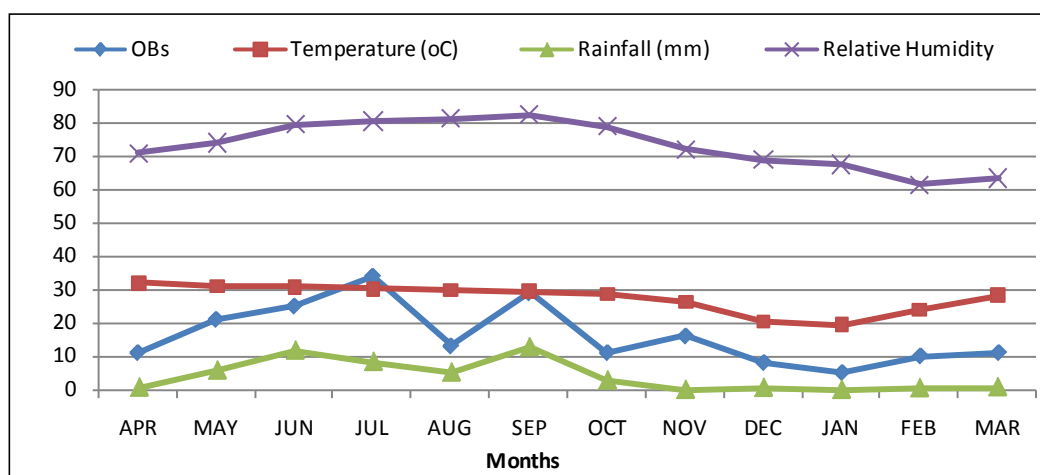


Fig. 10.12. Outbreaks of PPR in relation to Rainfall, Humidity and Temperature

So far it has been observed that PPR outbreaks occur through out the year. Maximum number of outbreaks (34) reported in the month of July followed by September(29), June(25), and May(21) and minimum number of outbreaks i.e. below 10 outbreaks recorded in December(8) and January(5). From the outbreaks of seasonal variation it can be said the disease is more prevalent in the rainy season during May, June and July when there is more rain fall as compared to winter months. Presently in West Bengal PPR vaccination is done in the face of outbreaks to contain the disease in the population due to limited production of vaccines in the state. From the seasonal trend the, mass vaccination can be performed in the pre-monsoon vaccination for control of disease in the state.

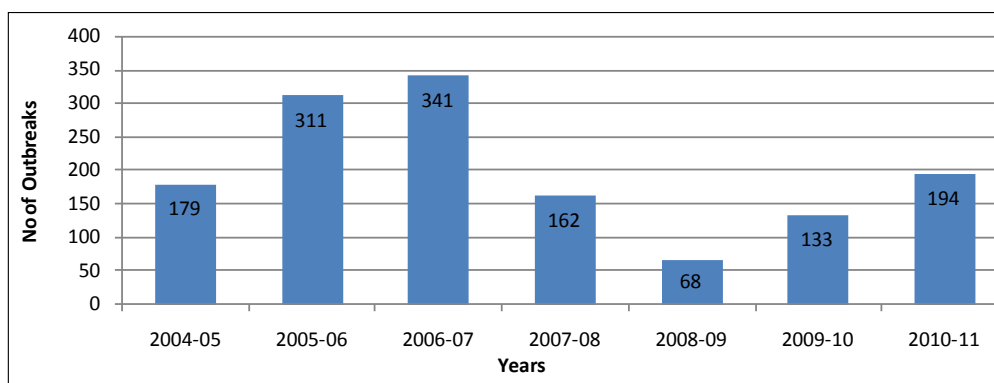


Fig. 10.13. Trend of PPR outbreaks in the last 7 years

Sheep and Goat Pox

Goat Pox is an important contagious disease of goat and sheep caused by Capripox virus and characterized by fever and vesicular eruption on body surface. Skin lesion and scabs are major sources of virus

During the year, there is increased in the number of outbreaks increased considerably (127) with a about same case fatality rate (9.56%). In this year, incidence reported only from nine districts. Highest incidence (35) reported from Hooghly, followed by Howrah (33), North 24 Paragana (23) and Burdwan(16) district.

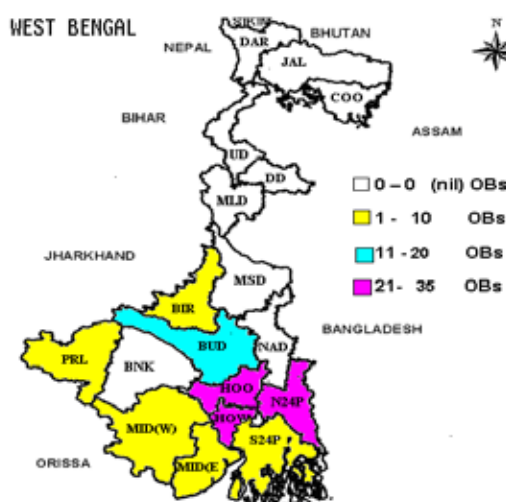


Fig. 10.14. Spatial Distribution of outbreaks of goat pox in West Bengal, 2010-11

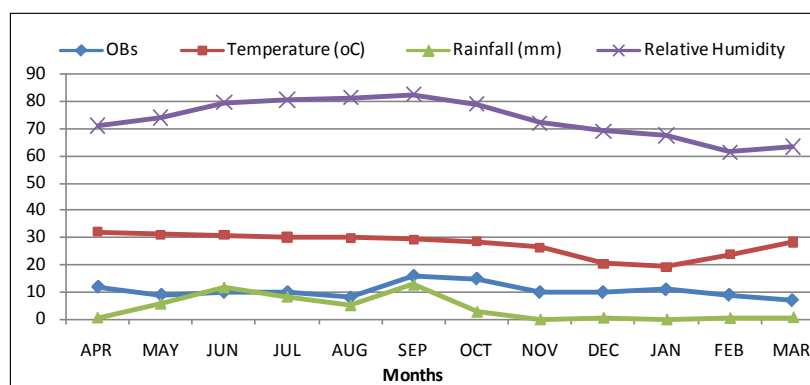


Fig. 10.15. Outbreaks of goat pox in relation to Rainfall, Humidity and Temperature

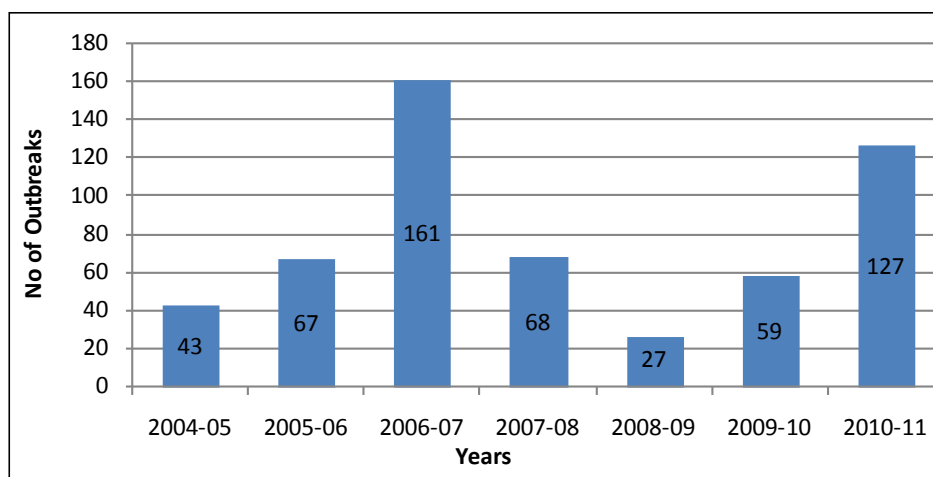


Fig. 10.16. Trend of goat pox outbreaks in the last 7 years

Swine Fever (Hog Cholera)

Table 10.3 Outbreaks of swine fever during last seven years

Year	No. of OBs	Attack	Death	C.F.R. (%)	Morbidity (%)	Mortality (%)
2004-2005	6	96	22	22.92	12.85	2.94
2005-2006	11	178	72	40.45	9.65	3.90
2006-2007	21	365	220	60.27	12.46	7.51
2007-2008	11	159	74	46.54	9.04	4.21
2008-2009	13	132	44	33.33	11.62	3.87
2009-2010	4	163	89	54.60	37.99	20.74
2010-2011	4	49	14	28.57	14.89	4.26

Table 10.4. Monthwise incidence of swine fever West Bengal, 2010-11

Months	OBS	Attacks	Deaths	Population at risk
April	1	30	7	99
May	0	0	0	0
June	1	2	2	120
July	0	0	0	0
August	0	0	0	0
September	0	0	0	0
October	0	0	0	0
November	0	0	0	0
December	0	0	0	0
January	0	0	0	0
February	2	17	5	110
March	0	0	0	0
Total	4	49	14	329

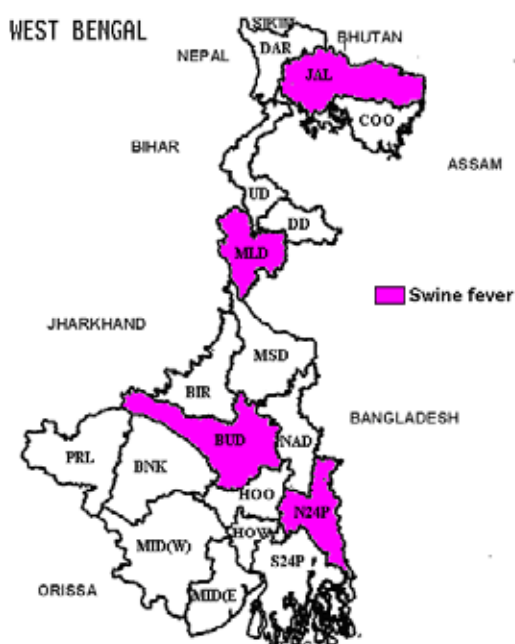


Fig. 10.17. Spatial Distribution of outbreaks of swine fever in West Bengal, 2010-11

Parasitic Diseases

Table 10.5. Outbreaks of blood protozoan parasites in West Bengal, 2010-11

Diseases	No OBS	Attacks	Deaths	Population
Theileriosis	31	52	2	5336
Trypanosomosis	9	16	3	1398
Babesiosis	6	11	1	1055

11. AICRP on ADMAS Collaborating Unit: Ludhiana

Agroclimatic zones of the state

The State of Punjab has been classified into *five agro-climatic zones* on the basis of homogeneity, rainfall pattern, distribution, soil texture, cropping patterns etc. These zones are as under:

Table 11.1. Agroclimatic zones of Punjab

Sr. No.	Agroclimatic Zone	Districts	Agromet Field Unit (AMFU) Location
1	Sub-mountain undulating zone	Gurdaspur and Hoshiarpur	Gurdaspur
2	Undulating plain zone	Ropar & Nawanshahr	Kandi/Ballowal
3	Central plain zone	Amritsar, Taran Tarn, Kapurthala, Jalandhar, Ludhiana, Fatehgarh Sahib, Sangrur and Patiala	Ludhiana
4	Western plain zone	Ferozepur and , Faridkot	Faridkot
5	Western zone	Moga, Bhatinda, Mansa, Muktsar, Sangrur & Barnala	Bhatinda

Disease investigation work carried out in 2010-11

The department of epidemiology & Preventive Veterinary Medicine, GADVASU has always been working as emergency control services related to animals disease, during the period of report (2010-11), department investigated total of 63 outbreaks of different diseases in farm animals all over the Punjab.

