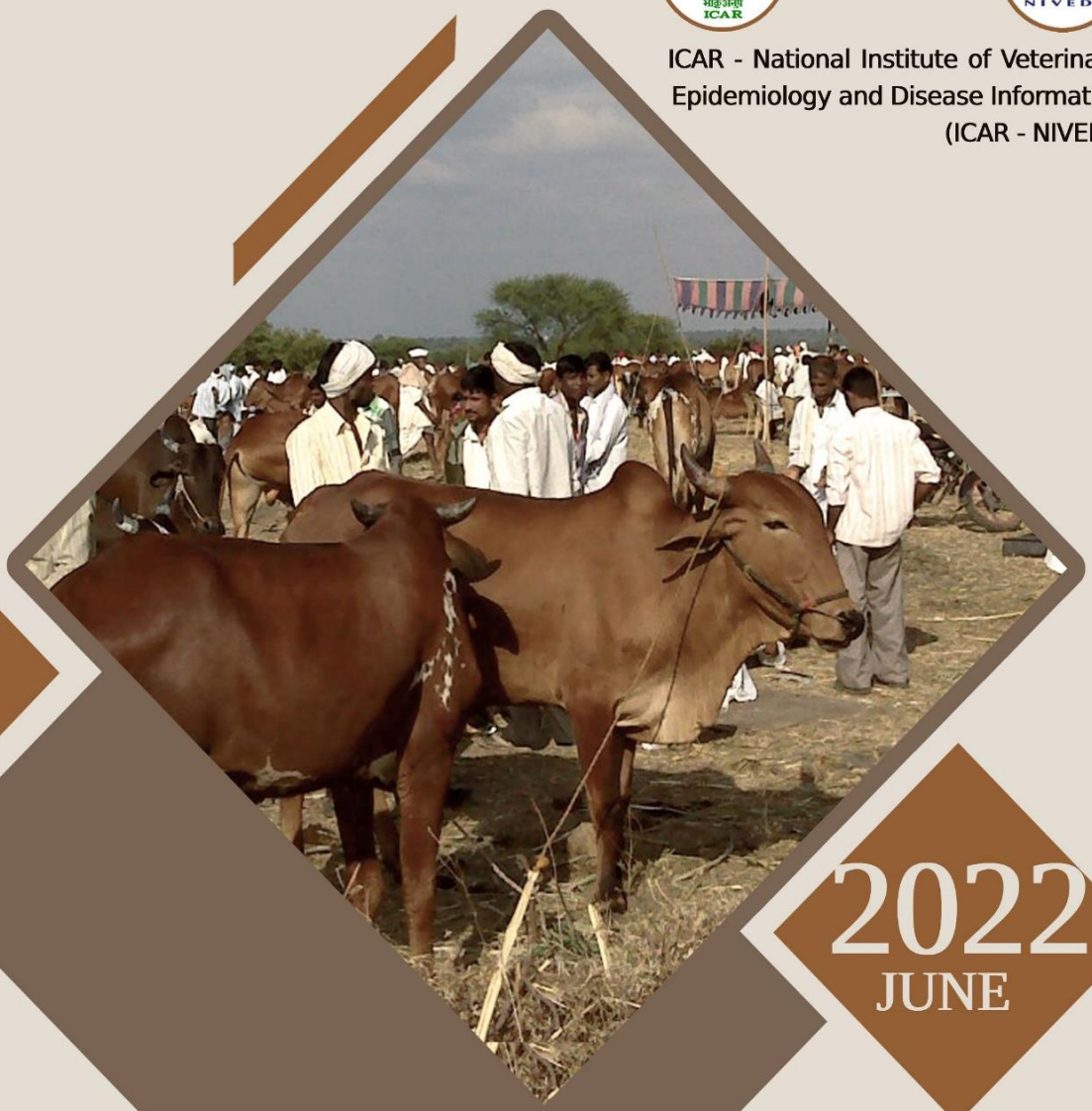
APRIL 2022, Volume 10, Issue 04

ICAR - National Institute of Veterinary Epidemiology and Disease Informatics (ICAR - NIVEDI)



2022
JUNE

LIVESTOCK DISEASE RISK FOREWARNING BULLETIN

Powered by Artificial Intelligence

PUBLISHED BY:
DIRECTOR
ICAR-NIVEDI

©2022 ICAR-NIVEDI

NOW LINKED WITH
FARMER REGISTRATION AND UNIFIED BENEFICIARY INFORMATION SYSTEM
(FRUITS)

Citation: Suresh K P, Hemadri D, Patil S S, Krishnamoorthy P, Siju S J and Shome B R. Livestock Disease Risk Forewarning Bulletin – June 2022, ICAR-NIVEDI, Bengaluru, 10(04): 1-122.

Month &Year: April, 2022.

Published by: Director, ICAR- National Institute of Veterinary Epidemiology and Disease Informatics (NIVEDI), Yelahanka, Bengaluru-560064.

PME NUMBER: F.No.13/NIVEDI/PMEC/Forewarning Bulletin/2022-23/01

©ICAR-NIVEDI

Prepared By: Dr. K. P. Suresh
Dr. D. Hemadri
Dr. S. S. Patil
Dr. P. Krishnamoorthy
Dr. S.J. Siju

Printed by
Naveen Printers
No 155 CHS, 4th Phase, Yelahanka New Town,
Bengaluru, Karnataka 560064
E-Mail Id: naveenprinters04@gmail.com

Front Page Design by: Ms. Apoorva Hemadri

Disclaimer

The forewarnings are based on the retrospective disease data available in the NADRES database. Hence, for those states wherein data is limited/less, the forewarning may not be realistic. Further the forewarning will not take into consideration the control measures that are *in situ*.

Acknowledgement

I would like to acknowledge the constant support and inspiration from Hon'ble Secretary, DARE and Director General, ICAR, Government of India, New Delhi.

I would like to express sincere everlasting gratitude to Hon'ble Deputy Director General (Animal Science) for his constant encouragement, support and guidance.

I would also like to express sincere gratitude to the Department of Animal Husbandry and Dairying (DAHD), Ministry of Agriculture and Farmers Welfare, Government of India for providing the livestock population data for the preparation of this bulletin.

Animal Husbandry Departments of state governments and also AICRP on ADMAS centres are gratefully acknowledged for the timely submission of reports of livestock disease outbreak data. I am thankful to all the scientific and technical staff of ICAR-NIVEDI for their feedback and support. I sincerely acknowledge the Statistical Division of DAHD for providing the data on livestock census.

Furthermore, I would also like to acknowledge with much appreciation the crucial role of Dr. K. P. Suresh, Principal Scientist and support received from the scientists, Dr. D. Hemadri, Dr. S.S. Patil, Dr. P. Krishnamoorthy, Dr. S.J. Siju and SRF's, JRF's, Young Professionals and other contractual staff working in Disease Informatics Lab/Spatial Epidemiology Lab in preparing this monthly bulletin.

Director (Acting)
ICAR- NIVEDI

TABLE OF CONTENT

Sl No	Content	Page Number
1	About the Bulletin	1
2	Summary of the Forewarning Bulletin	2
3	Introduction to NADRES $_{V2}$	4
4	Forewarning Methodology	6
	I. Material	6
	II. NADRES $_{V2}$ Data flow and AI Based Data capturing diagram	8
	II. Weighted outbreak score	9
	IV. Forecasting of weather parameters	9
	V. Implementation of Principal Component Analysis	11
	VI. Machine Learning Models	11
5	Accuracy of Prediction	12
6	Moran's I for clustering of Livestock diseases	13
7	R Software	13
8	Forewarning of livestock disease for the month of June, 2022	14
	I. District wise Livestock Disease Risk Forewarning	14
	II . Glimpse of Predicted disease outbreaks	60
	III. Diseases, Species affected, clinical signs and its preventive measures	71
	IV. Risk Prediction -Livestock disease forewarning maps	76
	V. Forecasting of remote sensing and meteorological parameters	89
	VI. Significant Weather Parameters Table	91
9	Post prediction Validation	92
	I. Correlational Assessment	98
10	Launch of Mobile Android app. & link to download	100
11	Farmers Empowerment through IT: Disease Risk Communication	102
12	Appendix	103
	a). R Code	103
	b). Abbreviations	109
13	Infection with SARS-COV-2 in animals	110
	a). Epidemiology of COVID-19	111
14	Customer/Client Feedback Form	121

1. About the Bulletin…

Livestock sector plays a crucial role in the rural economy of India as around 20.5 million people depend upon livestock for their livelihood. Even though the investment in the livestock sector is meagre, tremendous achievements have been observed in the sector during the last decade. As it is an important component in poverty alleviation programmes, continuous emphasis is being laid on this sector for enhancing the quality of the primary and secondary products in the international market, which in turn demands improved animal health. Therefore, livestock development programmes cannot succeed unless a well-organized animal health service is built up and in place for safeguarding the livestock against economically important diseases.

India has made a noteworthy success in the eradication of Rinderpest (RP), CBPP, AHS and Dourine. However, there are several other infectious and non-infectious diseases prevailing in the country causing huge annual economic loss. Prevention, control and eradication of the animal diseases need a thorough understanding of the epidemiology as well their economic impact.

National Institute of Veterinary Epidemiology and Disease Informatics (NIVEDI) has the mandate to carry out research activities in the area of veterinary epidemiology and disease informatics. With the eradication of RP successfully, India has not only proved its ability to face the challenges but also to succeed, despite various limitations. Similar efforts are needed to control and eradicate diseases like FMD, PPR, Brucellosis, CSF, HS etc., which cause huge economic loss annually to the livestock industry. To this end, ICAR-NIVEDI has identified 13 priority diseases, based on the past incidence patterns and has built a strong database of these diseases. The database, which is the backbone of the National Animal Disease Referral Expert System (NADRESv2), is used for providing monthly livestock disease forewarning, which is compiled in this monthly bulletin to alert the animal husbandry departments, both at the National/state level, to take appropriate control measures. We hope users/stakeholders find this bulletin useful in their quest to control livestock diseases. This forewarning bulletin will assist the field Veterinarians in adopting appropriate preventive and control measures, thereby reducing the occurrence of livestock disease outbreaks.

2. SUMMARY OF THE FOREWARNING BULLETIN….

The association between infectious diseases and the climate was known from ancient times. Hippocrates observed in the 5th century that epidemics were associated with natural phenomena rather than divinities or demons. In modern times, our increasing capabilities to detect and predict climate variations joined with growing evidence for global climate change, have powered interest in understanding the impacts of climate on animal health, particularly the emergence and transmission of infectious disease agents. Simple reasoning suggests that climate can affect infectious disease patterns because disease agents (viruses, bacteria, and parasites) and their vectors are sensitive to temperature, moisture, and other ambient environmental conditions.

India being an agriculture-based country, the livestock sector plays a vital role in contributing to the economy. A robust reporting and forewarning system enable the concerned authorities in disease preparedness and awareness of the risk associated with livestock disease. Therefore, the economic loss due to morbidity and mortality of the animals is reduced thereby helps to increase the productivity in terms of egg, meat, and dairy products. National Animal Disease Referral Expert System database is a weather-based forewarning system enabled with an artificial intelligence system developed by ICAR- National Institute of Veterinary Epidemiology & Disease Informatics Bengaluru, Karnataka state, India that forecast potential threats from pathogens two months in advance to provide the stakeholders with sufficient timeline for awareness and preparedness to act. Artificial Intelligence (AI) and Machine Learning (ML) models use the programmed algorithms that receive and analyse input data to predict output (Infectious risk prediction) values within an acceptable range. As new data fed into these algorithms, they learn and optimize their operations to improve performance, developing intelligence over time.

Summary

The livestock disease forecasting for June 2022 revealed Jharkhand, Assam, Karnataka, Kerala and West Bengal as the top five states with high predicted livestock disease outbreaks.

Among the predicted diseases, control programmes are in full swing for FMD and PPR in the country and due attention is demanded by the predicted disease outbreaks of these diseases. Among the expected disease outbreaks, the predicted FMD outbreaks are high in Kerala (14), Karnataka (13) and Jharkhand (11) and whereas predicted PPR outbreaks are high in Jharkhand (14). Further the co-occurrence of FMD and IHS can be expected in Himachal Pradesh, Jharkhand, Karnataka, Kerala, Meghalaya, Odisha, and West Bengal. Among the different diseases in livestock, the predicted outbreaks are expected to be high for Black Quarter (67), Fascioliasis (58) and FMD (55).

The major challenges for the effective disease control programme being the lack of thorough understanding about the complexity of disease dynamics, wide host range of pathogens, widening of niche of pathogens due to climate change etc. The effective control programme for major livestock diseases in the country can be efficiently addressed by planning and execution of available control measures in the high risk areas and routine surveillance and monitoring of diseases.