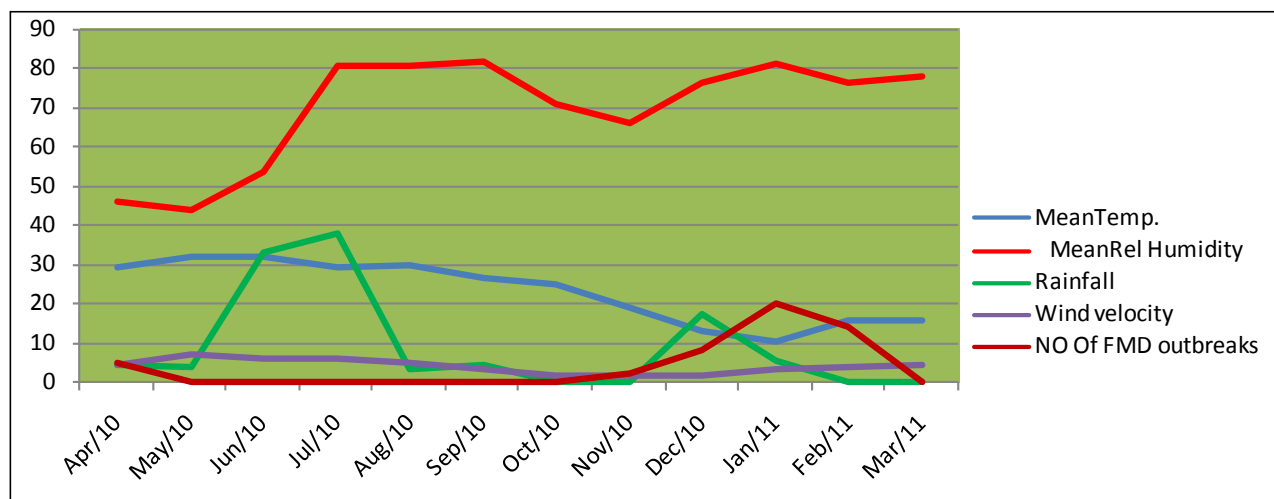


Fig. 11.1. Temporal representation of agro meteorological parameters

Table 11.2. Distribution of total outbreaks attended

Place/ District	Date	Disease	Species	Total	Affected	Death
Salana, Khanna, Ludhiana	11.5.10	HS	Cow and buffalo	10	5	2
Malerkotla	11.5.10	Clostridium	Cow	8	1	1
Salaan/ Ludhiana	11.5.10	HS	Buffalo	12	4	2
Raikot	24.5.10	Trypanosomiasis	Cow	30	5	3
Ahemadgarh, Sangrur	28.5.10	HS	Buffalo	15	5	2
Latala, Ludhiana	4.6.10	Cryptosporidium+ HS	Cow calves	100	30	15
Haibowal/Ludhiana	14.6.10	HS	Buffalo	35	5	1
Kapoorthala	25.8.10	Babesiosis	Cows	40	2	Nil
Moga	15.9.10	Babesiosis	Cows	22	1	Nil
Rajgarh/ Patiala	6.10.10	Black quarter	Buffalo & cow	36	7	5
GADVASU/ Ludhiana	19.10.10	Hydatid cyst	Sheep	1	1	1
Begowal/ Kapurthala	29.10.10	Anaplasmosis	Cows	75	15	12
Khanna/	10.11.10	Babesia+ theileria	Cows	75	40	5
Bhikhiwind/ Tarntarn	10.11.10	Theileria	Cow	43	11	0
Khalaspura, Patiala	30.11.10	Sheep Pox	Sheep	240	35	14
Marhi bohr wali/ Tarantaran	18.11.10	Theilariosis/ Anaplasmosis	Cows	41	13	0
Bidhipur/ Jalandhar	30.11.10	Sheep pox	Sheep & Goat	240	35	14
Rajgarh/ Patiala	1.12.10	Black quarter	Buffalo	20	3	1

1. Black Quarter (Black - leg, Farrya)

Epidemiology of BQ

Department attended two outbreaks of the BQ at the same farm at Vill. Rajgarh, Distt. Patiala. First outbreak was attended by the department in the month of October 2010. There were total 22 buffalo and 14 cows on the farm. Among these 7 animals were affected and out of them 3 buffalo calves and 2 cattle calves died. The age of affected animals was between 10 days to 3 month. Later in the month of December there was second outbreak of the disease at same farm. 3 buffalo calves were affected and 1 calf died. The disease was particularly present in those animals which were tied on *Kacha* (Loose Soil) floor, particularly young calves that died. It seemed that the animals were gaining infection from soil. Apart from this, there were unhygienic conditions (Improper disposal of waste material and manure at farm) which might be considered as one of source of infection.



Fig. 11.2. Buffalo calf showing degeneration of muscles

Haemorrhagic Septicemia

Two outbreaks of HS were attended by the department scientists in the month of May one at Malerkotla and other at village salana, Amloh. At malerkotla, there were total of ten animals out of which 2 died with HS At Amloh total of 2 animals were affected with disease out of 5 animals and 2 animals died of the disease. The diagnosis was made on the basis of PCR assay carried out by Deptt. of Veterinary Microbiology. The affected animals had respiratory distress, nasal discharge, anorexia. Rest of the animals showed improvement after treatment with Gentamycin and enrofloxacin.

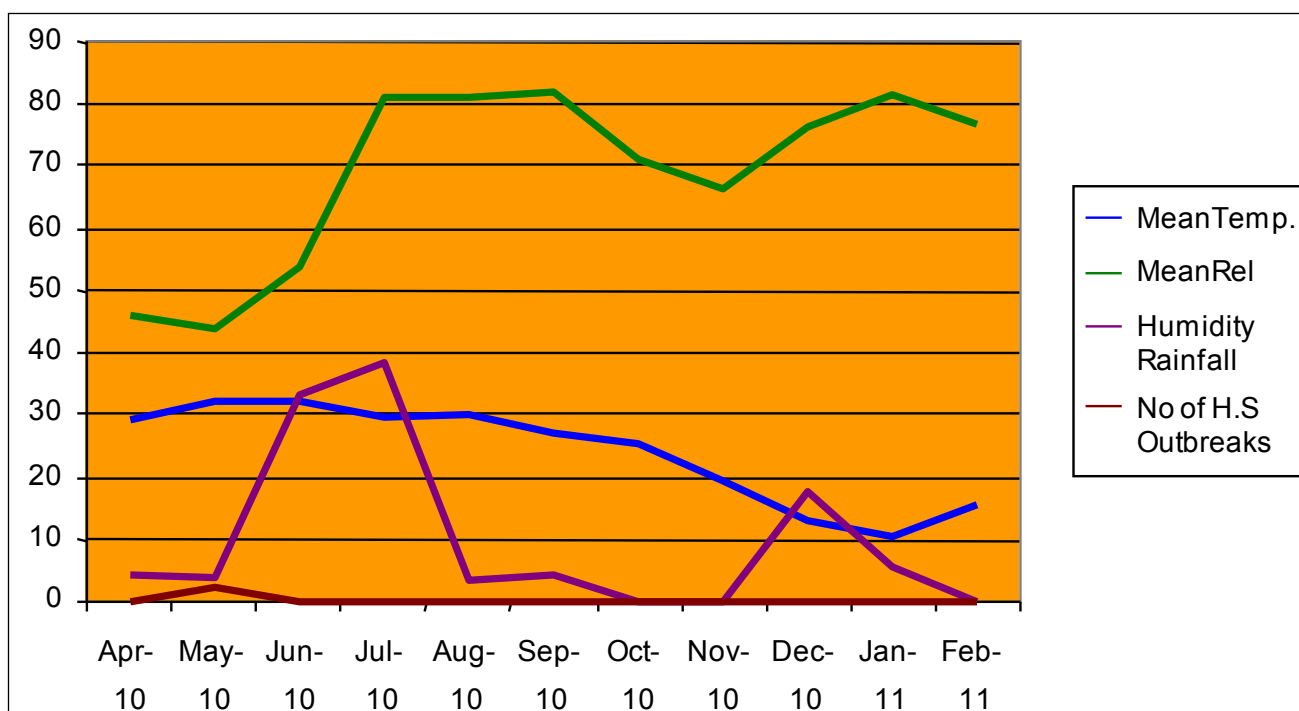


Fig. 11.3. Agro meteorological parameters and H.S outbreaks in Punjab 2010-11

Sheep Pox

Outbreaks investigated

One outbreak of sheep pox has been attended by the Department in the village Chaheru near Jalandhar. Farmers were belonging to Rajpura, Dist Patiala but flock was at Village Chaheru at the time of Outbreak. There were about 240 sheep in the flock and 35 were infected and 20 animals succumbed to disease. Animal were showing clear cut pox lesions of erythematic, Papule, nodule and vesicle formation on the face, udder and under the tail.

Post mortem lesions Erythematous lesions were found on the skin, nostrils were blocked with thick exudates. Lungs revealed severe pneumonia and pock lesions.

Bovine tuberculosis

A total of 347 cattles were tested for Tuberculosis by SID (Single intradermal testing) and 30 animals (approx. 8.6%) were found positive. Out of total 72 goats tested for T.B (SID), 3 were found positive.

Table 11.3 Details of TB testing (SID) in Punjab

District	Cattles tested for TB	Positive
Jalandhar	11	1
NawanShehar	30	1

District	Cattles tested for TB	Positive
Ropar	40	1
Amritsar	12	Nil
Ludhiana	316	16
Moga	20	8
Hoshiarpur	31	Nil
Mukatsar	25	12
Bhatinda	62	2
Total	347	30

Tuberculosis in goats

Table 11.4. Details of TB testing in goats in Punjab

District	Goats tested	Positive
Bhatinda	47	3
Ludhiana	25	Nil
Total	72	3

Johne' disease

A total of 347 animals were tested for Johne's disease and 4 animals were found to be positive.

Table 11.5 Details of JD testing in Punjab

District	Cattles tested for JD	Positive
Jalandhar	11	Nil
NawanShehar	30	Nil
Ropar	40	Nil
Amritsar	12	Nil
Ludhiana	116	1
Moga	20	2
Hoshiarpur	31	Nil
Mukatsar	25	Nil
Bhatinda	62	1
Total	347	4

Blood, faecal and milk samples were collected from 102 goats and 103 sheep. These samples were collected randomly from Ludhiana, Sangrur, Bathinda, Jalandhar, Patiala and Hoshiarpurditt. The serum and milk samples were subjected to ELISA for detection of antibodies against JD. The fecal and milk samples were subjected to PCR. 46.1% and 45.1% serum samples collected from sheep and goat respectively were found to be positive by ELISA. With milk samples subjected to ELISA, 47.6% and 40.2% samples for sheep and goat, respectively, were found to be positive. Zeihl-neelsen staining of fecal samples revealed 35.3 and 39.8% positive results for sheep and goat, respectively.

The IS 900 PCR on samples gave an amplicon of 413 bp size with positive samples. Among the fecal samples subjected to PCR, 19.4% and 27.5% samples of sheep and goat, respectively, were positive whereas, in the PCR of milk samples 15.5% and 20.6% samples were found to be positive for sheep and goat, respectively.

The fecal samples were also subjected to IS 1311 PCR. The amplicon size of the PCR product was found to be 608 bp for positive samples. The restriction enzyme analysis of these PCR products with *Hinf*I and *Mse*I revealed that only 'Bison' type of bacteria were present in these isolates.

Brucellosis

During the period under report **2689** animals were tested for brucellosis (on the request of the farmers) and **775** animals were found positive on the basis of RBPT and STAT test. Overall prevalence came out to be **28.82%**. Maximum no. of samples (463) was received in month of April. Maximum cases were detected in Patiala district with overall prevalence of 66.48% among the animals tested.

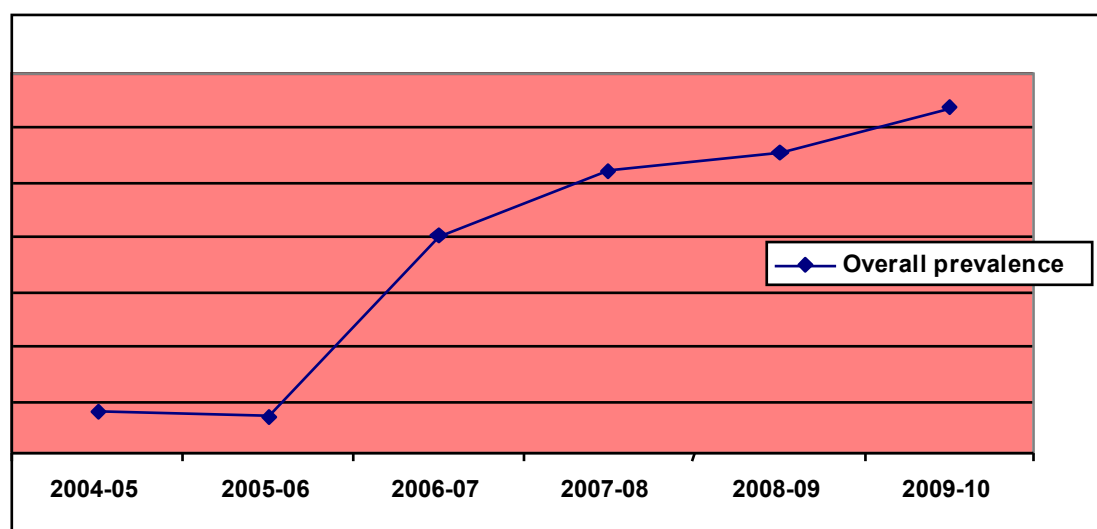


Fig. 11.4. Brucellosis trend in Punjab for the last 6 years from 2004-2010

Epidemiological aspect of brucellosis

From the data collected by the Department it was observed:

- Maximum abortions were observed at 7 & 8 month of gestation but in some cases abortions were also recorded at 4, 5 and 6 months.
- Most of the females showing abortion were in their 1st and 2nd lactation. And they were newly purchased as calves and reported positive on first gestation.
- Most of the newly purchased animals by the dairy farmer when tested were reported positive for brucellosis
- In year 2010-11 brucellosis is wide spread all over the Punjab because there is no regular and systematic calf hood vaccination programme with S-19 vaccine.

Some of the progressive dairy farmers aware of brucellosis get their animals tested. The owner of the animals found positive for brucellosis try to get rid of infected animals by selling them. The other farmers who purchase the infected animals spread brucellosis unknowingly in their farm due to ignorance. Now a days some farmers those who are aware of this disease are getting the blood of animals tested before purchase.

Molecular diagnosis of Brucellosis using Polymerase Chain Reaction (PCR)

Out of total 40 samples of fetal stomach/abomassal contents and vaginal mucus/uterine discharges processed for diagnosis of brucellosis in cattle and buffaloes 11 were positive in PCR. Out of 28 cattle and 12 buffalo samples tested for brucellosis 8 cattle and 3 buffaloes were found positive for *Brucella abortus*. In cattle out of 18 samples of foetal stomach/abomassal contents 5 samples were found positive and out of 10 samples of vaginal mucus/uterine

discharge 3 were found positive on PCR. Similarly in buffaloes out of 6 samples of fetal stomach/abomasal contents 2 samples were found positive and out of 6 samples of vaginal mucus/uterine discharge 1 was found positive on PCR. Of the total 20 whole blood samples 4 were found to be positive on PCR.

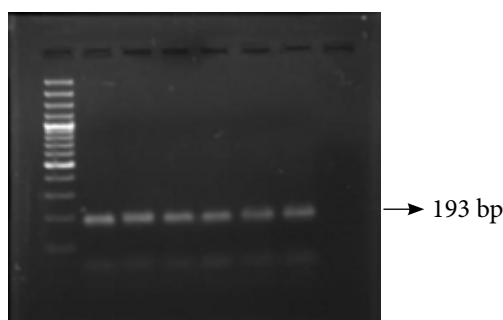


Fig. 11.5. PCR product from aborted fetal stomach contents

Guidelines given to the farmers for prevention of brucellosis

1. The farmers were advised to separate the pregnant brucella positive animals in individual calving pens at the time of calving. Animals should not be allowed to calve in dairy farm because larger no of the brucella organisms are excreted from the infected uterus and fetus at the time of calving from brucella infected animal.
2. The farmers were advised to treat their Brucella infected pregnant animals by Inj. Oxytetracycline (Long Acting) @20mg/kg deep Intra muscular repeated at 48 hr interval for 7 injections. This type of treatment was tested and started in this centre and abortions were prevented successfully.
3. The farmers were advised to vaccinate female calves during the age of 4-8 month with Inj. Bruvax (2 ml S/C Indian immunologicals).
4. The farmers were advised to clean the farm with savlon (1:1000), separate the infected animals from the healthy animals by creating the partition in between them. They are also advised to check the serum sample of the animals before introducing them in the herd. Care is to be taken that brucella positive animals should not be introduced in the herd.

Babesiosis

Three outbreaks of babesiosis were attended by the department. At Kapurthala and Moga no mortality was observed. At Ludhiana, mixed infection of theileria and babesia was there and 5 animals died out of 40 affected animals.

Anaplasmosis

One outbreak occurred in the month of november at Begowal, Distt. Kapurthala. There were total 75 cows at the farm. 12 animals died. The sick animals were showing signs of anorexia, respiratory stress and depression. Recumbancy followed after some time. Blood samples of the affected animals were taken in EDTA and broth. Blood film examination revealed presence of rickettsial organisms.

Another outbreak was reported at Vill. Marhi Bohr vali, Distt.Tarantaran. Mixed infection of theileriosis and anaplasmosis was there. Animals were showing signs of weakness but there was no mortality.

Theileriosis

During this period one outbreak of theileriosis was attended. In one outbreak at Khanna, Ludhiana mixed infection of babesia and theileria was observed. Out of 40 affected animals 5 died.

Molecular Diagnosis of *Trypanosoma evansi* (Surra)

PCR was standardized using four different primers viz; ITS1/ CF/BR (Njiru *et al* 2005), ESAG 6/7 (Holland *et al* 2001), TBR1/2 (Masiga *et al* 1992) and 21/22mer (Wuyts *et al* 1995). For standardization of PCR, purified parasites, whole blood, clotted blood and mice tissues samples were used. *Trypanosoma evansi* parasites from cattle, buffalo, horse and dog were used. Blood samples from parasitologically positive cases were collected from different animals as mentioned above. Mice (Swiss albino) were injected with *T. evansi* positive cattle blood by intraperitoneal (i/p) route for maintenance of infection. Mice were observed daily for parasitemia by examination of wet blood film (WBF) from tail blood. At peak (teaming) parasitemia mice were sacrificed and *T. evansi* parasites in blood were purified by using Diethyl amino ethane (DEAE) column chromatography (Lanham and Godfrey 1970).

DNA extraction was carried out as per standard PCI extraction method as well as direct boiling of whole blood/clotted blood/purified trypanosomes (Sambrook *et al* 1989, Ravindran *et al* 2008). Systematic necropsies were performed on the healthy control as well as infected mice, sacrificed/died at peak parasitemia Different tissues viz; lungs, heart, liver, kidneys, spleen, intestine and brain were collected, stored at -20°C for further use. DNA extraction was carried out using HiPura Mammalian Genomic Miniprep Purification Spin Kit (Himedia) as per protocol. PCR products obtained from all the above primers were visualized on gel documentation system after running on 1.5 % agarose gel as 480 bp, 237 bp, 164 bp multiples and 227 bp, respectively for all the four primers mentioned above.

Histo pathological studies on *Trypanosoma evansi* in experimentally infected swiss albino mice

Sixteen Swiss albino mice were used in the experiment and were divided into four groups (I, II, III and IV) comprising four each. Systematic necropsies were performed on the healthy control (group IV) as well as infected mice (groups I,II,III) and gross lesions were recorded. The tissue samples viz. lungs, heart, liver, kidneys, spleen, intestine and brain were collected in 10% neutral buffered formalin (NBF) to study the histopathological changes. Gross post mortem examination revealed enlargement of spleen, petechial haemorrhages in liver in severely infected/ animal dying due to trypanosomosis. Microscopic examination of tissue sections revealed presene of numerous trypanosomes in blood vessels of liver, spleen, brain and kidneys.

Table 11.6. Ticks collected from cows of different places of state during parasitic disease outbreaks by the Department in 2010-11

Place	Total ticks	Identification
Kanganwal, Ludhiana	10	<i>Boophilus spp.</i>
Sangrur	5	<i>Boophilus spp.</i>
Haibowal, Ludhiana	12	<i>Boophilus spp.</i>
Gureh, Ludhiana	10	<i>Boophilus spp.</i>
Muktsar	9	<i>Boophilus spp.</i>
Talwara, Hoshiarpur	5	<i>Boophilus spp.</i>
Dera Bassi, Mohali	10	<i>Boophilus spp.</i> & <i>Hyalomma spp.</i>
Lohian, Jalandhar	5	<i>Hyalomma spp</i>
Bathinda	5	<i>Boophilus spp.</i>
Total	71	

Disease incidence in Sub mountainous area (Hoshiarpur) versus central area of Punjab (Ludhiana, Jalandhar and Fatehgarh Sahib)

It has been observed that incidence of TB, JD and brucellosis and ectoparasite is comparatively lesser in sub-mountainous regions as compared to central regions of Punjab. It may be due to intensive dairy farming in central

area of Punjab e.g avg. herd size is 400-500 animals in central areas of Punjab leading to more disease transmission of infectious diseases e.g. Brucellosis. The incidence of brucellosis in central areas of Punjab is approx. 29% as compared to 2% in sub mountaneous regions.

Table 11.7. Budget position

Sr.No	Sub Head	Amount Sanctioned	Expenditure(A)	Balance(B)	
(1)	Salary of staff	NIL	NIL	NIL	
(2)	Travelling allowance	25,000	24,472	528/-	
(3.)	Contingencies Including IT Two Nos* of research fellow & one nos of computer operator are paid contractual charges one of contingencies.	2,75,000	2,72,604	2,396/-	
	Total	3,00,000	2,97,076/-(A)	2,924/-(B)	

Research Fellows (2 No.) appointed as per the permission of the funding agency No PD_ADMAS/CU/Lud/2004-05/186 dated 29th June 2004.2 research fellows Dr sunil Verma & Dr Ganesh appointed in the project are due to get their salaries for the month of August, September & Revised emoluments from April 2010 (approx Rs 2,00,000/-).

12. AICRP on ADMAS: Palode, Kerala

The Department of Animal Husbandry has streamlined the diagnostic laboratories in the state by creating a four tier laboratory system for effectively implementing the mandates of PD_ADMAS. The Chief Disease Investigation Office (CDIO) is the state Diagnostic Laboratory having technical control over the regional diagnostic laboratories and clinical laboratories. This institute was identified as the collaborating unit of PD_ADMAS from the year 2003-2004.

Table 12.1. Disease profile of Kerala for the year 2010-2011

Disease	No. of outbreaks	No. of attacks			
		Cattle	Buffalo	Goat	Total
Anthrax	5	6	-		6
HS	3	6	5		11
PPR	1	-	-	1	1
Anaplasmosis	1	8	-		8
Rabies	23	26	-	11	37
Combined infection of Anthrax and HS	1	2	-	1	3

Anthrax

All the cases of Anthrax reported from 2006-11 were confirmed either at the State referral laboratory, CDIO, at Palode or at RDDs. The disease appeared sporadically throughout the year and showed no tendency to spread, except in few cases. The disease was effectively controlled by containment vaccination. Cattle was the major species affected and all the affected animals succumbed to death

Table 12.2. Anthrax disease outbreak data from April 2006-March 2011

Period	Outbreak	Attack	Death	Districts	Panchayaths
2006-07	8	12	12	5	7
2007-08	9	10	10	5	9
2008-09	7	8	8	6	6
2009-10	4	6	6	3	3
2010-11	6	9	9	4	5

An outbreak in wild boars was noticed in Kerala Police Academy Campus, Thrissur District in 2009-10. A detailed disease investigation was conducted by the technical experts of CDIO immediately on receipt of information from the concerned authorities and necessary technical advices were given to control the spread of the diseases.

During 2010-11, a combined infection of Anthrax and HS was reported in two cattle and one goat in a farm at Kollam district. The technical experts of CDIO, Palode conducted a detailed disease investigation. The disease was controlled by containment vaccination.

Haemorrhagic Septicaemia

Table 12.3. HS disease outbreak data from April 2006-March 2011

Period	Outbreak	Attack	Death	Districts	Panchayaths
2006-07	8	29	26	4	8
2007-08	2	11	11	2	2

Period	Outbreak	Attack	Death	Districts	Panchayaths
2008-09	7	24	23	3	7
2009-10	3	4	4	2	3
2010-11	4	14	9	2	4

In most cases of outbreaks, only few of the affected animals survived attack. The spread of the disease was controlled by ring vaccination of the affected area. Routine HS vaccination is carried out in the state with the vaccine prepared at Institute of Animal Health and Veterinary Biologicals, Palode.

Classical Swine Fever

Classical swine fever was an emerging disease of pigs in Kerala in 2006 and the first confirmed outbreak occurred in the month of May 2006 in Koorachundu Panchayath in Kozhikode district. In 2006-07 there were six outbreaks with 1543 attacks and 1447 deaths. In 2007-08 there was only a single outbreak of CSF in which eighteen animals were affected and with as much deaths. For the last three years no outbreaks of CSF is reported in Kerala. This is achieved by the effective vaccination programme implemented in the state. Also animals passing through check posts are thoroughly inspected for signs of the disease and sera samples are periodically screened for the disease.