Table S1. Summary of State wise Livestock Disease forewarning for June, 2022

Sl. No	State Name	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis	Total number of diseases predicted
1	Andaman and Nicobar	0	0	0	0	0	3	1	0	0	0	0	0	0	**04**
2	Andhra Pradesh	4	0	2	0	0	0	0	0	0	2	0	0	0	**08**
3	Arunachal Pradesh	0	1	0	0	0	4	2	0	0	0	0	0	0	**07**
4	Assam	1	1	19	0	2	14	0	11	2	5	9	3	0	**67**
5	Bihar	0	0	0	0	0	1	0	0	0	0	0	0	1	**02**
6	Chandigarh	0	0	0	0	0	0	0	0	0	0	0	0	0	**00**
7	Chhattisgarh	0	0	0	0	0	0	0	0	0	0	0	0	0	**00**
8	Dadra and Nagar Haveli	0	0	0	0	0	0	0	0	0	0	0	0	0	**00**
9	Daman and Diu	0	0	0	0	0	0	0	0	0	0	0	0	0	**00**
10	Goa	0	0	0	0	0	0	0	0	0	0	0	0	0	**00**
11	Gujarat	0	0	0	0	0	0	0	0	1	0	0	1	0	**02**
12	Haryana	0	0	0	0	1	0	0	0	1	0	2	1	0	**05**
13	Himachal Pradesh	0	0	0	0	0	0	2	1	3	1	0	0	0	**07**
14	Jammu and Kashmir	0	0	0	0	0	0	0	0	0	6	0	0	0	**06**
15	Jharkhand	2	23	8	0	3	23	11	5	14	5	2	21	24	**141**
16	Karnataka	7	0	13	0	8	0	13	1	4	7	0	1	0	**54**
17	Kerala	2	3	0	0	0	0	14	7	1	0	2	11	0	**40**
18	Lakshadweep	0	0	0	0	0	0	0	0	0	0	0	0	0	**00**
19	Madhya Pradesh	0	0	1	0	0	0	0	4	0	0	0	0	0	**05**
20	Maharashtra	1	0	0	0	0	0	0	1	1	2	0	2	0	**07**
21	Manipur	0	0	3	0	0	6	0	1	0	0	4	0	0	**14**
22	Meghalaya	2	0	3	0	0	1	6	4	0	2	5	0	0	**23**
23	Mizoram	0	0	1	0	0	0	0	1	0	0	1	0	0	**03**
24	Nagaland	0	0	0	0	0	0	0	0	0	0	5	0	0	**05**
25	NCT of Delhi	0	0	0	0	0	0	0	0	0	0	0	0	0	**00**
26	Odisha	4	0	3	0	0	0	1	1	4	1	0	2	1	**17**
27	Puducherry	0	3	0	0	0	2	0	0	0	0	0	0	0	**05**
28	Punjab	0	1	0	0	0	0	0	0	0	0	0	1	0	**02**
29	Rajasthan	0	1	0	0	2	0	2	0	1	1	0	0	0	**07**
30	Sikkim	0	0	0	0	0	0	0	0	0	0	0	0	0	**00**
31	Tamil Nadu	3	0	3	0	0	0	0	0	1	2	0	0	0	**09**
32	Telangana	0	0	0	0	2	0	0	0	0	2	0	0	0	**04**
33	Tripura	0	0	0	0	0	1	1	0	0	1	0	0	0	**03**
34	Uttar Pradesh	0	1	0	0	0	1	0	1	0	0	0	2	16	**21**
35	Uttarakhand	0	0	0	0	0	0	0	0	2	0	0	0	0	**02**
36	West Bengal	2	1	11	0	0	2	2	8	7	2	0	6	2	**43**
Total number of districts likely to report.		**28**	**35**	**67**	**0**	**18**	**58**	**55**	**46**	**42**	**39**	**30**	**51**	**44**	**513**

3. INTRODUCTION TO NADRES v2

The geographic and seasonal distribution of many infectious diseases are associated with climate and therefore the possibility of using seasonal climate forecasts as predictive indicators in disease early warning system (EWS) became imminent. In this context, ICAR-NIVEDI, in its quest for achieving better livestock health, had developed an interactive web portal named "National Animal Disease Referral Expert System (NADRES)" during early part of the first decade of the millennium. The web portal, which was developed from the financial support of National Agricultural Technology Project, was launched in the year 2005. The portal which is interactive, allows the user/stakeholder to access livestock disease forewarning (n=13) at the district level for entire country two months in advance. The portal which was initially built on oracle platform was later changed to MySQL platform to store the administrator provided disease information and other relevant meteorological and risk factor information. However, with the availability of remote sensed satellite images and the advancement in information technology and statistical algorithms, the upgradation of NADRES became inevitable. To this end, a newer version of NADRES (NADRES *V2*) has been developed and is ready for release.

How it is different from previous version?

In brief, it can be said that NADRES V2 underwent a sea change not only in its internal structure but also in its physical design. As a result, now the central menu bar consists of Home, About us, Risk factors, Analysis, Livestock disease, post prediction validation and contact details. Risk factors menu comprises of details on resolution, time interval, units and source of 11 meteorological and 5 remote sensing parameters. Analytics menu has various analysis options. The newly created livestock disease menu has the details regarding species affected, clinical signs and preventive measures to be adopted for the 13 economically important diseases. Post prediction validation menu contains the outbreak reports vs prediction. The menu bar on the RHS tabs include online GIS, state wise Livestock disease forecast, district wise Livestock disease forecast, Epi-calculator, download links for mobile app, etc. The website now hosts disease maps in the form of choropleth maps for 13 diseases in two time periods (1990-2000 and 2000-2018). Similarly, disease trends plots exhibit periodic regression plots providing future trend for the disease. On the LHS, Login menu is provided for authorized persons to login and enter disease details and other related parameters. Disease maps provide choropleth maps for 13 diseases in two time periods (1990-2000 and 2000-2018) is presented. Disease trends- Periodic regression plots are exhibited for prediction of the diseases. Auto-messaging option has been created to send the reminders in the form of text messages to concerned PI's and Co-PI's of AICRP centers for submission of outbreak reports. This message is sent weekly to all the concerned officials. Additionally, a message is sent to the concerned veterinary officers in Karnataka for initiation of preventive measures for the forewarned diseases at the block level. Plans are in place to incorporate farmers' and local vets' mobile numbers in to the list so that they may be asked to initiate preventive measures for the forewarned diseases.

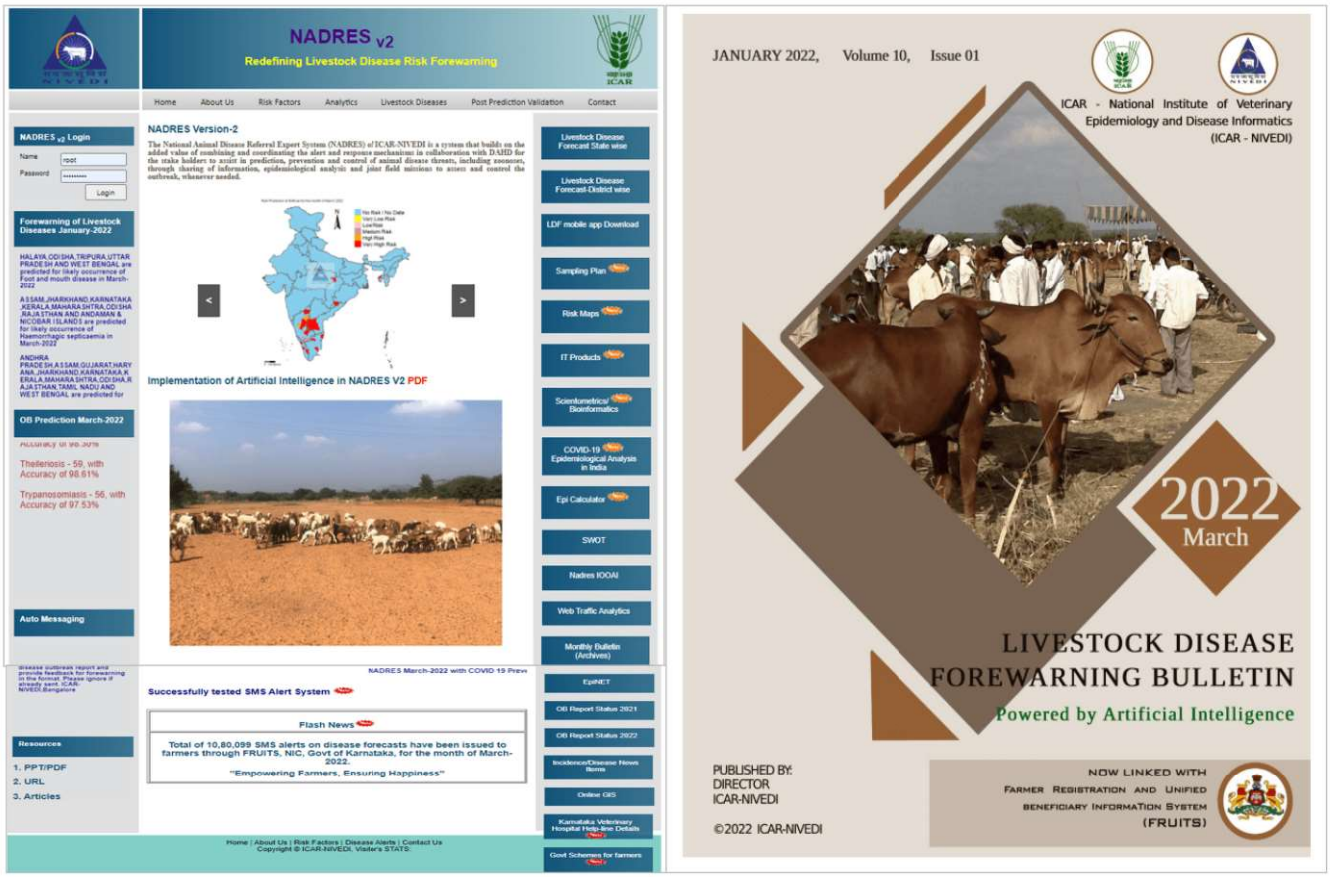


Fig 3.1. NADRES V_2 Home page

The forewarning methodology used is unique and has not been used earlier for livestock disease forewarning in India. Following few paragraphs describe about the forewarning methodology used. It is a well-known fact that weather plays an important role in the precipitation of many diseases and therefore, the climatic parameters such as land surface temperature (LST), precipitation, wind velocity, humidity etc are considered as risk parameters. These parameters along with other non-climatic parameters such as livestock population, density, Normalized Differential Vegetation Index (NDVI), soil moisture constitute the overall risk parameters. A total of 24 such parameters are collected/generated at village level and then aggregated to district level before these are used for analysis.

In addition to the output provided at interactive web portal, the NADRES output are also published in the form of monthly livestock disease forewarning bulletins. The prediction results come with a disclaimer that forewarnings do not take into account of the control measures that already in situ and also may not be realistic for those regions where the data is either unavailable or limited. This bulletin provides the likely occurrence of the 13 shortlisted diseases two months in advance at the district level, disease forewarning maps, prediction accuracy, details on diseases, species affected, clinical signs and its preventive measures.

In summary, it can be said that NADRES $_{V2}$ has underwent substantial changes not only in its internal structure but also in its physical design and can be a useful tool for visitors of the website, farmers, vets, policy makers etc.

4. Forewarning Methodology

I. Materials

Livestock disease data

Previous 10 years' livestock disease outbreak data retrieved from the NADRES database linked with Risk factors data.

Livestock population data

The population data at village level for five major livestock species viz., cattle, buffalo, sheep, goat and pigs were obtained from 20th Livestock census (2019) from Department of statistics, DAHD, GOI.

Species-wise & Category-wise Livestock Population (in thousands)					
Sl No	Species	Category	Population in 2012	Population in 2019	% Change
1	Cattle	Exotic	39732	51356	29.3
		Indigenous	151172	142106	-6
		Total	190904	193462	1.3
2	Buffalo	Total	108702	109852	1.1
3	Sheep	Exotic	3781	4088	8.1
		Indigenous	61288	70172	14.5
		Total	65069	74260	14.1
4	Goat	Total	135173	148885	10.1
5	Pig	Exotic	2456	1897	-22.8
		Indigenous	7837	7159	-8.7
		Total	10293	9056	-12
6	Yaks	Total	77	58	-24.7
7	Mithuns	Total	298	386	29.5
8	Horses & Ponies	Total	625	342	-45.3
9	Mules	Total	196	84	-57.1
10	Donkeys	Total	319	124	-61.1
11	Camels	Total	400	252	-37
Total Livestock			**512056**	**536761**	**4.8**

Meteorological and Remotely Sensed Data:

The parameters such as air temperature (^{0}C), perceptible water (mm), pressure (millibar), relative humidity (%) and sea level pressure (millibar) were extracted from National Centre for environmental prediction (NCEP). The parameters such as potential evapotranspiration (PET), Enhanced Vegetation Index (EVI), Leaf Area Index (LAI), Land Surface Temperature (LST), Normalised Difference Vegetation Index (NDVI) were extracted from remote sensed images from MODIS website (https://modis.gsfc.nasa.gov/). In brief, the MODIS products from NASA-TERRA satellite was downloaded for the Indian locations by specifying the tiles (H24V5, H25V6, H24V6, H24V7, H25V7, H25V8, H26V7, H26V6) from 2001 to till date.

The details are given below;

PRODUCT	Science Data Sets (HDF Layers)
MOD15A2H	Lai_500m(Leaf area index) 8 days average
MOD16A2	PET_500m (Total Potential Evapotranspiration) 8 days average
MOD11A2	LST_Day_1km (Daytime Land Surface Temperature) 8 days average
MOD13A1	i. 500m 16 days NDVI (Normalized Difference Vegetation Index) ii. Enhanced Vegetation Index (EVI) 16 days average

The downloaded HDF files (Datasets, which are multidimensional arrays (layers) of a homogeneous type) were converted to GeoTIFF files (single layer data) using R packages, which were later used to extract the parameters by linking it with the sinusoidal values of the Indian villages. The scale factors were multiplied for the extracted values as specified by the MODIS data products to get the values of the parameters. As shown above, the atmospherically corrected NDVI was collected on 16-day interval at 250-meter resolution using MODIS product MOD13A1 and LST was collected on 8-day interval using MOD11A2 at 1 KM resolution.

The parameters such as rainfall, soil moisture and wind speed were obtained from Global Land Data Assimilation System of NASA (https://disc.gsfc.nasa.gov). The remaining parameters were downloaded from climatic research unit (CRU) of University of East Anglia website. It is worth mentioning that the entire process of extraction, assimilation, processing and aligning have been done using R programming language and R environment. After aligning the climatic and non-climatic data with the disease and the livestock population data (aggregated at the district level), the statistical analysis was performed in the R environment.