Table 12.4. CSF disease outbreak data from April 2006-March 2011

Period	Outbreak	Attack	Death	Districts	Panchayaths
2006-07	6	1543	1447	5	6
2007-08	1	18	18	1	1
2008-09	0	0	0	0	0
2009-10	0	0	0	0	0
2010-11	0	0	0	0	0

Black Quarter

In the year 2006-07 a single BQ outbreak was reported in Kollam district. In the year 2007-08 & 2008-09, no outbreak was reported in Kerala. A single outbreak occurred in December 09 in Thiruvananthapuram district. All the three affected cattle died. The disease was contained with effective vaccination programme. For BQ also routine vaccination programme is being implemented in Kerala.

Table 12.5. BQ disease outbreak data from April 2006-March 2011

Period	Outbreak	Attack	Death	Districts	Panchayaths
2006-07	1	1	1	1	1
2007-08	0	0	0	0	0
2008-09	0	0	0	0	0
2009-10	1	3	3	1	1
2010-11	0	0	0	0	0

Peste Des Petitis Ruminants (PPR)

There was a major attack of PPR in the state during 2005-06 after which a major reduction in the occurrence of the disease noticed mainly due to the routine vaccination. The disease confirmation facility by Sandwich ELISA is available at RDDDL.



All cases of PPR are reported from Palakkad the border district of Kerala. The reason for dominance of PPR in Palakkad may be due to the migration of goat population from the neighbouring state and the stress conditions due to high temperature and severe drought conditions.

Table 12.6 PPR disease outbreak data from April 2006-March 2011

Period	Outbreak	Attack	Death	Districts	Panchayaths
2006-07	0	0	0	0	0
2007-08	0	0	0	0	0
2008-09	1	37	28	1	1
2009-10	1	36	16	1	1
2010-11	1	1	1	1	1

Anaplasmosis

4 cases of Anaplasmosis were reported in September 2009. It was laboratory confirmed. All four cattle died. 8 cases of Anaplasmosis were reported during the month of December 2010 in a farm at Idukki district. It was laboratory confirmed by blood smear examination and also by PCR with the help of College of Veterinary And Animal Sciences, Pookode. It is noted that there is a raise in the number of haemoprotozoan diseases in recent years. All the affected animals were brought from outside Kerala. Now a day farmers prefer high yielding cross breeds from the neighbouring states.

Theileriosis

One case of theileriosis was reported during the month of December 2009 in Thiruvananthapuram district. It was laboratory confirmed. The cow died in spite of treatment.

Rabies

Six cattle and one goat were affected with rabies and all the seven animals succumbed to death during 2009-10. In 2010-11 twenty six cattle and eleven goats were affected with rabies and all the animals succumbed to death. These were the laboratory confirmed cases.

Achievements

Activities undertaken

- State Level Referral Diagnostic Laboratory under AHD
- Collaborating unit of PD- ADMAS
- Nodal office of SRDDL, Bangalore

Intensive efforts are being taken to control and contain the disease outbreaks in all the cases as soon as the outbreaks are reported. The state has an established network of institutions for carrying out the surveillance of animal diseases. SADEC is a twenty four hours functional emergency control room with all communication facilities like fax, internet and even wireless communication facility. As part of State and National eradication programmes, CDIO conducts mandatory screening and surveillance for diseases of public health significance like brucellosis, Tuberculosis, Johnes disease and Salmonellosis in all departmental farms. Surveillance of Avian Influenza and Bovine Spongiform Encephalopathy (BSE) are being conducted with the help of SRDDL Bangalore. In the current year steps were initiated for surveillance of Swine Influenza among pig population of Kerala in wake of the recent influenza outbreak among humans. CDIO also perform Screening of all the animals in bull stations of KLDB in association with SRDDL, Bangalore for TB, JD, brucellosis, IBR, Campylobacteriosis and Trichomoniasis.

The Department of Animal Husbandry has initiated a telepathology networking for better diagnosis by consultation especially in cases in which an expert second opinion is required and also to evolve a platform for scientific discussion. Major laboratories of the department including State lab, Regional Disease Diagnostic Laboratories and District labs are connected in this network.

CDIO is also publishing technical brochures/bulletins, laboratory manuals, research articles in National & International journals and popular articles in leading dailies and periodicals. CDIO has hosted 2 national seminars, SRDDL nodal officer's meetings & PD ADMAS review meetings. Other allied activities for the last five years included Workshops for laboratory officers and Laboratory technicians, Refreshing training for paravets & attendants, Awareness camps for field vets & farmers & Participation in exhibitions/camps.

The main research projects carried out for the last five years were Project on IB in poultry, Project on Toxoplasmosis in goats and Project on efficacy of rabies vaccination in dogs .

Conclusion

For effective livestock disease control the following are strategies are followed.

1. Precise reporting of the disease outbreaks by the field level Officers.
2. Laboratory confirmation of the disease.
3. Ring vaccinations in pertinent cases.

For ensuring the effectiveness of the above aspects the Department of Animal Husbandry is up grading laboratory facilities in certain areas, the technical persons including in CDIO are trained at in the latest diagnostic techniques and implementing extensive extension works to educate the public.

Table 12.7. Expenditure statement for the year 2010-2011

Sl No.	Head of account	Previous balance as on 1-04-2010	Amount received during the year 2010-2011	Total fund available	Expenditure up to 31.03.2011	Balance as on 31.03.2011
1	Establishment	-	-	-	-	-
2	TA	NIL	25,000	25,000	25,000	NIL
3	Contingency	7,915	1,42,085	1,50,000	1,50,000	NIL
4	Equipment	NIL	NIL	NIL	NIL	NIL
	TOTAL	7,915	167085	1,75,000	1,75,00	NIL

13. AICRP on ADMAS: Pune , Maharashtra

Maharashtra – Profile

Situated in central India on the west coast of the country, Maharashtra is positioned between 16° N and 22° N latitude and 72° E and 80° E longitude and is bordered by Gujarat state and Dadra – Nagar – Haveli union territory to the north west, Madhya Pradesh to the north, Chhattisgarh to the east, Andhra Pradesh and Karnataka states to the south- east and Goa state to the south. The Arabian Sea stretches on the western border of the state.

Maharashtra is the third largest state in the country after Rajasthan and Madhya Pradesh, with a total area of 307,713 sq.km. Maharashtra constitutes 9.36% the total area of the India (3,287,263 sq.km). The maximum east – west length of Maharashtra is 800 km. and north- south length is 700 km.

Maharashtra has three types of terrains namely Konkan coast line, Sahyadri mountain range or the Western Ghats and hilly region and the Deccan Plateau.

The state has tropical climate with three distinct season (a) Summer (b) Rainy (c) Winter. Though a beneficiary of the south west monsoon, which lasts from July to September, the rainfall is varying. It is high as 5000 mm in Western Ghats and 600 mm in the plains. Average annual temperature remains 25-27°c in most regions

HS

HS outbreaks since inception of the center are summarized as per below. Data indicates that more outbreaks have occurred during 1998-99 to 2001-02. Later on outbreaks decreased and during 2009-10, only 11 out breaks have been recorded.

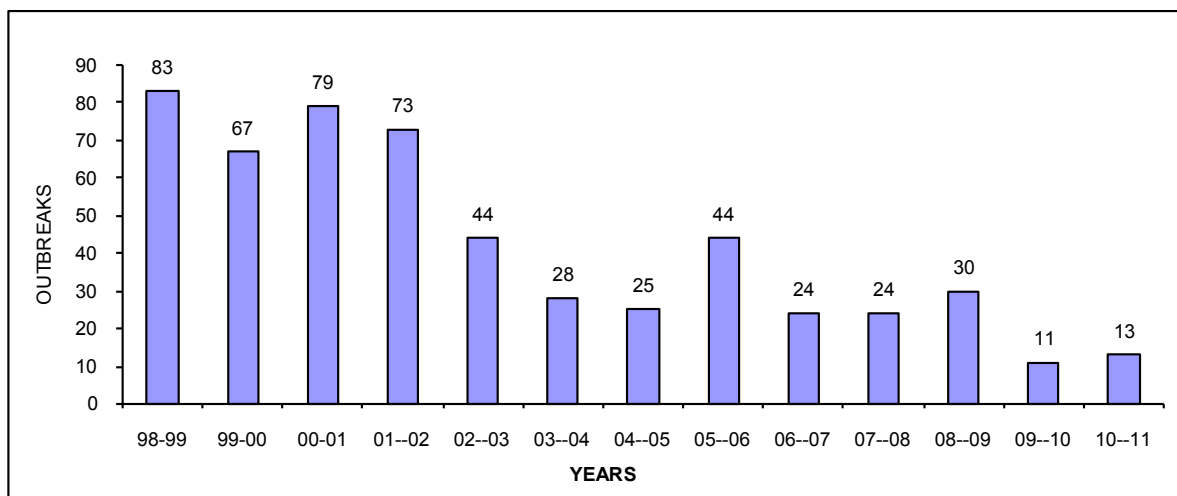


Fig. 13.1. Year wise HS outbreaks in bovines

Outbreaks of H.S. in sheep and goats are also recorded and these are summarized below. Data indicates that more outbreaks have occurred during 1998-99. Later on outbreaks decreased and during 2007-8 to 2009 -10 only few out breaks have been recorded.

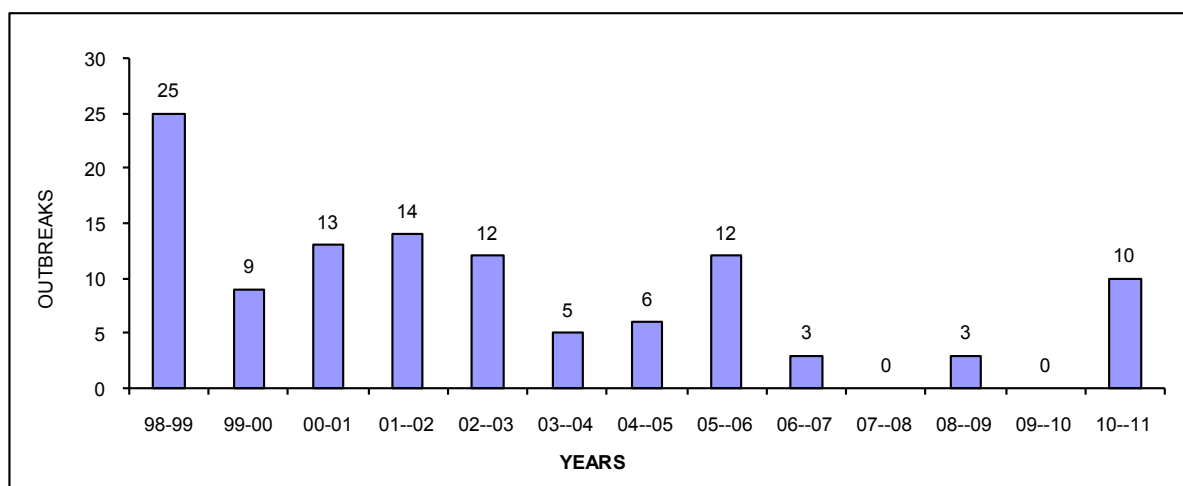


Fig. 13.2. Year wise HS outbreaks in sheep and goats

BQ

BQ is prioritized as major disease in Maharashtra and outbreaks of B.Q. are summarized below. Data indicates that more outbreaks have been recorded during 2000-2001 and since last two years it has decreased up to 22 to 24

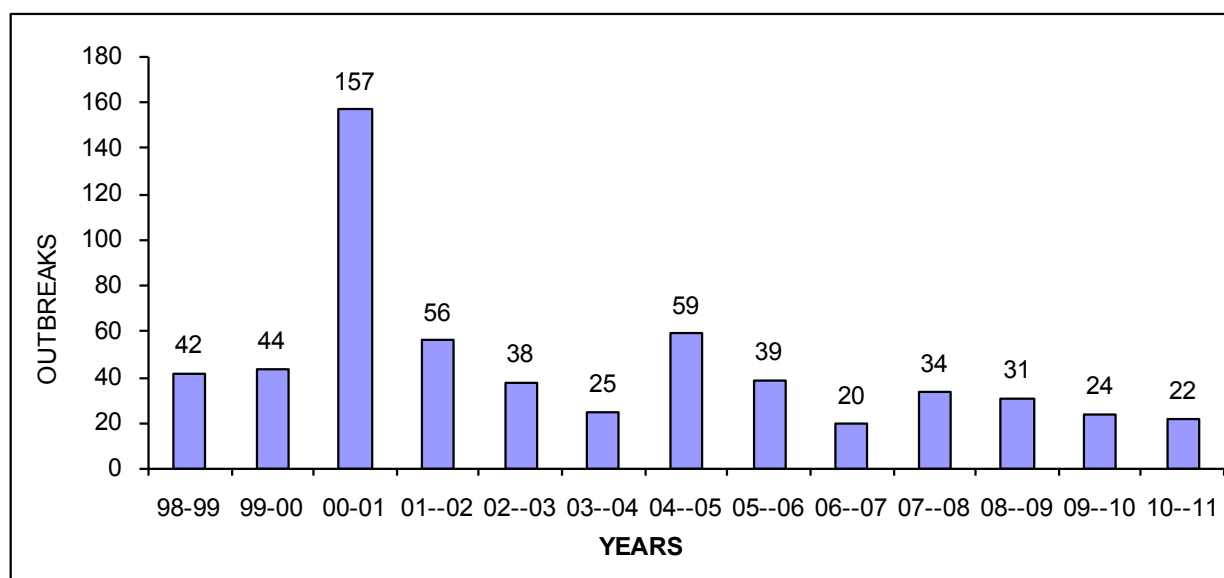


Fig. 13.3. Year wise BQ outbreaks in bovines

Enterotoxaemia

Data of Enterotoxaemia outbreaks revealed that outbreaks are decreased since 2003-04 and in recent years only one or nil outbreaks have been recorded

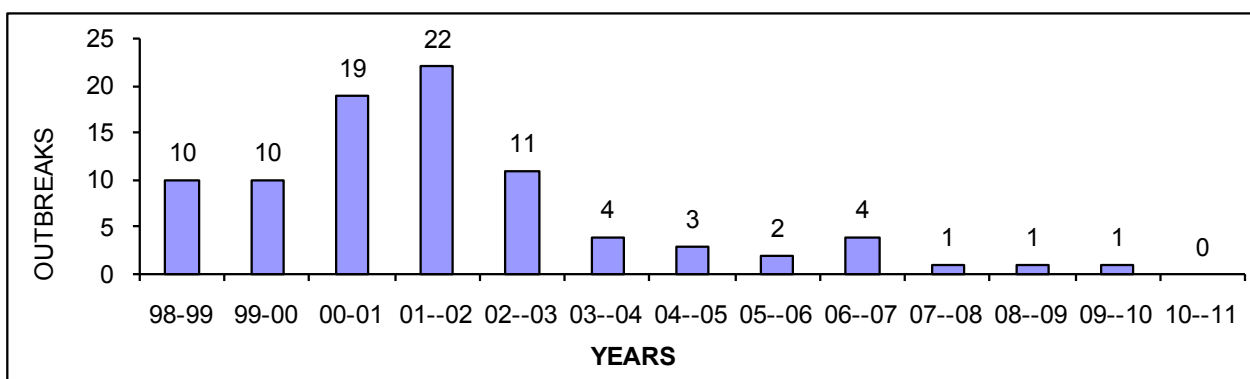


Fig. 13.4. Year wise ET outbreaks in sheep and goats

Anthrax

Data on anthrax outbreaks indicates that 2-5 outbreaks have recorded during the year and since last 3-5 years. Only one or nil outbreak has been recorded in bovines. In case of sheep and goats, more outbreaks up to 20 to 21 have been recorded and in recent years it has lowered down to 2 to 3 outbreaks.

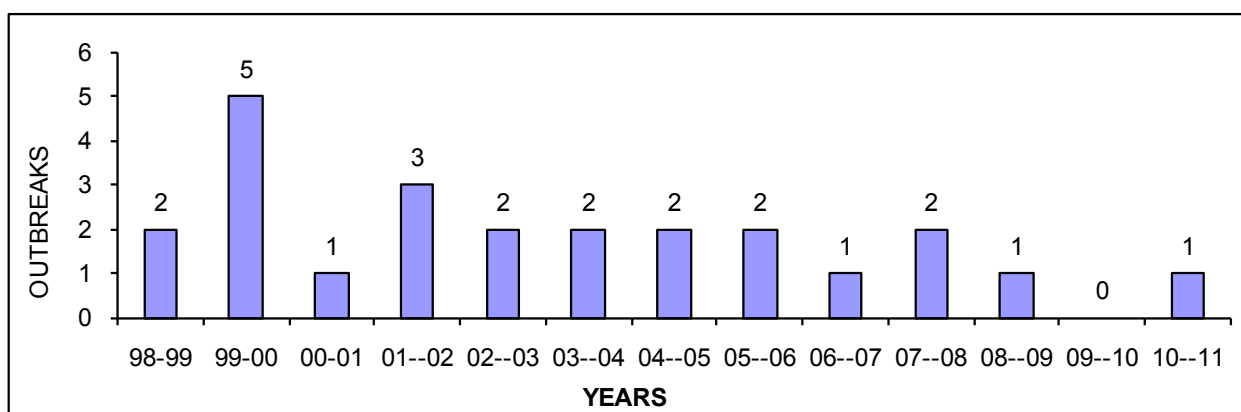


Fig. 13.5. Year wise anthrax outbreaks in bovines

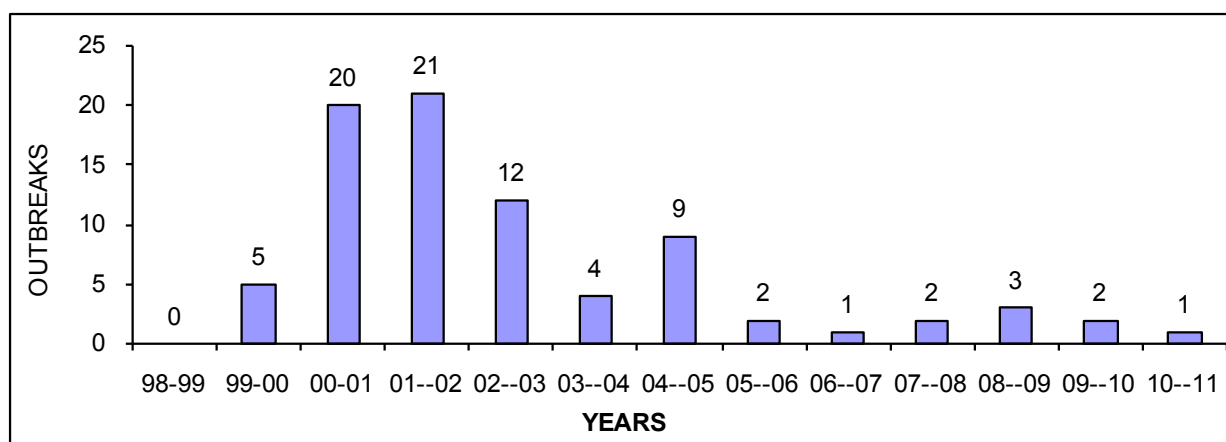


Fig. 13.6. Year wise anthrax outbreaks in sheep and goats

Bovine surra

Data indicates that rare outbreaks of bovine Surra have occurred during last 13 years

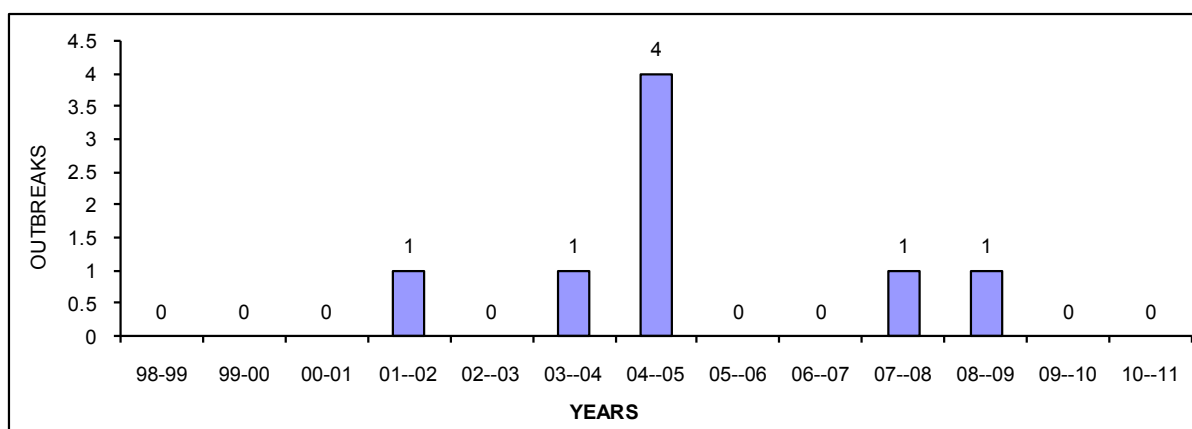


Fig. 13.7. Year wise surra outbreaks in bovines

Sheep pox

Data on sheep and goat pox indicates that more outbreaks have been occurred during 2000-2001, 2001-2002 and 2002-2003. Outbreaks have lowered down in recent years and it is recorded up to 1 to 3 outbreaks.

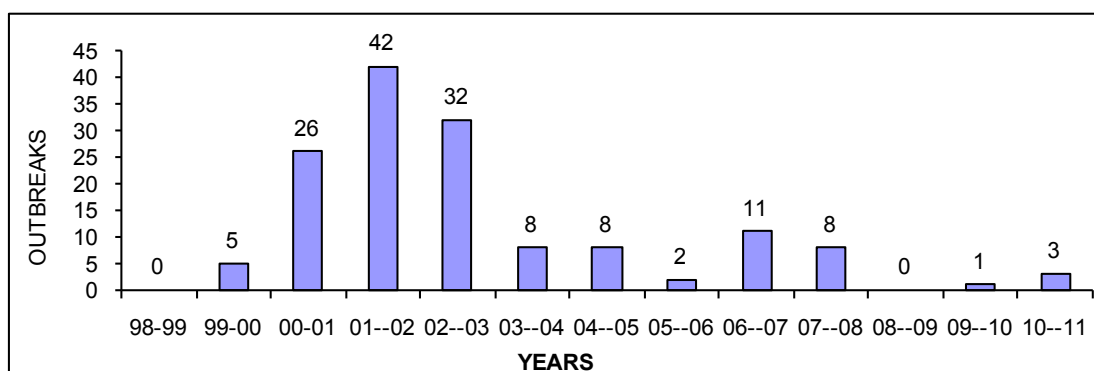


Fig. 13.8. Year wise sheep pox outbreaks in sheep

PPR Data on PPR outbreaks indicates that more outbreaks are recorded during 2002 -3 to 2005-6 and in recent also outbreaks are decreased , however on an average 13-14 outbreaks have been recorded in the state

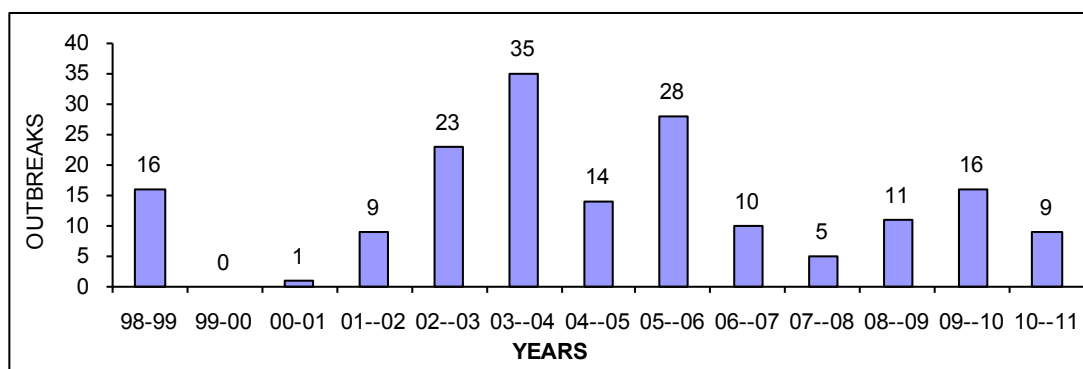


Fig. 13.9. Year wise PPR outbreaks in sheep and goats

Swine fever

Data on swine fever indicates that outbreaks are recorded since 2006-7 and in every year on an average 5-6 outbreaks have been occurred which has caused heavy mortality in pigs in the state.