Initially, two regression models and six machine learning models were applied to test their suitability to fit the data and in all, three models; one regression model (Generalized Linear Model (GLM) and two machine learning models, *viz.,* Gradient Boosting Machine Learning Algorithm (GBM) and Random Forest (RF), which fitted to data well were incorporated for the purpose of disease prediction. The models were trained using the case and control data available at ICAR-NIVEDI. Validation of the models were done by dividing the total observations for a particular disease into marker samples and validation samples and accuracy was tested in terms of discrimination power, which was done using Receiving Operating Characteristics (ROC), Cohen Kappa (Heildke Skill Score) and True Skill statistics (TSS). Once the models produce the probability value, it was used for categorizing the risk. Briefly, when all the models produce the p value of more than 0.5, then the highest p value is used for determining the high-risk category. If all the models or any one model produces the p value of less than 0.5, then the lowest p value was used for categorizing lower risk. This was done to minimize the false alert. Thus, the risk predictions based on the probability values ranging from 0-1 are made as follows; Very High Risk (p=0.81-1.0), High Risk (p=0.61-0.80), Moderate Risk (p=0.41-0.60), Low Risk (p=0.21-0.40), Very Low Risk (p=0.0-0.20) and No Risk (p=0.0) for the occurrence of a said disease. It is believed that categorizing districts in to various risk categories will help the stake holders to effectively utilize the available resources (money and manpower).

II.NADRES v2 Data Flow and Data Processing Diagram

A) Data Flow Diagram:

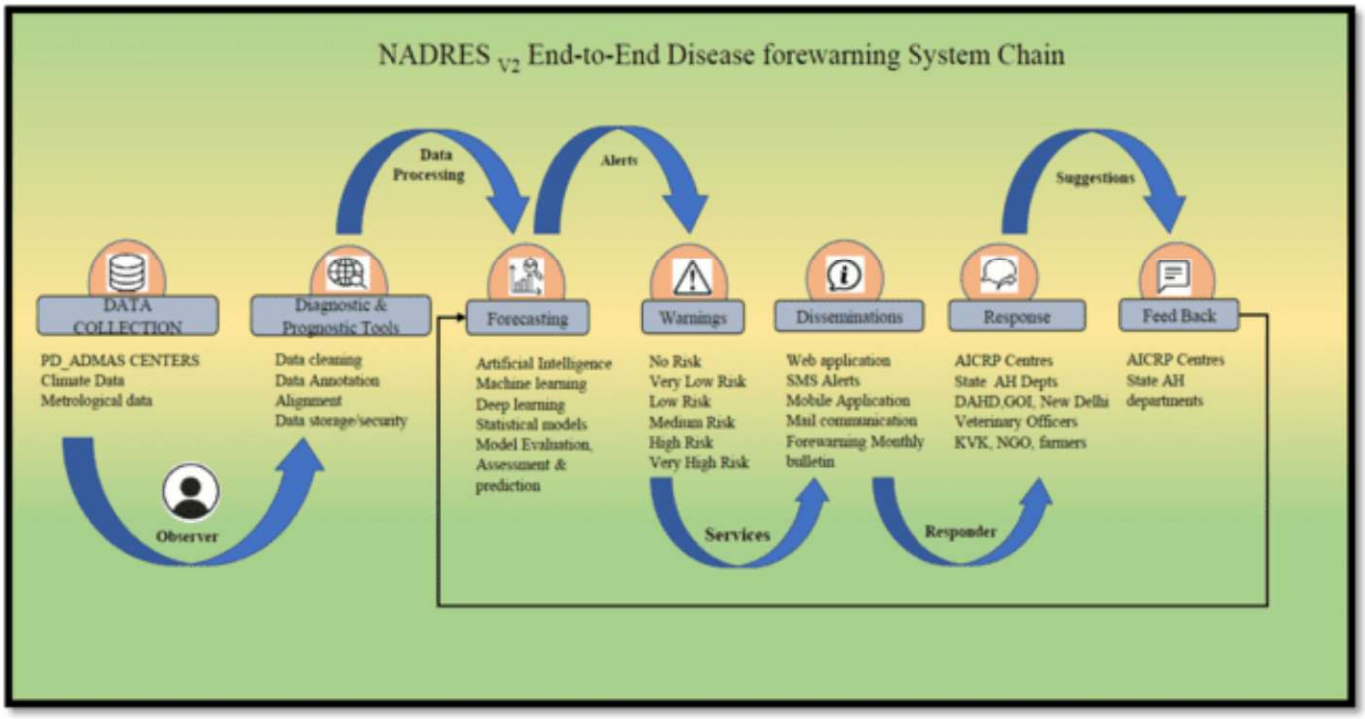


Fig 4.1. NADRES V2 Data Flow Diagram.

B) Artificial Intelligence enabled Data Capturing and Forewarning System:

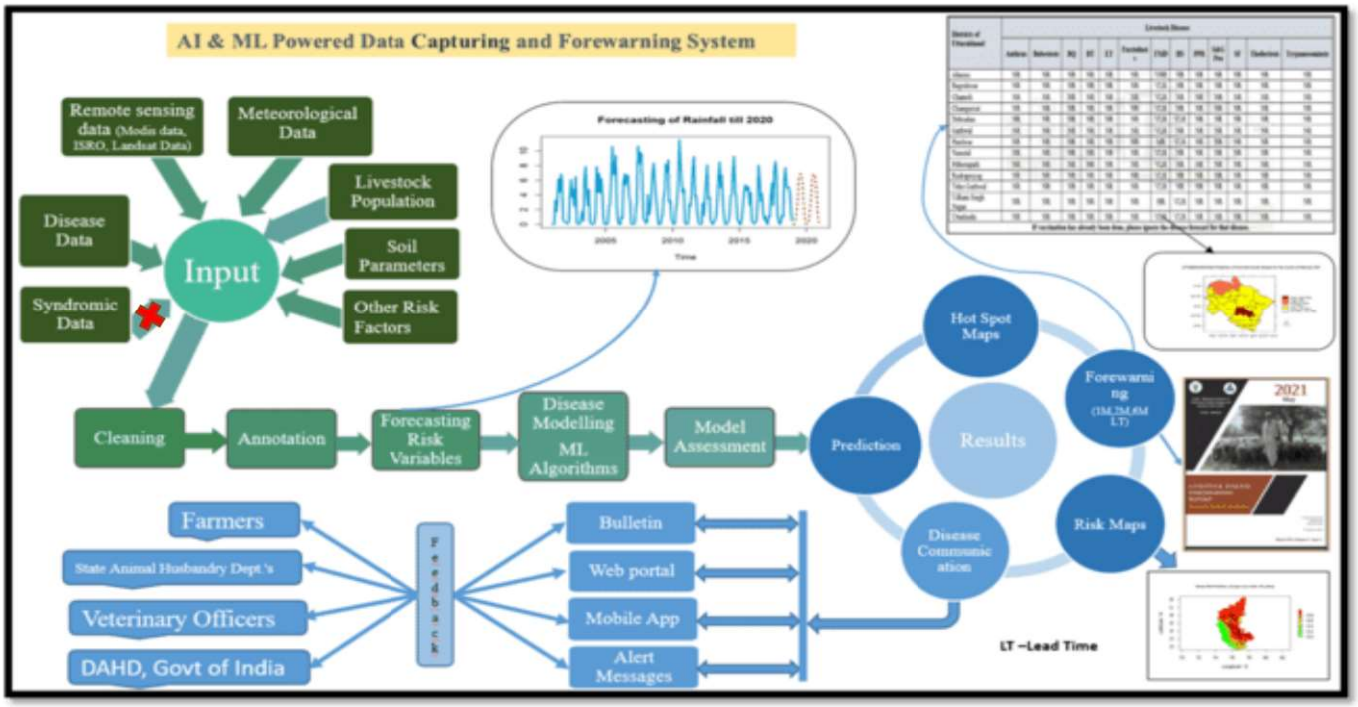


Fig 4.2. Data Capturing and Forewarning system

III. Weighted Outbreak Score

The outbreak data for the month of forecasting is extracted from NADRES database for the period of 10 years from current year. Outbreak data of 13 important livestock diseases are considered. The data is aggregated at district level and the weighted score is defined based on the number of outbreaks for each district in each month considering last 10 years. The weightage score was assigned as 0 for less than three number of outbreaks in the last 10 years for selected month, score 1 for 3–6 number of outbreaks and 2 for more than 6 outbreaks. This weightage score for each district is labelled as risk variable in building the models and risk maps.

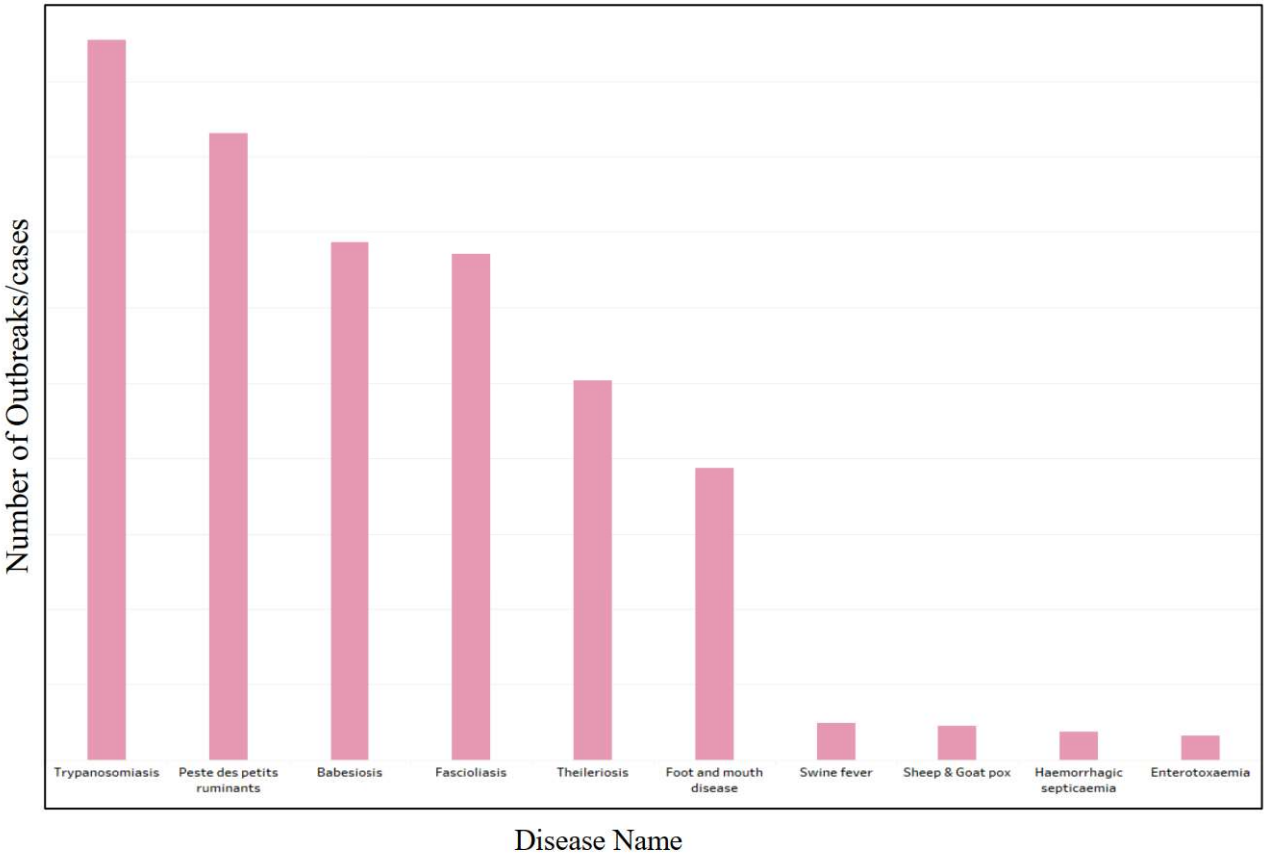


Fig 4.3. Top ten livestock diseases (2021)

IV. Forecasting of Weather Parameters

Weather forecasting has been one of the most challenging problems around the world because of both its practical value in meteorology and the popular sphere for scientific research. Weather forecast systems are among the most complex equation systems that computer has to solve. A great quantity of data, coming from satellites, ground stations and sensors located around our planet send daily information that must be used to foresee the weather situationthe in next hours and days all around. Weather forecasts provide critical information about future weather. There are various techniques involved in weather forecasting, from relatively simple observation of the sky to highly complex computerized mathematical models. Further, forecast products by Indian Metrological department were used for validationof our forecasts (https://mausam.imd.gov.in/imd_latest/contents/extendedrangeforecast.php).

Following are the basic steps of forecasting process:

1. Determine the forecast's purpose
2. Establish a time horizon
3. Select a forecasting technique
4. Gather and analyse data
5. Perform the forecast
6. Monitor the forecast and use it in prediction of disease

Statistical Models used for forecasting of weather and remotely sensed variables

ARIMA stands for Autoregressive Integrated Moving Average. ARIMA is also known as Box-Jenkins approach. Box and Jenkins claimed that non-stationary data can be made stationary by differencing the series, Y_t. The general model for Y_t is written as,

$$Y_t = \phi_1 Y_{t-1} + \phi_2 Y_{t-2} \ldots \phi_p Y_{t-p} + \epsilon_t + \theta_1 \epsilon_{t-1} + \theta_2 \epsilon_{t-2} + \ldots \theta_q \epsilon_{t-q}$$

Where, Y_t is the differenced time series value, ϕ and θ are unknown parameters and ϵ are independent identically distributed error terms with zero mean. Here, Y_t is expressed in terms of its past values and the current and past values of error terms.

The ARIMA Model combines three basic Methods:

- Auto Regression (AR) – In auto-regression the values of a given time series data are regressed on their own lagged values, which is indicated by the "p" value in the model.
- Differencing (I-for Integrated) – This involves differencing the time series data to remove the trend and convert a non-stationary time series to a stationary one. This is indicated by the "d" value in the model. If d = 1, it looks at the difference between two-time series entries, if d = 2 it looks at the differences of the differences obtained at d =1, and so forth.

- Moving Average (MA) – The moving average nature of the model is represented by the "q" value which is the number of lagged values of the error term.

This model is called Autoregressive Integrated Moving Average or ARIMA (p, d,q) of Y_t. We will follow the steps enumerated below to build our model. ARIMA models were run in 18 combinations of p, d, q. Based on the minimum AIC value, the order of ARIMA model was selected. This order was used for the prediction of all the weather parameters used in developing disease forewarning models.

V. Implementation of Principal Component Analysis

Large datasets are gradually common and are often difficult to interpret. Principal Component Analysis (PCA) is a technique for reducing the dimensionality of such datasets, increasing the interpretability but at the same time, minimizing the information loss. The PCA is employed in NADRES v2 by creating new uncorrelated variables that successively maximize the variance. This means that ` preserving as much variability as possible` translates into finding new variables that are linear functions of those in the original dataset, that successively maximize variance and that are uncorrelated with each other. Determining such new variables, the principal components (PCs) reduce to solve an eigenvalue/eigenvector problem. PCA can be based on either covariance matrix or the correlation matrix and the main use of PCA are descriptive.

In the present study, all the meteorological and remote sensing variables are considering for PCA, with correlation matrix, the final output of principal components which are independent of each were considered for further ML modelling and risk estimation.

VI. Machine Learning Models

Disease outbreak data were aligned with generated risk variables to the respective latitude and longitude, which were subjected to climate-disease modelling. A number of models were fit to aligned data and tested for accuracy in terms of discrimination power. Two regression models, Generalized Linear Models (GLM) and Generalized Additive Models (GAM) and six machine learning algorithms, i.e. Random Forest (RF), Boosted Regression Tree (BRT), Artificial Neural Network (ANN), Multiple Adaptive Regression Spline (MARS), Flexible Discriminant Analysis (FDA) and Classification Tree Analysis (CTA) were employed for disease modelling. Different modelling methods return different types of 'model object' and all these model objects could be used for the predict function to make predictions for any combinations of values of independent variables. Response plots were created to explore and understand model predictions.

The fitted models were assessed for their discriminating power using Receiving Operating Characteristic (ROC) curve, Cohen's Kappa (Heildke Skill Score) and True Skill Statistics (TSS). These measures were used to evaluate the quality of predictions based on presence-absence data. Raster Stack was used to combine the results of individual predictions by different model methods. All the models were assessed for overfitting.

The outcome of best fitted models was in probability of disease occurrence and was categorised into 6 risk levels as No risk (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (HR) and Very high risk (VHR) for enabling the stakeholders to take appropriate control measures by suitably allocating available resources.

5. Accuracy of Prediction

Serial No.	Diseases	Accuracy (%)
1.	Anthrax	99.69
2.	Babesiosis	98.77
3.	Black quarter	95.22
4.	Bluetongue	99.69
5.	Enterotoxaemia	100.00
6.	Fascioliasis	98.46
7.	Foot and mouth disease	97.22
8.	Haemorrhagic septicaemia	97.38
9.	Peste des petits ruminants	95.99
10.	Sheep & Goat pox	99.23
11.	Swine fever	100.00
12.	Theileriosis	99.54
13.	Trypanosomiasis	97.69

Aggregation and prediction of livestock diseases at district level leading to higher accuracy.

- **Formula Used:** The **Accuracy** of disease prediction was calculated using the following formula.

$$\frac{TP + TN}{Total} * 100$$

TP-True Positive Observations, TN-True Negative Observations, Total- Total observations.

- Internal Accuracy was performed using 10 years of data. Accuracy obtained was >90% for all the diseases predicted.
- Despite the power of climate and disease risk models, considerable uncertainties remain, identifying these uncertainties, highlighting importance of improved data may improve the model accuracy, realism, confidence, together with translating uncertainties in model inputs into uncertainties in model outputs, are important benefits of modelling.

6. Moran's I for clustering of Livestock diseases

Moran's I is a tool that measures spatial autocorrelation (feature similarity) based on both feature locations and feature values simultaneously. Given a set of features and an associated attribute, it evaluates whether the pattern expressed is clustered, dispersed, or random. The tool calculates the Moran's I Index value and both a Z score and p-value evaluating the significance of that index. In general, a Moran's Index value near +1.0 indicates clustering while an index value near -1.0 indicates dispersion.

Autocorrelation tool, the null hypothesis states that "there is no spatial clustering of the values associated with the geographic features in the study area". When the p-value is small and the absolute value of the Z score is large enough that it falls outside of the desired confidence level, the null hypothesis can be rejected. If the index value is greater than 0, the set of features exhibits a clustered pattern. If the value is less than 0, the set of features exhibits a dispersed pattern.

7. R Software

R is a programming language and software environment for statistical analysis, graphics representation and reporting. R is a simple and effective programming language, which includes conditionals, loops, user defined recursive functions and input and output facilities. R statistical software version 3.1.3 (version 3.4.3, R Foundation for Statistical Computing, Vienna, Austria. https://www.R-project.org/) was used as an integrated suite for data mining, calculation and graphical display. Several R packages like *openxlx, raster, RMySQL, rgdal, RColorBrewer, sqldf, sp, spdep, xlsx, plyr, randomFores, dismo, SDMTool, dplyr, tmap* and *data table*were used for data extraction, data alignment, annotation, analysis, modelling and risk mapping.

8. Forewarning of Livestock Disease for the Month of June, 2022

i). District wise Livestock Disease forewarning:

District wise Livestock Disease Risk Forewarning for June, 2022: Andaman and Nicobar

Districts of Andaman and Nicobar	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
Nicobars	NR	NR	VLR	NR	NR	***VHR***	***HR***	VLR	NR	NR	NR	NR	NR
North & Middle Andaman	NR	NR	VLR	NR	NR	***VHR***	NR	NR	NR	NR	NR	NR	NR
South Andaman	NR	NR	VLR	LR	NR	***VHR***	MR	NR	NR	MR	NR	NR	NR

If vaccinated, please ignore the disease forecast.

*No risk/No data available (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (HR),Very high risk (VHR)

District wise Livestock Disease Risk Forewarning for June, 2022: Andhra Pradesh

Districts of Andhra Pradesh	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
Anantapur	NR	NR	NR	NR	NR	NR	NR	VLR	MR	***VHR***	NR	NR	NR
Chittoor	NR	NR	VLR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
East Godavari	NR	NR	***HR***	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Guntur	NR	NR	VLR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Krishna	NR	NR	VLR	NR	NR	NR	NR	NR	VLR	***VHR***	NR	NR	NR
Kurnool	***VHR***	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Prakasam	NR	NR	VLR	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Sri Potti Sriramulu Nellore	***VHR***	NR	VLR	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Srikakulam	***VHR***	NR	***HR***	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Visakhapatnam	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Vizianagaram	NR	NR	VLR	NR	NR	NR	VLR	NR	VLR	NR	NR	NR	NR
West Godavari	NR	NR	VLR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Y.S.R.	***VHR***	NR	VLR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR

If vaccinated, please ignore the disease forecast.

*No risk/No data available (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (HR),Very high risk (VHR)

District wise Livestock Disease Risk Forewarning for June, 2022: Arunachal Pradesh

Districts of Arunachal Pradesh	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
Anjaw	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Changlang	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Dibang Valley	NR	NR	VLR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR
East Kameng	NR	NR	VLR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR
East Siang	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Kurung Kumey	NR	***VHR***	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Lohit	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Lower Dibang Valley	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Lower Subansiri	NR	NR	NR	VLR	NR	***VHR***	NR	NR	NR	NR	NR	NR	NR
Papum Pare	NR	NR	VLR	NR	NR	***HR***	VLR	NR	NR	NR	NR	NR	NR
Tawang	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Tirap	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Upper Siang	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Upper Subansiri	NR	NR	VLR	VLR	NR	***VHR***	***HR***	NR	NR	NR	NR	NR	NR
West Kameng	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
West Siang	NR	NR	VLR	NR	NR	***VHR***	***VHR***	NR	NR	NR	NR	NR	NR

If vaccinated, please ignore the disease forecast.

*No risk/No data available (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (HR),Very high risk (VHR)

District wise Livestock Disease Risk Forewarning for June, 2022: Assam

Districts of Assam	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
Baksa	NR	NR	***VHR***	VLR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Barpeta	NR	NR	***VHR***	NR	NR	***VHR***	NR	***VHR***	VLR	NR	NR	NR	NR
Bongaigaon	NR	NR	VLR	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Cachar	NR	NR	***VHR***	VLR	NR	NR	VLR	VLR	***VHR***	NR	NR	NR	NR
Chirang	NR	NR	VLR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR
Darrang	***VHR***	NR	***VHR***	NR	***VHR***	***VHR***	NR	***VHR***	VLR	NR	NR	NR	NR
Dhemaji	NR	NR	***VHR***	NR	NR	***VHR***	NR	***VHR***	NR	NR	***VHR***	***VHR***	NR
Dhubri	NR	NR	***VHR***	NR	NR	***VHR***	VLR	VLR	VLR	NR	NR	NR	NR
Dibrugarh	NR	NR	***VHR***	NR	NR	***VHR***	VLR	VLR	VLR	NR	NR	NR	NR
Dima Hasao	NR	NR	VLR	VLR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Goalpara	NR	NR	***VHR***	NR	***VHR***	NR	VLR	***VHR***	VLR	NR	NR	NR	NR
Golaghat	NR	NR	***VHR***	NR	NR	***VHR***	NR	VLR	VLR	NR	NR	NR	NR
Hailakandi	NR	NR	MR	VLR	NR	NR	VLR	VLR	VLR	NR	NR	NR	NR
Jorhat	NR	NR	***VHR***	NR	NR	***VHR***	NR	VLR	VLR	NR	***VHR***	NR	NR
Kamrup	NR	NR	MR	NR	NR	***HR***	NR	VLR	VLR	***HR***	***VHR***	NR	NR
Kamrup Metropolitan	NR	NR	***VHR***	NR	NR	***VHR***	NR	VLR	VLR	***VHR***	***VHR***	NR	NR
Karbi Anglong	NR	NR	MR	NR	NR	NR	NR	VLR	NR	***VHR***	***VHR***	***VHR***	NR
Karimganj	NR	NR	***VHR***	NR	NR	NR	VLR	VLR	***VHR***	NR	NR	NR	NR
Kokrajhar	NR	NR	***HR***	NR	NR	NR	VLR	***VHR***	VLR	NR	***VHR***	NR	NR
Lakhimpur	NR	NR	***VHR***	NR	NR	***VHR***	VLR	***HR***	NR	NR	***VHR***	NR	NR
Morigaon	NR	NR	***VHR***	NR	NR	NR	NR	***HR***	VLR	NR	NR	NR	NR

Continued

Districts of Assam	Livestock Diseases												
	Anthrax	**Babesiosis**	**BQ**	**BT**	**ET**	**Fascioliasis**	**FMD**	**HS**	**PPR**	**S&G Pox**	**SF**	**Theileriosis**	**Trypanosomosis**
Nagaon	NR	NR	VLR	NR	NR	NR	NR	VLR	VLR	***VHR***	NR	NR	NR
Nalbari	NR	NR	***VHR***	NR	NR	***VHR***	NR	***VHR***	VLR	***VHR***	NR	NR	NR
Sivasagar	NR	NR	***VHR***	NR	NR	***VHR***	NR	***HR***	NR	NR	***VHR***	NR	NR
Sonitpur	NR	NR	***VHR***	NR	NR	***HR***	NR	***VHR***	VLR	NR	NR	NR	NR
Tinsukia	NR	***VHR***	VLR	NR	NR	NR	NR	VLR	NR	NR	NR	***VHR***	NR
Udalguri	NR	NR	***VHR***	NR	NR	***VHR***	NR	***VHR***	VLR	NR	***VHR***	NR	NR

If vaccinated, please ignore the disease forecast.

*No risk/No data available (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (HR),Very high risk (VHR)

District wise Livestock Disease Risk Forewarning for June, 2022: Bihar

Districts of Bihar	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
Araria	NR	NR	NR	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Arwal	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Aurangabad	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Banka	NR	NR	VLR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Begusarai	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Bhagalpur	NR	NR	VLR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Bhojpur	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	***VHR***
Buxar	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Darbhanga	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Gaya	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Gopalganj	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Jamui	NR	NR	VLR	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Jehanabad	NR	NR	VLR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Kaimur (Bhabua)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Katihar	NR	NR	VLR	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Khagaria	NR	NR	VLR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Kishanganj	NR	NR	VLR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR
Lakhisarai	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Madhepura	NR	NR	VLR	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Madhubani	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Munger	NR	NR	VLR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Muzaffarpur	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

Continued

Districts of Bihar	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
Nalanda	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Nawada	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Pashchim Champaran	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Patna	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR
Purba Champaran	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Purnia	NR	NR	VLR	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Rohtas	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Saharsa	NR	NR	VLR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Samastipur	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Saran	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sheikhpura	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sheohar	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sitamarhi	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Siwan	NR	NR	NR	NR	NR	***VHR***	NR	NR	NR	NR	NR	NR	NR
Supaul	NR	NR	NR	NR	NR	NR	NR	NR	MR	NR	NR	NR	NR
Vaishali	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

If vaccinated, please ignore the disease forecast.

*No risk/No data available (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (HR),Very high risk (VHR)

District wise Livestock Disease Risk Forewarning for June, 2022: Chandigarh

Districts of Chandigarh	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
Chandigarh	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

If vaccinated, please ignore the disease forecast.

*No risk/No data available (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (***HR***),Very high risk (VHR)

District wise Livestock Disease Risk Forewarning for June, 2022: Chhattisgarh

Districts of Chhattisgarh	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
Bastar	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR
Bijapur	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Bilaspur	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Dakshin Bastar Dantewada	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Dhamtari	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR
Durg	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR
Janjgir-champa	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Jashpur	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Kabeerdham	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Korba	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Koriya	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mahasamund	NR	NR	NR	VLR	NR	NR	VLR	NR	VLR	NR	NR	NR	NR
Narayanpur	NR	NR	NR	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Raigarhh	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Raipur	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Rajnandgaon	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Surguja	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Uttar Bastar Kanker	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

If vaccinated, please ignore the disease forecast.

*No risk/No data available (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (HR),Very high risk (VHR)

District wise Livestock Disease Risk Forewarning for June, 2022: Dadra and Nagar Haveli

Districts of Dadra and Nagar Haveli	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
Dadra and Nagar Haveli	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

If vaccinated, please ignore the disease forecast.