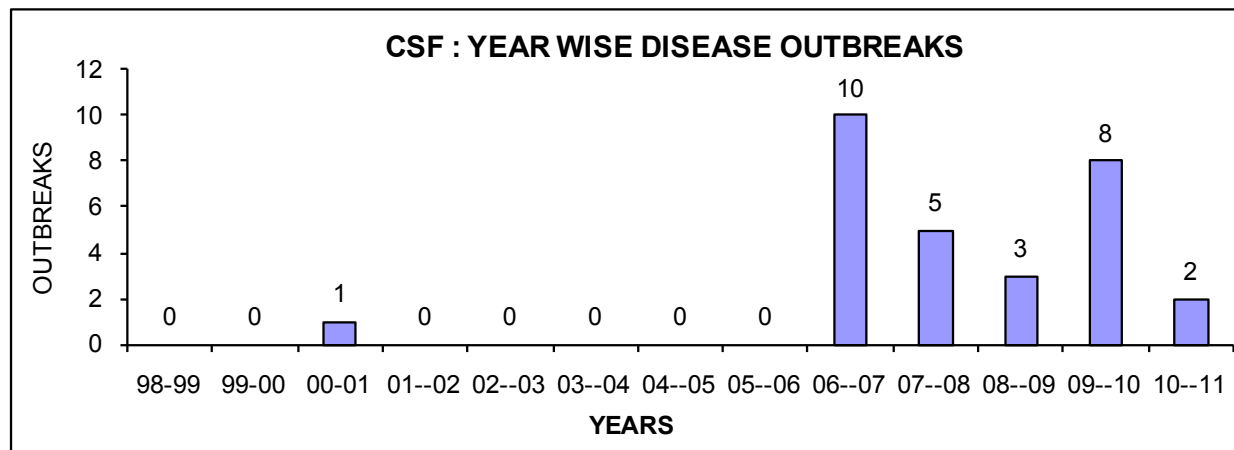


Fig. 13.10. Year wise CSF outbreaks in pigs

One each outbreak of Avian Influenza have been occurred during 2006-7 and 2007-8 and in 2006-7 two outbreaks of Glanders have been occurred in Maharashtra.

Serosurvey of brucellosis in Sheep and Goats during 2010 -11

In the state, following eight districts were randomly selected for serosurvey of brucellosis in small ruminants.

1. Kolhapur, 2) Osmanabad, 3) Jalna, 4) Wardha, 5) Yavatmal, 6) Amravati, 7) Ratnagiri and 8) Bhandara
Two villages were randomly selected from each selected district. 20 sera sample from sheep and 20 sera sample from goats were randomly collected. Total 397 goat sera sample and 289 sheep sera sample were collected and all these samples were screened for brucellosis antibodies by Plate Agglutination Test using RBPT brucella colour antigen.

Results of screening are summarized as below.

Table 13.1. Serosurvey of brucellosis in Sheep and Goats in 2010 -11

Sr No	District	Species	No. of samples	No. of samples Examined	No. of samples Positive	% Positive
1	Kolhapur	Sheep	40	40	17	42.5%
		Goats	40	40	6	15%
2	Osmanabad	Sheep	82	82	10	12%
		Goats	90	90	11	12%
3	Jalna	Sheep	7	7	0	0
		Goats	27	27	0	0
4	Wardha	Sheep	40	40	8	20%
		Goats	40	40	8	20%
5	Yavatmal	Sheep	40	40	0	0
		Goats	40	40	0	0

Sr No	District	Species	No. of samples	No. of samples Examined	No. of samples Positive	% Positive
6	Amravati	Sheep	40	40	2	5%
		Goats	40	40	7	17.5%
7	Ratnagiri	Sheep	0	0	0	0
		Goats	80	80	3	3.75%
8	Bhandara	Sheep	40	40	11	27.5%
		Goats	40	40	6	15%
Total		Sheep	289	289	51	17.64%
		Goats	397	397	38	9.57%

It is observed that 17.64 % sheep were seropositive to brucella antibodies whereas in goats seroprevalence was 9.57 %. In sheep more seroprevalence was observed in Kolhapur district (42.5 %), followed by Bhandara (27.5 %) and Wardha (20 %). No sheep were found seropositive in Yeotmal and Jalna. Same seroprevalence (20 %) was observed in both the species in Wardha district. In goats more seroprevalence was observed in Wardha (20 %), followed by Kolhapur and Bhandara (15%). No goats were found seropositive in Yeotmal and Jalna districts.

Table 13.2. Screening of sera samples for various diseases in Maharashtra (2010 - 2011)

S.no.	Diseases	Samples Screened	Positive	Negative	% Sero Positive
1	Brucellosis	4586	158	4428	3.45 %
2	IBR	2840	419	2421	14.75 %
3	PPR	512	344	168	67.19 %

Table 13.3. Audit utilization certificate in respect of AICPRP on ADMAS collaboration unit Pune for the year 2010-2011

Opening balance due from council as on 01.04.10	Remittance by council during the year 2010-11	Council share of receipt released from Scheme	Actual expenditure for the year (revenue & capital)	Council share of sanctioned grant of the year 2010-11	Council share of actual expenditure incurred and audited during the year 2010-11	Closing balance as the end of the year 2010-11 (1+2+3+6)
1	2	3	4	5	6	7
3.69	-----	3.69	3.29	3.69	3.29	0.40

Certified that Grant in aid of 100% ICAR has been utilized for the purpose for which it was made by the Council.

14. AICRP on ADMAS Collaborating Unit: Ranchi, Jharkhand

Livestock Migratory Route of Jharkhand State

There are many Migratory Route in the State by which animal passes through

1. G.T.Road:- It is entered in the State in Hazaribagh district at Chouparan Block and ends at Nirsa at Dhanbad district.
2. N.H.78:- Raidih Block to Gumla.
3. N.H.23:- Gumla to Sisai to Bharno by these routes animal passes through own foot also.
4. N.H.57:- Chatra district.
5. Anarapara Road:- Ashondhipu to Yadavpur at Pakur district.
6. N.H.33:- Ranchi to Patna.
7. N.H.75:- Ranchi to Patna.
8. Purulia Road:- Ranchi to West Bengal.
9. Ranchi to Rourkela.
10. N.H.33:- Jamshedpur to Behragora.
11. N.H.99
12. Deoghar to Dumka Road.
13. Ranibahal to Tongra road (Dumka district).
14. Dhanbaddistrict :- Link road NandKharhi to Gopalpul.
15. Dhanbad district:- Pandra more to east Tundi road.
16. Pakurdistrict :- Amrapara to Tilayapara.

Table 14.1. Epidemiological data on various diseases encountered in the state during year 2010-11

Sl.No.	District/ Block/ Village	Disease	No. of Outbrak	Popula- tion at risk	Attack	Death
1	Ranchi	PPR	21	5044	2867	374
		HS	-	-	3416	-
2	Hazaribagh	PPR	01	150	40	-
		CCPP	02	-	84	10
		HS	01	325	54	05
		BQ (Dhanbad)	04	400	12	02
3	Kolhan	PPR	01	450	50	10
4	Palamau	HS	01	2850	08	-

Table 14.2. Epidemiological data on various diseases encountered in the state during year 2009-10

Sl.No.	District/ Block/Village	Disease	No. of Outbrak	Population at risk	Attack	Death
1	Palamau	Anthrax	01	200	25	14
		PPR	10	152	42	02

Table 14.3. Epidemiological data on various diseases encountered in the state during year 2008-09

Sl.No.	District/ Block/Village	Disease	No. of Outbrak	Population at risk	Attack	Death
1	Palamau	BQ	10	152	42	02

Table 14.4. Epidemiological data on various diseases encountered in the state during year 2007-08

Sl.No.	District/ Block/Village	Disease	No. of Outbrak	Population at risk	Attack	Death
1	Ranchi	HS	-	-	04	02
		Ranikhet	06		16	
2	Hazaribagh	BQ	02	-	02	
3	Palamau	BQ	04	-	-	-

Table 14.5. Epidemiological data on various diseases encountered in the state during year 2006-07

Sl.No.	District/ Block/Village	Disease	No. of Outbrak	Population at risk	Attack	Death
1	Ranchi	HS				-
2	Hazaribagh	BQ	03	03		
3	Palamau	BQ	01		05	
4	kolhan	PPR	04	900	710	28

15. AICRP on ADMAS Collaborating Unit: Srinagar, J&K

Progress of Work & Achievements

Visits were conducted in enlisted villages and the survey work was carried out in these identified villages to obtain first hand information regarding the incidence of various livestock and poultry diseases in the state. The incidence of these diseases was correlated with meteorological data collected from each district, where the outbreak was recorded.

Interaction with villagers involving village heads and conducting interviews for gathering first hand information on disease status in the villages was carried out with the help of District Disease Investigation Officers, local veterinary field staff in these identified villages. Survey was conducted and blood samples were collected as per the stratified Random Sampling Technique under the supervision of Co-Principal Investigator.

Meetings were organized with Chief Animal Husbandry Officers (Distt. Heads) Distt. Disease Investigation Officers and other veterinary and para-veterinary staff of different districts involving them to the programme for its complete success. Besides that number of Live Stock Health Awareness Camps were Organized in all the 22 districts of the State to educate the farmers regarding the prevention & Control of Economically important Diseases of Livestock & poultry and they were advised to follow the immunization schedule framed by the department for their complete eradication in the State in phased manner. .

Table 15.1. Population survey in enlisted villages

Village	District	No. of Households	Cattle Population	Sheep & Goat Population	Buffalo Population	Total Livestock Population
Hanipora Chatnipora	Pulwama	3000	950	1700	-	2650
Kali Nawi	Samba	50	180	100	07	287
Chek Desa	Kathua	100	150	25	50	225
Kulupora/Ramgarh	Samba	100	115	20	08	143
Pindi Sarokh Khurd Bishna	Jammu	300	35	12	300	347
Doglah Kaian	Reasi	30	20	200	-	220
Bayoalian	-do-	120	30	100	200	330
Khanpur	Jammu	100	70	35	35	140
Bhattwal	Kathua	150	60	48	90	198
Thalay	Udhampur	150	70	38	80	188
Barshalla	Doda	250	130	140	23	293
Nai	-do-	200	150	130	30	310
Balipora	Kupwara	150	650	2595	-	3245

Technical programme

During the year under report the monitoring and surveillance of important infectious diseases of livestock and poultry continued. The incidence of following diseases of livestock and poultry was monitored regularly by this institute.

01. Haemorrhagic Septicemia
02. Black-Quarter
03. Anthrax
04. Rabies
05. Sheep Pox

- 06. Foot Rot
- 07. PPR
- 08. Blue-tongue
- 09. Equine Influenza

The collaborating unit of ADMAS Srinagar undertook study of incidence of various livestock and poultry diseases that were referred to the institute. Wherever possible on spot diagnosis was provided, other wise suitable clinical, post mortem samples were collected from the affected animals for laboratory analysis of the samples and the disease was diagnosed and suitable control measures were communicated to the concerned.