*No risk/No data available (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (HR),Very high risk (VHR)

District wise Livestock Disease Risk Forewarning for June, 2022: Daman and Diu

Districts of Daman and Diu	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
Daman	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Diu	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR

If vaccinated, please ignore the disease forecast.

*No risk/No data available (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (HR),Very high risk (VHR)

District wise Livestock Disease Risk Forewarning for June, 2022: Goa

Districts of Goa	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
North Goa	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR
South Goa	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

If vaccinated, please ignore the disease forecast.

*No risk/No data available (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (HR),Very high risk (VHR)

District wise Livestock Disease Risk Forewarning for June, 2022: Gujarat

Districts of Gujarat	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
Ahmadabad	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Amreli	NR	NR	NR	NR	NR	NR	NR	NR	***HR***	NR	NR	NR	NR
Anand	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Banas Kantha	NR	NR	NR	NR	NR	NR	VLR	NR	VLR	NR	NR	NR	NR
Bharuch	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Bhavnagar	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Dohad	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Gandhinagar	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Jamnagar	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Junagadh	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Kachchh	NR	NR	NR	VLR	NR	NR	NR	NR	VLR	NR	NR	***VHR***	NR
Kheda	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mahesana	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Narmada	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Navsari	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Panch Mahals	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Patan	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Porbandar	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Rajkot	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Sabar Kantha	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Surat	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Surendranagar	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Tapi	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
The Dangs	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Vadodara	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Valsad	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

If vaccinated, please ignore the disease forecast.

*No risk/No data available (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (HR),Very high risk (VHR)

District wise Livestock Disease Risk Forewarning for June, 2022: Haryana

Districts of Haryana	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
Ambala	NR	NR	NR	LR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Bhiwani	NR	NR	NR	NR	NR	NR	NR	NR	MR	NR	NR	NR	NR
Faridabad	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Fatehabad	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Gurgaon	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Hisar	NR	NR	NR	NR	***VHR***	NR	NR	NR	***VHR***	NR	***VHR***	NR	NR
Jhajjar	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	***VHR***	NR	NR
Jind	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Kaithal	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Karnal	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Kurukshetra	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	***VHR***	NR
Mahendragarh	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Mewat	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Palwal	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Panchkula	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Panipat	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Rewari	NR	NR	VLR	NR	NR	NR	VLR	NR	VLR	NR	NR	NR	NR
Rohtak	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Sirsa	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Sonipat	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Yamunanagar	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

If vaccinated, please ignore the disease forecast.

*No risk/No data available (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (HR),Very high risk (VHR)

District wise Livestock Disease Risk Forewarning for June, 2022: Himachal Pradesh

Districts of Himachal Pradesh	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
Bilaspur	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR
Chamba	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Hamirpur	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR
Kangra	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Kinnaur	NR	NR	NR	NR	NR	NR	VLR	NR	VLR	NR	NR	NR	NR
Kullu	NR	NR	NR	VLR	NR	NR	***VHR***	NR	***VHR***	NR	NR	NR	NR
Lahul & Spiti	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR
Mandi	NR	NR	VLR	VLR	NR	NR	NR	NR	***VHR***	NR	NR	NR	NR
Shimla	NR	NR	NR	NR	NR	NR	***VHR***	NR	***HR***	***VHR***	NR	NR	NR
Sirmaur	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Solan	NR	NR	NR	NR	NR	NR	NR	***VHR***	VLR	NR	NR	NR	NR
Una	NR	NR	VLR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR

If vaccinated, please ignore the disease forecast.

*No risk/No data available (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (HR),Very high risk (VHR)

District wise Livestock Disease Risk Forewarning for June, 2022: Jammu and Kashmir

Districts of Jammu and Kashmir	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
Anantnag	NR	NR	NR	NR	NR	NR	NR	NR	NR	***HR***	NR	NR	NR
Badgam	NR	NR	VLR	VLR	NR	NR	VLR	NR	VLR	***VHR***	NR	NR	NR
Bandipore	NR	NR	VLR	VLR	NR	NR	NR	NR	VLR	***VHR***	NR	NR	NR
Baramula	NR	NR	VLR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR
Doda	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Ganderbal	NR	NR	VLR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Jammu	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Kargil	NR	NR	NR	NR	NR	NR	VLR	NR	VLR	NR	NR	NR	NR
Kathua	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Kishtwar	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Kulgam	NR	NR	NR	NR	NR	NR	NR	NR	NR	***VHR***	NR	NR	NR
Kupwara	NR	NR	VLR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR
Leh(Ladakh)	NR	NR	VLR	VLR	NR	NR	VLR	VLR	VLR	NR	NR	NR	NR
Pulwama	NR	NR	VLR	NR	NR	NR	VLR	NR	NR	***VHR***	NR	NR	NR
Punch	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Rajouri	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Ramban	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Reasi	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Samba	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Shupiyan	NR	NR	NR	VLR	NR	NR	VLR	NR	NR	***VHR***	NR	NR	NR
Srinagar	NR	NR	VLR	VLR	NR	NR	VLR	NR	VLR	NR	NR	NR	NR
Udhampur	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

If vaccinated, please ignore the disease forecast.

*No risk/No data available (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (HR),Very high risk (VHR)

District wise Livestock Disease Risk Forewarning for June, 2022: Jharkhan

Districts of Jharkhand	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
Bokaro	NR	***VHR***	***HR***	NR	***VHR***	***VHR***	***VHR***	NR	***VHR***	NR	NR	***VHR***	***VHR***
Chatra	NR	***VHR***	NR	NR	NR	***VHR***	NR	NR	NR	NR	NR	***VHR***	***VHR***
Deoghar	NR	***VHR***	***HR***	NR	NR	***VHR***	VLR	VLR	***VHR***	NR	NR	***VHR***	***VHR***
Dhanbad	NR	***VHR***	LR	NR	NR	***VHR***	***HR***	VLR	***VHR***	NR	NR	***VHR***	***VHR***
Dumka	***VHR***	***VHR***	***VHR***	NR	***VHR***	***VHR***	***HR***	***VHR***	***VHR***	NR	NR	***VHR***	***VHR***
Garhwa	NR	***VHR***	NR	NR	NR	***VHR***	NR	NR	NR	NR	NR	***VHR***	***VHR***
Giridih	NR	***VHR***	***HR***	NR	NR	***VHR***	VLR	NR	VLR	NR	NR	***VHR***	***VHR***
Godda	NR	NR	VLR	NR	NR	***VHR***	NR	VLR	VLR	NR	NR	NR	***VHR***
Gumla	NR	***VHR***	VLR	NR	NR	***VHR***	***HR***	NR	***VHR***	NR	NR	***VHR***	***VHR***
Hazaribagh	NR	***VHR***	***VHR***	NR	NR	***VHR***	***VHR***	VLR	***VHR***	NR	NR	***VHR***	***VHR***
Jamtara	NR	***VHR***	MR	NR	NR	***VHR***	NR	VLR	***VHR***	NR	NR	***VHR***	***VHR***
Khunti	NR	***VHR***	NR	NR	NR	***VHR***	VLR	NR	***VHR***	***VHR***	***VHR***	***VHR***	***VHR***
Koderma	NR	***HR***	NR	NR	NR	***VHR***	NR	NR	VLR	NR	NR	***VHR***	***VHR***
Latehar	NR	***VHR***	VLR	NR	NR	***VHR***	NR	NR	NR	NR	NR	NR	***VHR***
Lohardaga	NR	***VHR***	VLR	NR	NR	***VHR***	***HR***	NR	***VHR***	NR	NR	***VHR***	***VHR***
Pakur	NR	***VHR***	MR	NR	MR	***VHR***	***HR***	***HR***	***HR***	NR	NR	***VHR***	***HR***
Palamu	NR	***VHR***	***VHR***	NR	NR	***VHR***	VLR	VLR	MR	***HR***	NR	***HR***	***VHR***
PashchimiSinghbhum	NR	***VHR***	VLR	NR	NR	***VHR***	***HR***	***VHR***	***VHR***	***VHR***	NR	***VHR***	***VHR***
Purbi Singhbhum	NR	***VHR***	***VHR***	NR	MR	***VHR***	***HR***	***VHR***	***VHR***	***VHR***	NR	***VHR***	***VHR***
Ramgarh	NR	***VHR***	NR	NR	NR	MR	NR	NR	VLR	NR	NR	NR	***VHR***
Ranchi	NR	***VHR***	***HR***	NR	NR	***VHR***	***VHR***	NR	***VHR***	NR	NR	***VHR***	***VHR***
Sahibganj	***VHR***	***VHR***	LR	NR	***VHR***	***VHR***	***HR***	***VHR***	MR	***VHR***	***VHR***	***VHR***	***VHR***
Seraikela - Kharsawan	NR	***HR***	NR	NR	NR	***VHR***	NR	NR	VLR	NR	NR	***VHR***	***VHR***
Simdega	NR	***VHR***	NR	NR	NR	***VHR***	VLR	NR	***VHR***	NR	NR	***VHR***	***VHR***

If vaccinated, please ignore the disease forecast.

*No risk/No data available (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (HR),Very high risk (VHR)

District wise Livestock Disease Risk Forewarning for June, 2022: Karnataka

Districts of Karnataka	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
Bagalkot	NR	NR	MR	VLR	NR	MR	NR	VLR	VLR	MR	NR	NR	NR
Bangalore	NR	NR	***VHR***	VLR	NR	NR	***VHR***	VLR	***VHR***	***VHR***	NR	NR	NR
Bangalore Rural	NR	NR	VLR	VLR	NR	NR	***VHR***	NR	NR	NR	NR	NR	NR
Belgaum	NR	NR	MR	NR	***VHR***	NR	VLR	MR	MR	NR	NR	NR	NR
Bellary	***VHR***	NR	VLR	NR	NR	NR	VLR	VLR	***HR***	NR	NR	NR	NR
Bidar	NR	NR	***HR***	NR	NR	NR	VLR	VLR	VLR	NR	NR	NR	NR
Bijapur	NR	NR	VLR	NR	NR	NR	NR	NR	VLR	***VHR***	NR	NR	NR
Chamarajanagar	***VHR***	NR	VLR	VLR	NR	NR	***VHR***	***HR***	NR	NR	NR	NR	NR
Chikkaballapura	***VHR***	NR	VLR	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Chikmagalur	NR	NR	***HR***	NR	NR	NR	MR	VLR	VLR	NR	NR	NR	NR
Chitradurga	NR	NR	***HR***	NR	***VHR***	NR	***HR***	VLR	VLR	***HR***	NR	NR	NR
Dakshina Kannada	NR	NR	NR	VLR	NR	NR	***HR***	MR	VLR	NR	NR	NR	NR
Davanagere	NR	NR	***HR***	NR	***VHR***	NR	***VHR***	VLR	NR	***VHR***	NR	NR	NR
Dharwad	NR	NR	MR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Gadag	NR	NR	VLR	NR	NR	NR	VLR	VLR	VLR	NR	NR	NR	NR

Continued

Districts of Karnataka	Livestock Diseases												
	Anthrax	**Babesiosis**	**BQ**	**BT**	**ET**	**Fascioliasis**	**FMD**	**HS**	**PPR**	**S&G Pox**	**SF**	**Theileriosis**	**Trypanosomosis**
Gulbarga	NR	NR	MR	NR	***VHR***	NR	NR	VLR	NR	NR	NR	NR	NR
Hassan	***VHR***	NR	***VHR***	VLR	***VHR***	NR	***VHR***	MR	VLR	NR	NR	NR	NR
Haveri	NR	NR	***HR***	VLR	NR	NR	***VHR***	VLR	VLR	MR	NR	NR	NR
Kodagu	NR	NR	VLR	NR	NR	NR	***VHR***	NR	NR	NR	NR	NR	NR
Kolar	NR	NR	VLR	VLR	NR	NR	NR	NR	MR	NR	NR	NR	NR
Koppal	***VHR***	NR	MR	NR	***VHR***	NR	VLR	MR	NR	***VHR***	NR	NR	NR
Mandya	NR	NR	VLR	VLR	NR	NR	NR	VLR	MR	NR	NR	NR	NR
Mysore	NR	NR	***VHR***	VLR	NR	NR	***VHR***	MR	VLR	***VHR***	NR	NR	NR
Raichur	***VHR***	NR	***VHR***	NR	MR	NR	NR	VLR	VLR	NR	NR	NR	NR
Ramanagara	NR	NR	***HR***	VLR	NR	NR	***VHR***	MR	***HR***	NR	NR	***VHR***	NR
Shimoga	NR	NR	***VHR***	VLR	NR	NR	MR	VLR	MR	NR	NR	NR	NR
Tumkur	***VHR***	NR	***VHR***	VLR	***VHR***	NR	***VHR***	VLR	***VHR***	***VHR***	NR	NR	NR
Udupi	NR	NR	VLR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Uttara Kannada	NR	NR	***HR***	NR	NR	NR	***HR***	VLR	NR	NR	NR	NR	NR
Yadgir	NR	NR	VLR	NR	***VHR***	NR	NR	VLR	VLR	NR	NR	NR	NR

If vaccinated, please ignore the disease forecast.

*No risk/No data available (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (HR),Very high risk (VHR)

District wise Livestock Disease Risk Forewarning for June, 2022: Kerala

Districts of Kerala	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
Alappuzha	NR	NR	NR	NR	NR	NR	***VHR***	VLR	VLR	NR	NR	***VHR***	NR
Ernakulum	NR	***VHR***	NR	NR	NR	NR	***VHR***	NR	VLR	NR	***VHR***	***VHR***	NR
Idukki	***VHR***	NR	NR	VLR	NR	NR	***VHR***	NR	NR	NR	***VHR***	MR	NR
Kannur	NR	NR	NR	NR	NR	NR	***VHR***	***VHR***	VLR	NR	NR	***VHR***	NR
Kasaragod	NR	NR	NR	NR	NR	NR	***VHR***	VLR	VLR	NR	NR	***VHR***	NR
Kollam	NR	NR	NR	NR	NR	NR	***VHR***	***HR***	VLR	NR	NR	***VHR***	NR
Kottayam	NR	NR	NR	NR	NR	NR	***VHR***	***VHR***	NR	NR	NR	***VHR***	NR
Kozhikode	NR	NR	VLR	NR	NR	NR	***VHR***	NR	***VHR***	NR	NR	***VHR***	NR
Malappuram	NR	NR	NR	NR	NR	NR	***VHR***	***VHR***	VLR	NR	NR	***VHR***	NR
Palakkad	NR	NR	NR	NR	NR	NR	***VHR***	***HR***	VLR	NR	NR	***VHR***	NR
Pathanamthitta	***VHR***	***VHR***	NR	NR	NR	NR	***VHR***	VLR	VLR	NR	NR	***VHR***	NR
Thiruvananthapuram	NR	NR	NR	NR	NR	NR	***VHR***	***HR***	NR	NR	NR	***VHR***	NR
Thrissur	NR	***VHR***	NR	NR	NR	NR	***VHR***	***VHR***	VLR	NR	NR	NR	NR
Wayanad	NR	NR	VLR	NR	NR	NR	***VHR***	NR	NR	NR	NR	NR	NR

If vaccinated, please ignore the disease forecast.

*No risk/No data available (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (HR),Very high risk (VHR)

District wise Livestock Disease Risk Forewarning for June, 2022: Lakshadweep

Districts of Lakshadweep	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
Lakshadweep	NR	NR	NR	VLR	NR	NR	VLR	NR	NR	NR	NR	NR	NR

If vaccinated, please ignore the disease forecast.

*No risk/No data available (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (HR),Very high risk (VHR)

District wise Livestock Disease Risk Forewarning for June, 2022: Madhya Pradesh

Districts of Madhya Pradesh	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
Alirajpur	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Anuppur	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Ashoknagar	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Balaghat	NR	NR	VLR	VLR	NR	NR	NR	VLR	NR	NR	NR	NR	NR
Barwani	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Betul	NR	NR	VLR	NR	NR	NR	NR	***VHR***	NR	NR	NR	NR	NR
Bhind	NR	NR	VLR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Bhopal	NR	NR	VLR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR
Burhanpur	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Chhatarpur	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Chhindwara	NR	NR	***HR***	NR	NR	NR	NR	***VHR***	VLR	NR	NR	NR	NR
Damoh	NR	NR	NR	NR	NR	NR	VLR	NR	VLR	NR	NR	NR	NR
Datia	NR	NR	VLR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Dewas	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Dhar	NR	NR	VLR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR
Dindori	NR	NR	VLR	NR	NR	NR	VLR	***VHR***	NR	NR	NR	NR	NR
East Nimar	NR	NR	NR	NR	NR	NR	VLR	NR	VLR	NR	NR	NR	NR
Guna	NR	NR	VLR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR	NR
Gwalior	NR	NR	NR	NR	NR	NR	VLR	NR	VLR	NR	NR	NR	NR
Harda	NR	NR	VLR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR
Hoshangabad	NR	NR	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR	NR
Indore	NR	NR	VLR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR
Jabalpur	NR	NR	VLR	NR	NR	NR	VLR	***HR***	NR	NR	NR	NR	NR
Jhabua	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Katni	NR	NR	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR	NR

Continued

Districts of Madhya Pradesh	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
Khargone (West Nimar)	NR	NR	VLR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR
Mandla	NR	NR	NR	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Mandsaur	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Morena	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Narsimhapur	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Neemuch	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Panna	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Raisen	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR
Rajgarh	NR	NR	VLR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR
Ratlam	NR	NR	VLR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR
Rewa	NR	NR	VLR	NR	NR	NR	VLR	NR	VLR	NR	NR	NR	NR
Sagar	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Satna	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sehore	NR	NR	VLR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR
Seoni	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Shahdol	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Shajapur	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sheopur	NR	NR	NR	NR	NR	NR	VLR	NR	VLR	NR	NR	NR	NR
Shivpuri	NR	NR	VLR	NR	NR	NR	VLR	NR	VLR	NR	NR	NR	NR
Sidhi	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR
Singrauli	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR
Tikamgarh	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Ujjain	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR
Umaria	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Vidisha	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

If vaccinated, please ignore the disease forecast.

*No risk/No data available (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (HR),Very high risk (VHR)

District wise Livestock Disease Risk Forewarning for June, 2022: Maharashtra

Districts of Maharashtra	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
Ahmadnagar	NR	NR	NR	NR	NR	NR	VLR	NR	VLR	NR	NR	***VHR***	NR
Akola	NR	NR	VLR	NR	NR	NR	NR	NR	VLR	NR	NR	***VHR***	NR
Amravati	NR	NR	VLR	NR	NR	NR	VLR	NR	VLR	MR	NR	NR	NR
Aurangabad	NR	NR	NR	NR	NR	NR	NR	NR	***VHR***	***VHR***	NR	NR	NR
Bhandara	NR	NR	VLR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Bid	NR	NR	NR	NR	NR	NR	NR	***VHR***	VLR	NR	NR	NR	NR
Buldana	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Chandrapur	NR	NR	VLR	NR	NR	NR	VLR	VLR	VLR	NR	NR	NR	NR
Dhule	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Gadchiroli	NR	NR	VLR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Gondiya	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Hingoli	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Jalgaon	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Jalna	NR	NR	VLR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Kolhapur	NR	NR	VLR	VLR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Latur	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mumbai	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Mumbai Suburban	NR	NR	NR	VLR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Nagpur	NR	NR	VLR	NR	NR	NR	VLR	NR	VLR	NR	NR	NR	NR
Nanded	NR	NR	VLR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Nandurbar	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Nashik	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Osmanabad	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

Continued

Districts of Maharashtra	Livestock Diseases												
	Anthrax	**Babesiosis**	**BQ**	**BT**	**ET**	**Fascioliasis**	**FMD**	**HS**	**PPR**	**S&G Pox**	**SF**	**Theileriosis**	**Trypanosomosis**
Parbhani	NR	NR	VLR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Pune	***VHR***	NR	VLR	NR	NR	NR	NR	NR	VLR	***VHR***	NR	NR	NR
Raigarh	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Ratnagiri	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sangli	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Satara	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sindhudurg	NR	NR	VLR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR
Solapur	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Thane	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Wardha	NR	NR	VLR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Washim	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Yavatmal	NR	NR	VLR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR

If vaccinated, please ignore the disease forecast.

*No risk/No data available (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (HR),Very high risk (VHR)

District wise Livestock Disease Risk Forewarning for June, 2022: Manipur

Districts of Manipur	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
Bishnupur	NR	NR	VLR	NR	NR	***VHR***	VLR	VLR	VLR	NR	***VHR***	NR	NR
Chandel	NR	NR	***VHR***	VLR	NR	***VHR***	VLR	NR	NR	NR	NR	NR	NR
Churachandpur	NR	NR	***VHR***	VLR	NR	NR	VLR	VLR	NR	NR	NR	NR	NR
Imphal East	NR	NR	***HR***	VLR	NR	***VHR***	NR	NR	NR	NR	***VHR***	NR	NR
Imphal West	NR	NR	VLR	VLR	NR	***VHR***	NR	VLR	NR	NR	***VHR***	NR	NR
Senapati	NR	NR	VLR	NR	NR	***VHR***	VLR	VLR	NR	NR	NR	NR	NR
Tamenglong	NR	NR	VLR	VLR	NR	NR	VLR	***VHR***	NR	NR	***VHR***	NR	NR
Thoubal	NR	NR	VLR	VLR	NR	***VHR***	VLR	NR	NR	NR	NR	NR	NR
Ukhrul	NR	NR	VLR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR

If vaccinated, please ignore the disease forecast.

*No risk/No data available (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (HR),Very high risk (VHR)

District wise Livestock Disease Risk Forewarning for June, 2022: Meghalaya

Districts of Meghalaya	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
East Garo Hills	NR	NR	***HR***	NR	NR	NR	VLR	***HR***	NR	NR	MR	NR	NR
East Jaintia Hills	NR	NR	VLR	VLR	NR	NR	***VHR***	VLR	VLR	NR	NR	NR	NR
East Khasi Hills	***VHR***	NR	VLR	NR	NR	NR	***VHR***	NR	NR	***VHR***	***VHR***	NR	NR
Jaintia Hills	NR	NR	NR	VLR	NR	NR	***VHR***	NR	VLR	NR	NR	NR	NR
North Garo Hills	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Ribhoi	***VHR***	NR	VLR	NR	NR	NR	NR	NR	NR	***VHR***	***VHR***	NR	NR
South Garo Hills	NR	NR	VLR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR	NR
Southwest Garo Hills	NR	NR	VLR	NR	NR	NR	***VHR***	***HR***	VLR	NR	***VHR***	NR	NR
Southwest Khasi Hills	NR	NR	VLR	NR	NR	***VHR***	MR	LR	VLR	NR	NR	NR	NR
West Garo Hills	NR	NR	***HR***	NR	NR	NR	***VHR***	***HR***	NR	NR	***VHR***	NR	NR
West Khasi Hills	NR	NR	***HR***	NR	NR	NR	***VHR***	***VHR***	NR	NR	***VHR***	NR	NR

If vaccinated, please ignore the disease forecast.

*No risk/No data available (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (HR),Very high risk (VHR)

District wise Livestock Disease Risk Forewarning for June, 2022: Mizoram

Districts of Mizoram	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
Aizawl	NR	NR	VLR	VLR	NR	NR	VLR	VLR	NR	NR	NR	NR	NR
Champhai	NR	NR	***HR***	VLR	NR	NR	VLR	***HR***	NR	NR	***VHR***	NR	NR
Kolasib	NR	NR	VLR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR	NR
Lawngtlai	NR	NR	VLR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR
Lunglei	NR	NR	VLR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR
Mamit	NR	NR	VLR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR
Saiha	NR	NR	VLR	VLR	NR	NR	NR	VLR	NR	NR	NR	NR	NR
Serchhip	NR	NR	VLR	VLR	NR	NR	NR	VLR	NR	NR	NR	NR	NR

If vaccinated, please ignore the disease forecast.

*No risk/No data available (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (HR),Very high risk (VHR)

District wise Livestock Disease Risk Forewarning for June, 2022: Nagaland

Districts of Nagaland	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
Dimapur	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	***VHR***	NR	NR
Kiphire	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Kohima	NR	NR	VLR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Longleng	NR	NR	VLR	NR	NR	NR	NR	VLR	VLR	NR	***VHR***	NR	NR
Mokokchung	NR	NR	VLR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR
Mon	NR	NR	VLR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR
Peren	NR	NR	VLR	VLR	NR	NR	VLR	VLR	NR	NR	NR	NR	NR
Phek	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR	***VHR***	NR	NR
Tuensang	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	***VHR***	NR	NR
Wokha	NR	NR	VLR	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Zunheboto	NR	NR	VLR	NR	NR	NR	NR	VLR	VLR	NR	***VHR***	NR	NR

If vaccinated, please ignore the disease forecast.

*No risk/No data available (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (HR),Very high risk (VHR)

District wise Livestock Disease Risk Forewarning for June, 2022: NCT of Delhi

Districts of NCT of Delhi	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
Central	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
East	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
New Delhi	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR
North	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
North East	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
North West	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
South	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
South West	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
West	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

If vaccinated, please ignore the disease forecast.

*No risk/No data available (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (HR),Very high risk (VHR)

District wise Livestock Disease Risk Forewarning for June, 2022: Odisha

Districts of Odisha	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
Anugul	***VHR***	NR	NR	NR	NR	NR	NR	***VHR***	VLR	NR	NR	NR	NR
Balangir	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Baleshwar	NR	NR	VLR	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Bargarh	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Baudh	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Bhadrak	NR	NR	VLR	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Cuttack	NR	NR	***HR***	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Debagarh	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Dhenkanal	NR	NR	VLR	NR	NR	NR	NR	VLR	***VHR***	NR	NR	NR	NR
Gajapati	NR	NR	VLR	NR	NR	NR	VLR	MR	VLR	NR	NR	NR	NR
Ganjam	NR	NR	VLR	NR	NR	NR	VLR	VLR	VLR	NR	NR	NR	NR
Jagatsinghapur	NR	NR	VLR	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Jajapur	NR	NR	VLR	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Jharsuguda	NR	NR	NR	VLR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Kalahandi	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Kandhamal	NR	NR	VLR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR
Kendrapara	NR	NR	***HR***	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Kendujhar	NR	NR	VLR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Khordha	NR	NR	***HR***	NR	NR	NR	VLR	NR	***HR***	NR	NR	NR	NR
Koraput	***VHR***	NR	NR	VLR	NR	NR	VLR	NR	VLR	NR	NR	NR	NR
Malkangiri	NR	NR	VLR	NR	NR	NR	VLR	NR	VLR	***VHR***	NR	NR	NR

Continued

Districts of Odisha	Livestock Diseases												
	Anthrax	**Babesiosis**	**BQ**	**BT**	**ET**	**Fascioliasis**	**FMD**	**HS**	**PPR**	**S&G Pox**	**SF**	**Theileriosis**	**Trypanosomosis**
Mayurbhanj	NR	NR	VLR	NR	NR	NR	NR	VLR	***VHR***	NR	NR	NR	NR
Nabarangapur	***VHR***	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Nayagarh	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Nuapada	NR	NR	VLR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR
Puri	NR	NR	VLR	NR	NR	NR	***HR***	NR	NR	NR	NR	***HR***	NR
Rayagada	NR	NR	VLR	NR	NR	NR	VLR	NR	VLR	NR	NR	***VHR***	NR
Sambalpur	NR	NR	VLR	NR	NR	NR	NR	NR	***HR***	NR	NR	NR	NR
Subarnapur	NR	NR	VLR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Sundargarh	***HR***	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	***VHR***

If vaccinated, please ignore the disease forecast.