In addition the institute also received **4460** nos. of clinical samples sent by the field veterinarians for diagnosis

- a) The samples received include blood samples for detection of etiological agents, faecal samples for presence of parasitic ova or cyst, tissue impression smears, heart blood smears from necropsed animals and serum samples for detection of antibodies of bacterial/viral pathogens. The samples were analyzed by suitable tests and results were communicated to the concerned

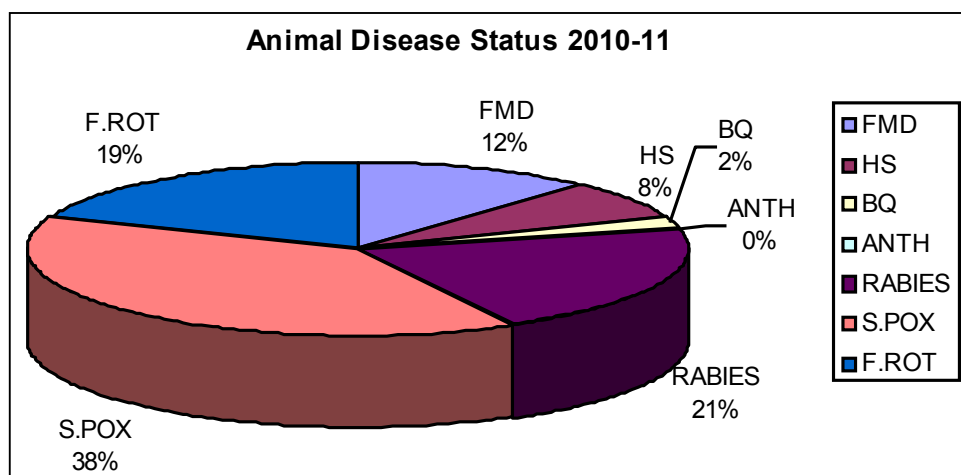


Fig. 15.1. Animal disease status 2010-11

Table 15.2. Meteorological profile: Kashmir

Month & Year	Max. Temp. (Deg. Cel.)	Min. Temp. (Deg. Cel.)	Relative Humidity		Total Rainfall during the Month
			Max.%	Min. %	
August 2010	34.5	27.5	85	60	5mms
September 2010	34.5	27.5	65	55	4mms
January 2011	4.6	Minus 4	-	-	-

Table 15.3. Meteorological profile: Jammu

Month & Year	Max. Temp. (Deg. Cel.)	Min. Temp. (Deg. Cel.)	Relative Humidity		Total Rainfall during the Month
			Max.%	Min. %	
November 2011	35.5	28.5	80	60	5mms

Haemorrhagic Septicaemia

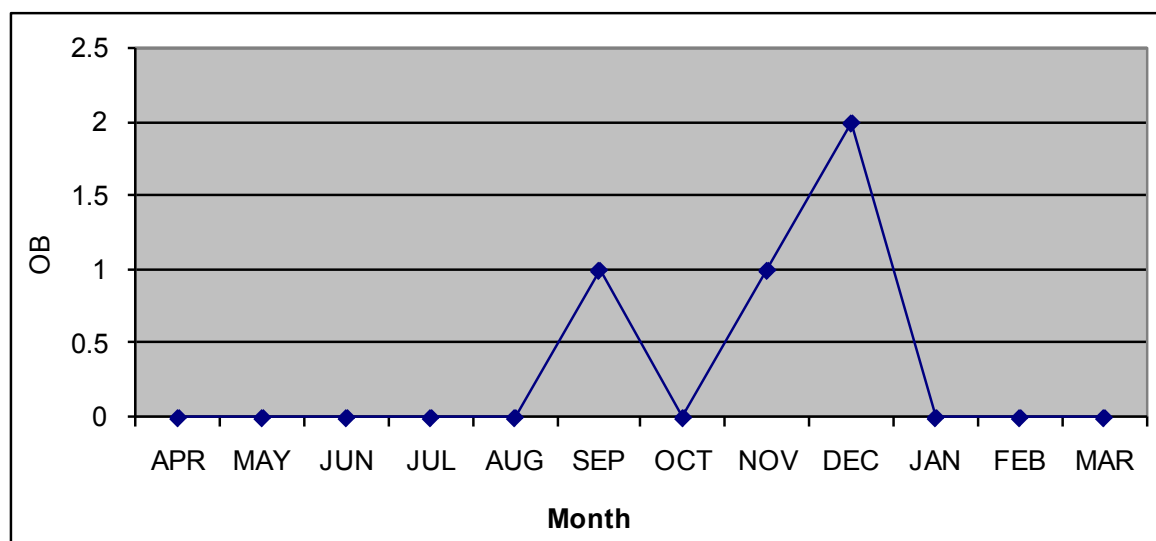


Fig. 15.2. Seasonal Pattern of HS

During the year under report (04) outbreaks of HS disease were recorded in Rajouri and Kathua of Jammu Division during the months of September, November and December 2010 having environmental temperature of 36.6 °C & 28.7 °C with relative humidity of 80 to 60% affecting (31) cattle and causing death of (03) cattle. However no outbreak of the disease was recorded anywhere in Kashmir Division.

Table 15.4. Details of HS disease outbreaks recorded/investigated in the State during 2010-11

S. No.	Month	District	OB	Attacks	Deaths
1.	September 2010	Kathua	01	15	01
2.	November 2010	-do-	01	06	01
3.	December 2010	Rajouri	02	10	01

Table 15.5. Meteorological profile: Jammu

Month & Year	Max. Temp. (Deg. Cel.)	Min. Temp. (Deg. Cel.)	Relative Humidity		Total Rainfall during the Month
			Max.%	Min. %	
September 2010	36.2	28.7	85	65	-
November 2010	35.5	28.5	80	60	5mms
December 2010	34.0	25.0	77	49	6mms

Black Quarter

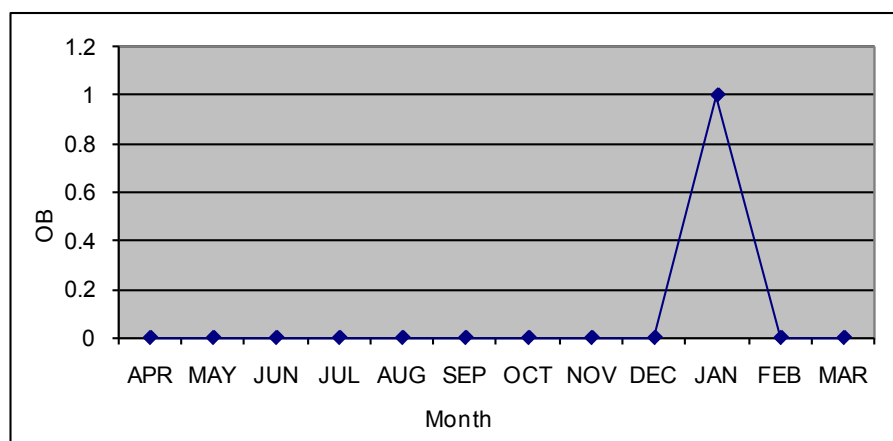


Fig. 15.3. Seasonal Pattern of HS

During the year under report (01) outbreak of BQ disease was recorded in Kathua district of Jammu Division, during the month of January 2011 having environmental temperature of 29.6°C with relative humidity of 60% affecting (06) cattle and causing death of (02) cattle.

Table 15.6 Details of Black Quarter disease outbreaks recorded/investigated in the State during 2010-11

S. No.	Disease	Month	District	OB	Attacks	Deaths
1.	BQ	January 2011	Kathua	01	06	02

Table 15.7. Meteorological profile: Jammu

Month & Year	Max. Temp. (Deg. Cel.)	Min. Temp. (Deg. Cel.)	Relative Humidity		Total Rainfall during the Month
			Max. %	Min. %	
January 2011	29.6	15.5	60	40	8mms

Anthrax

The outbreaks of the Anthrax disease were usually recorded in Srinagar and Kupwara districts of the valley. However during the year under report **not even a single sporadic case of the disease** was recorded anywhere in the state. This because of compulsory vaccination of animals in endemic zones with indigenously manufactured attenuated Anthrax Spore vaccine. The department has already identified endemic zones of the Anthrax disease in the state.

Infectious Bovine Rhinotracheitis (IBR)

During the year under report (486) nos. of sera samples have been collected randomly from identified villages and were sent to PD-ADMAS Bangalore.

Table 15.8. Random collection of serum samples from identified villages

S. No.	Name of the district	Name of the village	No. of samples
01.	Pulwama	Hanipora Chatnipora	32
02.	Samba	Kali Nawi	49
03.	Kathua	Chek Desa	51
04.	Samba	Kulupora/Ramgarh	39

S. No.	Name of the district	Name of the village	No. of samples
05.	Jammu	Pindi Sarokh Khurd Bishna	31
06.	Reasi	Doglah Kaian	19
07.	-do-	Bayoalian	30
08.	Jammu	Khanpur	50
09.	Kathua	Bhattwal	30
10.	Udhampur	Thalay	30
11.	Doda	Barshalla	50
12.	-do-	Nai	50
13.	Kupwara	Balipora	25
		Total	486

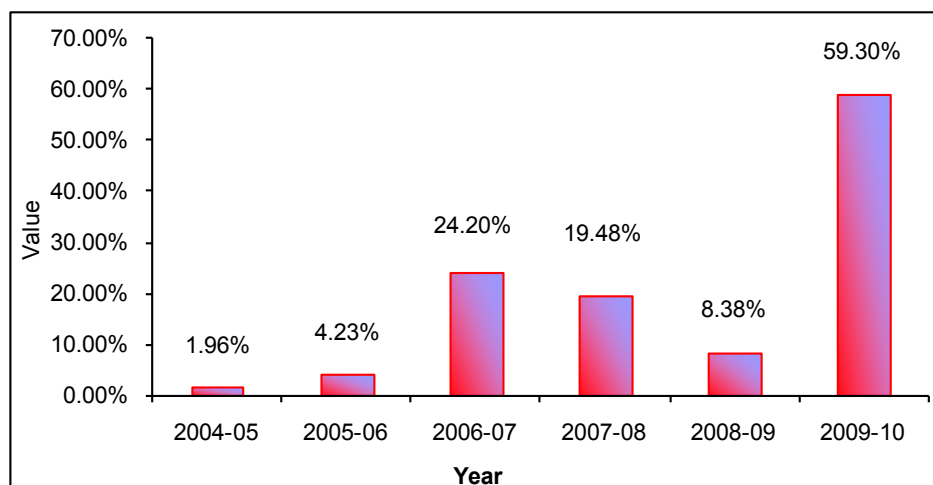


Fig. 15.4. Cumulative Sero Prevalence of IBR for last six years

Brucellosis

During the year under report (486) nos. of sera samples have been collected randomly from identified villages and were sent to PD-ADMAS Bangalore. .

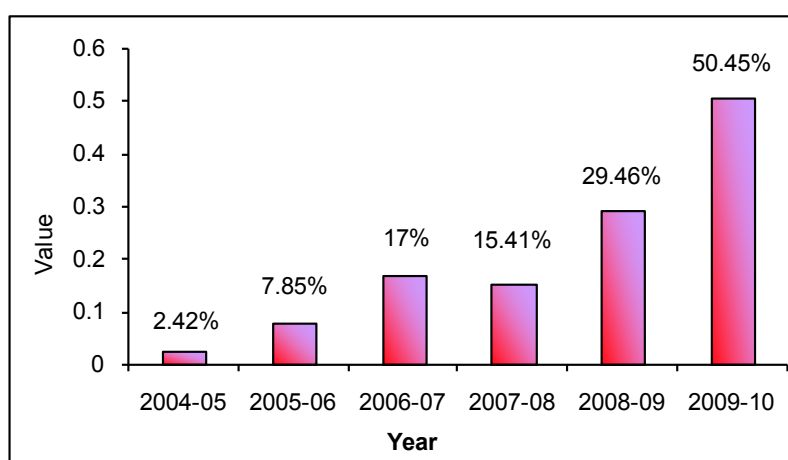


Fig. 15.5. Cumulative Sero Prevalence of brucellosis for last six years

Sheep & Goat Pox

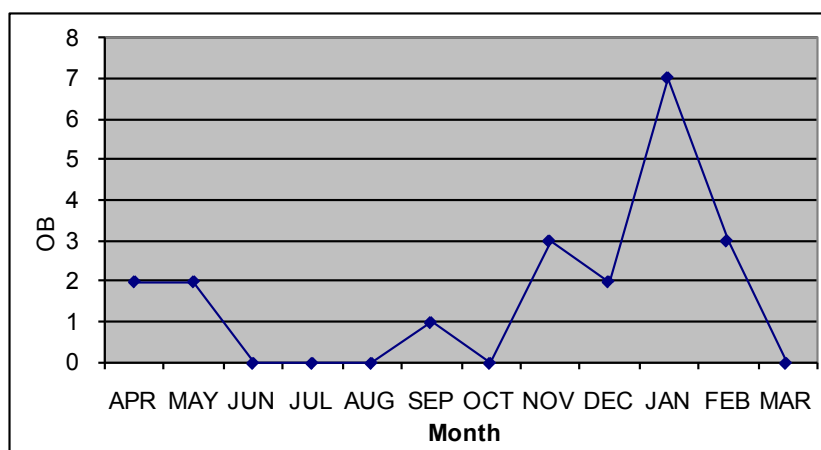


Fig. 15.6. Seasonal Pattern of Sheep and goat pox

The disease Sheep & Goat Pox being endemic in Kashmir valley affecting both Sheep and Goat population of the state. During the year under report (20) outbreaks of the disease were recorded in different districts of the valley through out the year.