*No risk/No data available (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (HR),Very high risk (VHR)

District wise Livestock Disease Risk Forewarning for June, 2022: Puducherry

Districts of Puducherry	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
Karaikal	NR	***VHR***	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mahe	NR	***VHR***	NR	VLR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Puducherry	NR	***VHR***	NR	NR	NR	***VHR***	NR	NR	NR	NR	NR	NR	NR
Yanam	NR	NR	VLR	NR	NR	***VHR***	NR	VLR	VLR	NR	NR	NR	NR

If vaccinated, please ignore the disease forecast.

*No risk/No data available (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (HR),Very high risk (VHR)

District wise Livestock Disease Risk Forewarning for June, 2022: Punjab

Districts of Punjab	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
Amritsar	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Barnala	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Bathinda	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Faridkot	NR	***VHR***	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Fatehgarh Sahib	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Firozpur	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	***VHR***	NR
Gurdaspur	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Hoshiarpur	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Jalandhar	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Kapurthala	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Ludhiana	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mansa	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Moga	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Muktsar	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Patiala	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Rupnagar	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sahibzada Ajit Singh Nagar	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sangrur	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Shahid Bhagat Singh Nagar	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Tarn Taran	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

If vaccinated, please ignore the disease forecast.

*No risk/No data available (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (HR),Very high risk (VHR)

District wise Livestock Disease Risk Forewarning for June, 2022: Rajasthan

Districts of Rajasthan	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fasciolia sis	FMD	HS	PPR	S&G Pox	SF	Theileriosi s	Trypanosomosis
Ajmer	NR	NR	VLR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Alwar	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR
Banswara	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Baran	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Barmer	NR	NR	NR	NR	NR	NR	NR	VLR	MR	NR	NR	NR	NR
Bharatpur	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Bhilwara	NR	NR	VLR	NR	NR	NR	VLR	NR	VLR	NR	NR	NR	NR
Bikaner	NR	NR	VLR	NR	NR	NR	VLR	NR	VLR	NR	NR	NR	NR
Bundi	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR
Chittaurgarh	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR
Churu	NR	NR	VLR	NR	***VHR***	NR	NR	VLR	***VHR***	NR	NR	NR	NR
Dausa	NR	NR	VLR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Dhaulpur	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Dungarpur	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Ganganagar	NR	NR	VLR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR
Hanumangarh	NR	NR	NR	VLR	NR	NR	NR	NR	NR	***VHR***	NR	NR	NR
Jaipur	NR	NR	VLR	NR	***VHR***	NR	***HR***	VLR	VLR	NR	NR	NR	NR
Jaisalmer	NR	NR	VLR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Jalor	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR
Jhalawar	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Jhunjhunun	NR	NR	NR	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Jodhpur	NR	NR	VLR	NR	NR	NR	NR	VLR	MR	NR	NR	NR	NR
Karauli	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR

Continued

Districts of Rajasthan	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fasciolia sis	FMD	HS	PPR	S&G Pox	SF	Theileriosi s	Trypanosomosis
Kota	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Nagaur	NR	NR	VLR	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Pali	NR	NR	VLR	VLR	NR	NR	VLR	VLR	VLR	NR	NR	NR	NR
Pratapgarh	NR	NR	VLR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Rajsamand	NR	MR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sawai Madhopur	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sikar	NR	NR	VLR	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Sirohi	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR
Tonk	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Udaipur	NR	***VHR***	VLR	NR	NR	NR	***VHR***	VLR	VLR	NR	NR	NR	NR

If vaccinated, please ignore the disease forecast.

*No risk/No data available (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (HR),Very high risk (VHR)

District wise Livestock Disease Risk Forewarning for June, 2022: Sikkim

Districts of Sikkim	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fasciolia sis	FMD	HS	PPR	S&G Pox	SF	Theileriosi s	Trypanosomosis
East District	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR
North District	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR
South District	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
West District	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

If vaccinated, please ignore the disease forecast.

*No risk/No data available (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (HR),Very high risk (VHR)

District wise Livestock Disease Risk Forewarning for June, 2022: Tamil Nadu

Districts of Tamil Nadu	Livestock Disease												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
Ariyalur	NR	NR	VLR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Chennai	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Coimbatore	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Cuddalore	NR	NR	***VHR***	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Dharmapuri	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Dindigul	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Erode	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Kancheepuram	NR	NR	***VHR***	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Kanniyakumari	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Karur	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Krishnagiri	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Madurai	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Nagapattinam	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR
Namakkal	NR	NR	VLR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Perambalur	NR	NR	VLR	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Pudukkottai	NR	NR	VLR	VLR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Ramanathapuram	NR	NR	VLR	VLR	NR	NR	NR	VLR	NR	NR	NR	NR	NR
Salem	NR	NR	VLR	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Sivaganga	NR	NR	VLR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Thanjavur	NR	NR	VLR	NR	NR	NR	NR	VLR	NR	***VHR***	NR	NR	NR
The Nilgiris	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Theni	NR	NR	VLR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Thiruvallur	***VHR***	NR	VLR	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Thiruvarur	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Thoothukkudi	NR	NR	NR	NR	NR	NR	NR	NR	VLR	***VHR***	NR	NR	NR

Continued

Districts of Tamil Nadu	Livestock Disease												
	Anthrax	**Babesiosis**	**BQ**	**BT**	**ET**	**Fascioliasis**	**FMD**	**HS**	**PPR**	**S&G Pox**	**SF**	**Theileriosis**	**Trypanosomosis**
Tiruchirappalli	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Tirunelveli	NR	NR	NR	VLR	NR	NR	VLR	VLR	VLR	NR	NR	NR	NR
Tiruppur	NR	NR	NR	NR	NR	NR	NR	NR	***HR***	NR	NR	NR	NR
Tiruvannamalai	NR	NR	VLR	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Vellore	***VHR***	NR	VLR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR
Viluppuram	***VHR***	NR	***HR***	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Virudhunagar	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR

If vaccinated, please ignore the disease forecast.

*No risk/No data available (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (HR),Very high risk (VHR)

District wise Livestock Disease Risk Forewarning for June, 2022: Telangana

Districts of Telangana	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
Adilabad	NR	NR	VLR	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Hyderabad	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Karimnagar	NR	NR	NR	NR	NR	NR	VLR	NR	NR	***VHR***	NR	NR	NR
Khammam	NR	NR	VLR	NR	NR	NR	NR	NR	NR	***VHR***	NR	NR	NR
Mahbubnagar	NR	NR	VLR	NR	***VHR***	NR	NR	VLR	VLR	NR	NR	NR	NR
Medak	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Nalgonda	NR	NR	VLR	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Nizamabad	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Rangareddy	NR	NR	VLR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Warangal	NR	NR	MR	NR	***VHR***	NR	VLR	NR	VLR	NR	NR	NR	NR

If vaccinated, please ignore the disease forecast.

*No risk/No data available (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (HR),Very high risk (VHR)

District wise Livestock Disease forewarning for June, 2022: Tripura

Districts of Tripura	Livestock Disease												
	Ant*hr*ax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
Dhalai	NR	NR	VLR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR
North Tripura	NR	NR	VLR	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
South Tripura	NR	NR	VLR	NR	NR	***HR***	***VHR***	VLR	MR	***VHR***	NR	NR	NR
West Tripura	NR	NR	VLR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR

If vaccinated, please ignore the disease forecast.

*No risk/No data available (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (HR),Very high risk (VHR)

District wise Livestock Disease Risk Forewarning for June, 2022: Uttar Pradesh

Districts of Uttar Pradesh	Livestock Disease												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
Agra	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Aligarh	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Allahabad	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	***VHR***	***VHR***
Ambedkar Nagar	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Amethi	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Auraiya	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Azamgarh	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Baghpat	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	MR
Bahraich	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	***HR***
Ballia	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Balrampur	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Banda	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Bara Banki	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	***VHR***
Bareilly	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Basti	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	***VHR***
Bijnor	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Budaun	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Bulandshahr	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	***HR***
Chandauli	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Chitrakoot	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR
Deoria	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Etah	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	***VHR***
Etawah	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Faizabad	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Farrukhabad	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

Continued

Districts of Uttar Pradesh	Livestock Disease												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
Fatehpur	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	MR
Firozabad	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Gautam Buddha Nagar	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Ghaziabad	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Ghazipur	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Gonda	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Gorakhpur	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	MR	***VHR***
Hamirpur	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR
Hapur	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Hardoi	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	***HR***
Jalaun	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Jaunpur	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	MR
Jhansi	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Jyotiba Phule Nagar	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR
Kannauj	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Kanpur Dehat	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Kanpur Nagar	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Kanshiram Nagar	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Kaushambi	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Kheri	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Kushinagar	NR	***VHR***	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	***VHR***
Lalitpur	NR	NR	VLR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR
Lucknow	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
MahaJanuarya Nagar	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mahoba	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR

Continued

Districts of Uttar Pradesh	Livestock Disease												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
Mahrajganj	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mainpuri	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	***VHR***
Mathura	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR
Mau	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Meerut	NR	NR	NR	NR	NR	NR	NR	***HR***	NR	NR	NR	NR	NR
Mirzapur	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	***VHR***
Moradabad	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	***HR***
Muzaffarnagar	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Pilibhit	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Pratapgarh	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	***HR***
Rae Bareli	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	***VHR***	MR
Rampur	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Saharanpur	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	***HR***
Sambhal	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Sant Kabir Nagar	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sant Ravidas Nagar	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Shahjahanpur	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Shamli	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Shrawasti	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Siddharthnagar	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sitapur	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sonbhadra	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	***VHR***
Sultanpur	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	***VHR***
Unnao	NR	NR	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR	NR
Varanasi	NR	NR	NR	NR	NR	***VHR***	NR	NR	NR	NR	NR	NR	NR

If vaccinated, please ignore the disease forecast.

*No risk/No data available (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (HR),Very high risk (VHR)

District wise Livestock Disease Risk Forewarning for June, 2022: Uttarakhand

Districts of Uttarakhand	Livestock Disease												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
Almora	NR	NR	NR	NR	NR	NR	NR	VLR	***VHR***	NR	NR	NR	NR
Bageshwar	NR	NR	NR	VLR	NR	NR	NR	NR	***HR***	NR	NR	NR	NR
Chamoli	NR	NR	NR	NR	NR	NR	VLR	VLR	VLR	NR	NR	NR	NR
Champawat	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Dehradun	NR	NR	VLR	NR	NR	NR	VLR	VLR	VLR	NR	NR	NR	NR
Garhwal	NR	NR	VLR	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Hardwar	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR
Nainital	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Pithoragarh	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Rudraprayag	NR	NR	NR	VLR	NR	NR	VLR	VLR	VLR	NR	NR	NR	NR
Tehri Garhwal	NR	NR	VLR	NR	NR	NR	VLR	VLR	VLR	NR	NR	NR	NR
Udham Singh Nagar	NR	NR	NR	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Uttarkashi	NR	NR	VLR	VLR	NR	NR	VLR	NR	VLR	NR	NR	NR	NR

If vaccinated, please ignore the disease forecast.

*No risk/No data available (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (HR),Very high risk (VHR)

District wise Livestock Disease Risk Forewarning for June, 2022: West Bengal

Districts of West Bengal	Livestock Disease												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
Bankura	NR	NR	***HR***	VLR	NR	NR	***HR***	***VHR***	***HR***	NR	NR	NR	NR
Bardhhaman	***VHR***	NR	***VHR***	NR	NR	NR	NR	***VHR***	***HR***	NR	NR	***VHR***	***VHR***
Birbhum	NR	NR	***VHR***	NR	NR	NR	NR	***VHR***	***VHR***	NR	NR	NR	NR
Dakshin Dinajpur	NR	NR	***VHR***	NR	NR	NR	NR	VLR	***VHR***	NR	NR	***VHR***	NR
Darjiling	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Haora	NR	NR	***VHR***	NR	NR	NR	NR	VLR	MR	***VHR***	NR	***VHR***	NR
Hugli	NR	NR	***VHR***	VLR	NR	NR	NR	VLR	VLR	NR	NR	***VHR***	***VHR***
Jalpaiguri	NR	NR	MR	VLR	NR	NR	NR	***HR***	NR	NR	NR	NR	NR
Koch Bihar	NR	NR	***HR***	NR	NR	NR	NR	***VHR***	VLR	NR	NR	NR	NR
Kolkata	NR	NR	NR	NR	NR	***VHR***	NR	NR	MR	NR	NR	NR	NR
Maldah	NR	NR	***VHR***	NR	NR	NR	NR	VLR	***HR***	NR	NR	NR	NR
Murshidabad	***VHR***	NR	***HR***	VLR	NR	NR	NR	***HR***	MR	NR	NR	NR	NR
Nadia	NR	NR	VLR	NR	NR	NR	NR	***VHR***	VLR	NR	NR	NR	NR
North Twenty-Four Parganas	NR	NR	***VHR***	VLR	NR	NR	VLR	NR	VLR	***VHR***	NR	***VHR***	NR
Paschim Medinipur	NR	NR	***VHR***	VLR	NR	NR	***VHR***	***VHR***	***HR***	NR	NR	MR	NR
Purba Medinipur	NR	NR	VLR	NR	NR	NR	VLR	VLR	VLR	NR	NR	NR	NR
Puruliya	NR	***VHR***	VLR	NR	NR	***VHR***	NR	LR	***HR***	NR	NR	NR	NR
South Twenty Four Parganas	NR	NR	MR	NR	NR	NR	NR	VLR	VLR	NR	NR	***VHR***	NR
Uttar Dinajpur	NR	NR	VLR	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR

If vaccinated, please ignore the disease forecast.

*No risk/No data available (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (HR),Very high risk (VHR)

II) Glimpse about the risk of predicted diseases:

The Livestock disease risk obtained based on the Machine Learning algorithm were further categorized into risk events using High Risk and Very High Risk.