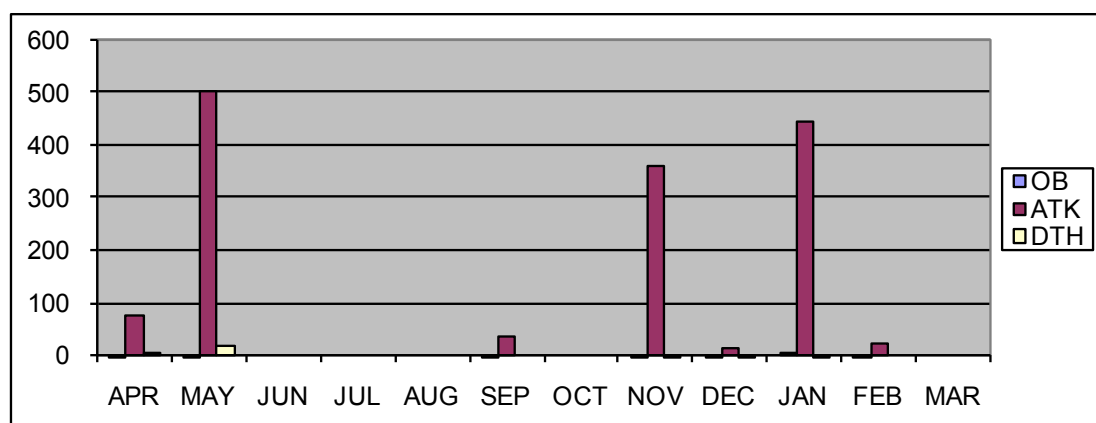


Fig. 15.7. Month wise outbreaks, attacks and mortality due to Sheep & Goat Pox during 2010-11 (J&K State)

The disease is observed through out the year in all seasons but the disease attack rate is significantly higher in summer and cold winter. The maximum outbreaks were mostly recorded in high snowfall areas which indicates the total snowfall has an influence on sheep and goat pox disease.

Foot Rot

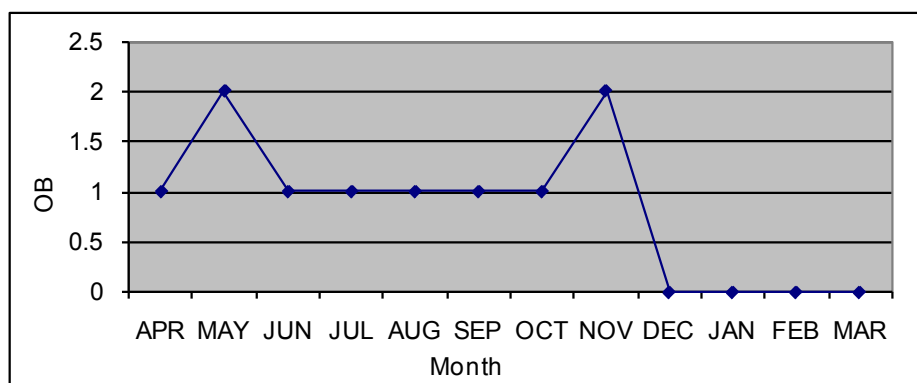


Fig. 15.8. Seasonal Pattern of foot rot

The disease Foot Rot affects the sheep and goat population in all the districts of the state. During the year under report (10) outbreaks of the disease were recorded affecting Sheep and Goat population of the state.

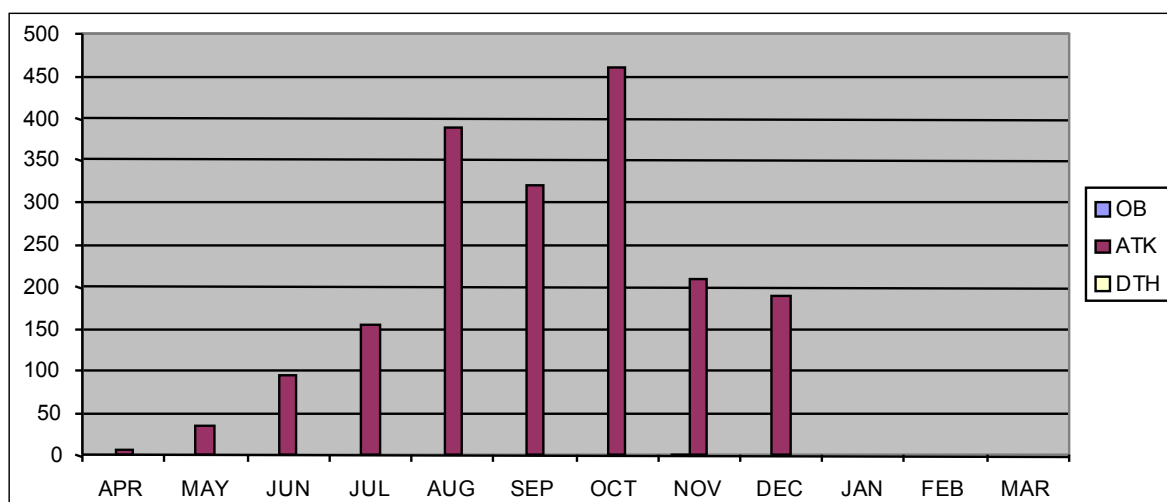


Fig. 15.9. Month wise outbreaks, attacks and mortality due to foot rot during 2010-11 (J&K State)

Significant no. of outbreaks of the Foot Rot disease in sheep and goat population were recorded during early monsoon followed by late monsoon, mostly in hilly and high rainfall areas of Kashmir Division, probably stress factor associated with rainfall may have definite influence in the occurrence on the Foot Rot Disease in the State.



Fig. 15.10. Disease endemic zones

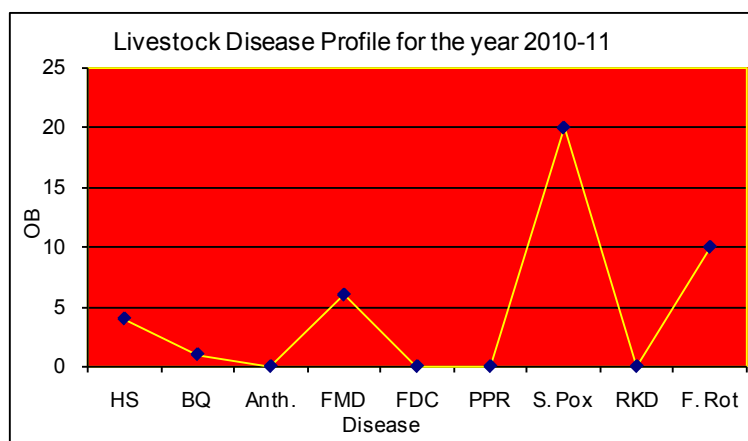


Fig. 15.11. Livestock Disease Profile for the year 2010-11

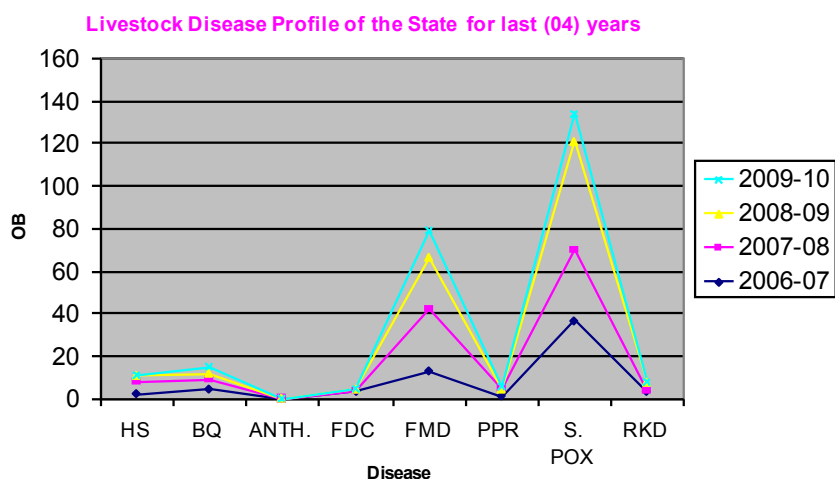


Fig. 15.12. Livestock Disease Profile of the state for the last 4 years

Parasitic diseases

Table 15.9. Faecal samples examination

No. of samples examined	No. of samples positive for strongylous	(%)
1892	25	1.31
No. of samples examined	No. of samples positive for Amphistome	(%)
1892	38	2.00
No. of samples examined	No. of samples positive for Fasciola	(%)
1892	42	2.21

Consolidated Financial Report

Sl. No.	Name of the Centre	Closing balance as on 31/3/10				Opening balance as on 1/4/10				Allocation for the year 2010-11				Remittance during the year 2010-11				Expenditure for the year 2010-11				Closing balance as on 31/3/11				Re-fund
		TA	Con	Equipment	Total	TA	Con	Equipment	Total	TA	Con	Equipment	Total	TA	Con	Equipment	Total	TA	Con	Equipment	Total	TA	Con	Equipment	Total	
1	Kerala	0	0	0	7915	0	0	0	7915	25000	150000	0	175000	0	0	0	167085	0	0	0	175000	0	0	0	0	
2	Jaipur	25030	132432	0	157462	25030	132432	0	157462	50000	150000	0	200000	24970	17568	0	42538	49338	149653	0	198991	692	317	0	1009	
3	Meghalaya	45335	2265	0	47600	45335	2265	0	47600	75000	425000	0	500000	29665	422735	0	452400	63000	395050	0	458050	12000	29950	0	41950	
4	Jammu & Kashmir	0	0	0	63432	0	0	0	63432	25000	150000	0	175000	0	0	0	111568	0	0	0	173150	0	1850	0	1850	
5	Ahmedabad	0	0	0	26774	0	0	0	26774	25000	200000	0	225000	25000	173226	0	198226	0	0	0	214488	0	10512	0	10512	
6	Hyderabad	1033	199	0	1232	1033	199	0	1232	75000	275000	0	350000	73967	274801	0	348768	74964	274982	0	349946	36	18	0	54	
7	Pune	0	0	0	369000	0	0	0	369000	50000	175000	0	225000	0	0	0	0	0	0	0	185000	0	40000	0	40000	144000 28.4.11
8	Bhopal	404	28	0	432	404	28	0	432	50000	275000	0	325000	49596	274972	0	324568	48699	276275	0	324974	1301	-1275	0	26	
9	Ludhiana	11	1122	0	1133	11	1122	0	1133	25000	275000	0	300000	24989	273878	0	298867	24472	272604	0	297076	528	2396	0	2924	
10	Cuttack	0	66757	0	66757	0	66757	0	66757	50000	250000	0	300000	50000	183243	0	233243	35044	197833	0	232877	14956	52167	0	67123	
11	Assam	45177	8596	984000	1037773	45177	8596	984000	1037773	75000	375000	0	450000	29823	366404	0	396227	68227	372793	668810*	1109830	6773	2207	315190	324170	

*Revalidated

12. Kolkata, 13. Bangalore, 14. Manipur: Incomplete report

15. Jharkhand: No report

NOTE:

- For Assam centre under the head equipment Rs.984000 was revalidated.



2. For Kolkata Centre a letter no.3-30/A&A/RRU/PD_ADMAS/10-11/1554-55 dated 28/10/10 sent by speed post regarding submission of AUC for the year 2009-10. Based on our letter AUC for the year 2009-10 has been received vide letter No. 2291/9D-1/107 dated 13.12.10 stating that they have spent the full amount for Rs.350000. Based on that a letter was sent to them for furnishing breakup of actual expenditure incurred during the year 2009-10. We have not received any letter from them so far, hence no fund was released to this center.
3. For Bangalore center, the closing balance of 2009-10 is different from opening balance of 2010-11. The center exceeded the expenditure limit under different heads against allocation and the closing balance 2010-11 is shown as negative balance. This needs rectification.
4. For Manipur center, examination of detailed expenditure revealed that an amount of Rs. 2,57,031/ was spent for the NRC items not approved. Accordingly as per audit note, the amount has to be refunded. This needs to be sorted out immediately.
5. For Jharkhand Centre, AUC for 2007-08 duly certified by CA was received but, for 2008-09, CA verified AUC was not received, However, a statement signed by their Head clerk was received which states that at the end of the year 2008-09, the closing balance was Rs. 6,53,659/. Since then no AUC for 2009-10 and 2010-11 were received. Accordingly, a letter no.3-30/A&A/RRU/PD_ADMAS/10-11/1554-55 dated 28/10/10 sent by speed post regarding submission of AUC for the year 2009-10 but we have not received any AUC from them till date and therefore fund was not released to this center.

18th Annual review meet of AICRP on ADMAS at Bangalore



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