1. Andaman and Nicobar

Sl. No	Disease prone districts	Number of districts prone for disease	Disease Name
1.	Nicobars, North & Middle Andaman and South Andaman	Three	Fascioliasis
2.	Nicobars	One	Foot and Mouth Disease

2. Andhra Pradesh

Sl. No	Disease prone districts	Number of districts prone for disease	Disease Name
1.	Kurnool, Sri Potti Sriramulu Nellore, Srikakulam and Y.S.R.	Four	Antrax
2.	East Godavari and Srikakulam	Two	Black Quarter
3.	Anantapur and Krishna	Two	Sheep & Goat pox

3. Arunachal Pradesh

Sl. No	Disease prone districts	Number of districts prone for disease	Disease Name
1.	Kurung Kumey	One	Babesiosis
2.	Lower Subansiri, Papum Pare, Upper Subansiri and West Siang	Four	Fascioliasis
3.	Upper Subansiri and West Siang	Two	Foot and Mouth Disease

4. Assam

Sl. No	Disease prone districts	Number of districts prone for disease	Disease Name
1.	Darrang	One	Antrax
2.	Tinsukia	One	Babesiosis
3.	Baksa, Barpeta, Cachar, Darrang, Dhemaji, Dhubri, Dibrugarh, Goalpara, Golaghat, Jorhat, Kamrup Metropolitan, Karimganj, Kokrajhar, Lakhimpur, Morigaon, Nalbari, Sivasagar, Sonitpur and Udalguri	Nineteen	Black Quarter
4.	Darrang and Goalpara	Two	Enterotoxaemia
5.	Barpeta, Darrang, Dhemaji, Dhubri, Dibrugarh, Golaghat, Jorhat, Kamrup, Kamrup Metropolitan, Lakhimpur, Nalbari, Sivasagar, Sonitpur and Udalguri	Fourteen	Fascioliasis
6.	Barpeta, Darrang, Dhemaji, Goalpara, Kokrajhar, Lakhimpur, Morigaon, Nalbari, Sivasagar, Sonitpur and Udalguri	Eleven	Haemorrhagic Septicaemia
7.	Cachar and Karimganj	Two	Peste des Petits Ruminants
8.	Kamrup, Kamrup Metropolitan, Karbi Anglong, Nagaon and Nalbari	Five	Sheep & Goat pox
9.	Dhemaji, Jorhat, Kamrup, Kamrup Metropolitan, Karbi Anglong, Kokrajhar, Lakhimpur, Sivasagar and Udalguri	Nine	Swine Fever
10.	Dhemaji, Karbi Anglong and Tinsukia	Three	Theileriosis

5. Bihar

Sl. No	Disease prone districts	Number of districts prone for disease	Disease Name
1.	Siwan	One	Fascioliasis
2.	Bhojpur	One	Trypanosomiasis

6. Gujarat

Sl. No	Disease prone districts	Number of districts prone for disease	Disease Name
1.	Amreli	One	Peste des Petits Ruminants
2.	Kachchh	One	Theileriosis

7. Haryana

Sl. No	Disease prone districts	Number of districts prone for disease	Disease Name
1.	Hisar	One	Enterotoxaemia
2.	Hisar	One	Peste des Petits Ruminants
3.	Hisar and Jhajjar	Two	Swine Fever
4.	Kurukshetra	One	Theileriosis

8. Himachal Pradesh

Sl. No	Disease prone districts	Number of districts prone for disease	Disease Name
1.	Kullu and Shimla	Two	Foot and Mouth Disease
2.	Solan	One	Haemorrhagic Septicaemia
3.	Kullu, Mandi and Shimla	Three	Peste des Petits Ruminants
4.	Shimla	One	Sheep & Goat pox

9. Jammu & Kashmir

Sl. No	Disease prone districts	Number of districts prone for disease	Disease Name
1.	Anantnag, Badgam, Bandipore, Kulgam, Pulwama and Shupiyan	Six	Sheep & Goat pox

10. Jharkhand

Sl. No	Disease prone districts	Number of districts prone for disease	Disease Name
1.	Dumka and Sahibganj	Two	Antrax
2.	All districts except Godda	Twenty-three	Babesiosis
3.	Bokaro, Deoghar, Dumka, Giridih, Hazaribagh, Palamu, Purbi Singhbhum and Ranchi	Eight	Black Quarter
4.	Bokaro, Dumka and Sahibganj	Three	Enterotoxaemia
5.	All districts except Ramgarh	Twenty-three	Fascioliasis
6.	Bokaro, Dhanbad, Dumka, Gumla, Hazaribagh, Lohardaga, Pakur, Pashchimi Singhbhum, Purbi Singhbhum, Ranchi and Sahibganj	Eleven	Foot and Mouth Disease
7.	Dumka, Pakur, Purbi Singhbhum, Pashchimi Singhbhum and Sahibganj	Five	Haemorrhagic Septicaemia
8.	Bokaro, Deoghar, Dhanbad, Dumka, Gumla, Hazaribagh, Jamtara, Khunti, Lohardaga, Pakur, Pashchimi Singhbhum, Purbi Singhbhum, Ranchi and Sahibganj	Fourteen	Peste des Petits Ruminants
9.	Khunti, Palamu, Pashchimi Singhbhum, Purbi Singhbhum and Sahibganj	Five	Sheep & Goat pox
10.	Khunti and Sahibganj	Two	Swine Fever
11.	All twenty-four districts except Godda, Latehar and Ramgarh	Twenty-one	Theileriosis
12.	All districts	Twenty-four	Trypanosomosis

11. Karnataka

Sl. No	Disease prone districts	Number of districts prone for disease	Disease Name
1.	Bellary, Chamarajanagar, Chikkaballapura, Hassan, Koppal, Raichur and Tumkur	Seven	Anthrax
2.	Bangalore, Bidar, Chikmagalur, Chitradurga, Davanagere, Hassan, Haveri, Mysore, Raichur, Ramanagara, Shimoga, Tumkur and Uttara Kannada	Thirteen	Black Quarter
3.	Belgaum, Chitradurga, Davanagere, Gulbarga, Hassan, Koppal, Tumkur and Yadgir	Eight	Enterotoxaemia
4.	Bangalore, Bangalore Rural, Chamarajanagar, Chitradurga, Dakshina Kannada, Davanagere, Hassan, Haveri, Kodagu, Mysore, Ramanagara, Tumkur and Uttara Kannada	Thirteen	Foot and Mouth Disease
5.	Chamarajanagar	One	Haemorrhagic Septicaemia
6.	Bangalore, Bellary, Ramanagara and Tumkur	Four	Peste des Petits Ruminants
7.	Bangalore, Bijapur, Chitradurga, Davanagere, Koppal, Mysore and Tumkur	Seven	Sheep & Goat pox
8.	Ramanagara	One	Theileriosis

12. Kerala

Sl. No	Disease prone districts	Number of districts prone for disease	Disease Name
1.	Idukki and Pathanamthitta	Two	Anthrax
2.	Ernakulam, Pathanamthitta and T1issur	Three	Babesiosis
3.	All districts	Fourteen	Foot and Mouth Disease
4.	Kannur, Kollam, Kottayam, Malappuram, Palakkad, Thiruvananthapuram and Thrissur	Seven	Haemorrhagic Septicaemia
5.	Kozhikode	One	Peste des Petits Ruminants
6.	Ernakulam and Idukki	Two	Swine Fever
7.	All districts except Idukki, T1issur and Wayanad	Eleven	Theileriosis

13. Madhya Pradesh

Sl. No	Disease prone districts	Number of districts prone for disease	Disease Name
1.	Chhindwara	One	Black Quarter
2.	Betul, Chhindwara, Dindori and Jabalpur	Four	Haemorrhagic Septicaemia

14. Maharashtra

Sl. No	Disease prone districts	Number of districts prone for disease	Disease Name
1.	Pune	One	Anthrax
2.	Bid	One	Haemorrhagic Septicaemia
3.	Aurangabad	One	Peste desPetitsRuminants
4.	Aurangabad and Pune	Two	Sheep & Goat pox
5.	Ahmadnagar and Akola	Two	Theileriosis

15. Manipur

Sl. No	Disease prone districts	Number of districts prone for disease	Disease Name
1.	Chandel, Churachandpur and Imphal East	Three	Black Quarter
2.	All nine districts except Churachandpur, Tamenglong and Uk1ul	Six	Fascioliasis
4.	Tamenglong	One	Haemorrhagic Septicaemia
5.	Bishnupur, Imphal East, Imphal West and Tamenglong	Four	Swine Fever

16. Meghalaya

Sl. No	Disease prone districts	Number of districts prone for disease	Disease Name
1.	East Khasi Hills and Ribhoi	Two	Anthrax
2.	East Garo Hills, West Garo Hills and West Khasi Hills	Three	Black Quarter
3.	Southwest Khasi Hills	One	Fascioliasis
4.	East Jaintia Hills, East Khasi Hills, Jaintia Hills, Southwest, Garo Hills, West Garo Hills and West Khasi Hills	Six	Foot and Mouth Disease
5.	East Garo Hills, Southwest Garo Hills, West Garo Hills and West Khasi Hills	Four	Haemorrhagic Septicaemia
6.	East Khasi Hills and Ribhoi	Two	Sheep & Goat pox
7.	East Khasi Hills, Ribhoi, Southwest Garo Hills, West Garo Hills and West Khasi Hills	Five	Swine Fever

17. Mizoram

Sl. No	Disease prone districts	Number of districts prone for disease	Disease Name
1.	Champhai	One	Black Quarter
2.	Champhai	One	Haemorrhagic Septicaemia
3.	Champhai	One	Swine fever

18. Nagaland

Sl. No	Disease prone districts	Number of districts prone for disease	Disease Name
1.	Dimapur, Longleng, Phek, Tuensang and Zunheboto	Five	Swine fever

19. Odisha

Sl. No	Disease prone districts	Number of districts prone for disease	Disease Name
1.	Anugul, Koraput, Nabarangapur and Sundargarh	Four	Anthrax
2.	Cuttack, Kendrapara and Khordha	Three	Black Quarter
3.	Puri	One	Foot and Mouth Disease
4.	Anugul	One	Haemorrhagic Septicaemia
5.	Dhenkanal, Khordha, Mayurbhanj and Sambalpur	Four	Peste desPetitsRuminants
6.	Malkangiri	One	Sheep & Goat pox
7.	Puri and Rayagada	Two	Theileriosis
8.	Sundargarh	One	Trypanosomosis

20. Puducherry

Sl. No	Disease prone districts	Number of districts prone for disease	Disease Name
1.	Karaikal, Mahe and Puducherry	Three	Babesiosis
2.	Puducherry and Yanam	Two	Fascioliasis

21. Punjab

Sl. No	Disease prone districts	Number of districts prone for disease	Disease Name
1.	Faridkot	One	Babesiosis
2.	Firozpur	One	Theileriosis

22. Rajasthan

Sl. No	Disease prone districts	Number of districts prone for disease	Disease Name
1.	Udaipur	One	Babesiosis
3.	Churu and Jaipur	Two	Enterotoxaemia
4.	Jaipur and Udaipur	Two	Foot and Mouth Disease
6.	Churu	One	Peste desPetitsRuminants
8.	Hanumangarh	One	Sheep & Goat pox

23. Tamil Nadu

Sl. No	Disease prone districts	Number of districts prone for disease	Disease Name
1.	Thiruvallur, Vellore and Viluppuram	Three	Anthrax
2.	Cuddalore, Kancheepuram and Viluppuram	Three	Black Quarter
3.	Tiruppur	One	Peste desPetitsRuminants
4.	Thanjavur and Thoothukkudi	Two	Sheep & Goat pox

24. Telangana

Sl. No	Disease prone districts	Number of districts prone for disease	Disease Name
1.	Mahbubnagar and Warangal	Two	Enterotoxaemia
2.	Karimnagar and Khammam	Two	Sheep & Goat pox

25. Tripura

Sl. No	Disease prone districts	Number of disease prone for districts	Disease Name
1.	South Tripura	One	Fascioliasis
2.	South Tripura	One	Foot and Mouth Disease
3.	South Tripura	One	Sheep & Goat pox

26. Uttar Pradesh

Sl. No	Disease prone districts	Number of districts prone for disease	Disease Name
1.	Kushinagar	One	Babesiosis
2.	Varanasi	One	Fascioliasis
3.	Meerut	One	Haemorrhagic Septicaemia
4.	Allahabad and Rae Bareli	Two	Theileriosis
5.	Allahabad, Ba1aich, Bara Banki, Basti, Bulandsha1, Etah, Gorakhpur, Hardoi, Kushinagar, Mainpuri, Mirzapur, Moradabad, Pratapgarh, Saharanpur, Sonbhadra and Sultanpur	Sixteen	Trypanosomosis

27. Uttarakhand

Sl. No	Disease prone districts	Number of districts prone for disease	Disease Name
1.	Almora and Bageshwar	Two	Peste desPetitsRuminants

28. West Bengal

Sl. No	Disease prone districts	Number of districts prone for disease	Disease Name
1.	Barddhaman and Murshidabad	Two	Anthrax
2.	Puruliya	One	Babesiosis
3.	Bankura, Barddhaman, Birbhum, Dakshin Dinajpur, Haora, Hugli, Koch Bihar, Maldah, Murshidabad, North Twenty Four Parganas, Paschim Medinipur	Eleven	Black Quarter
4.	Kolkata and Puruliya	Two	Fascioliasis
5.	Bankura and Paschim Medinipur	Two	Foot and Mouth Disease
6.	Bankura, Barddhaman, Birbhum, Jalpaiguri, Koch Bihar, Murshidabad, Nadia and Paschim Medinipur	Eight	Haemorrhagic Septicaemia
7.	Bankura, Barddhaman, Birbhum, Dakshin Dinajpur, Maldah, Paschim Medinipur, Puruliya	Seven	Peste desPetitsRuminants
8.	Haora and North Twenty Four Parganas	Two	Sheep & Goat pox
9.	Barddhaman, Dakshin Dinajpur, Haora, Hugli, North Twenty Four Parganas, South Twenty Four Parganas	Six	Theileriosis
10.	Barddhaman and Hugli	Two	Trypanosomosis

iii) Diseases, Species affected Clinical signs and its preventive measures.

Sl No.	Disease	Species Affected	Clinical Signs	Preventive Measures
1	Anthrax (AX)	Most of the mammals and ruminants are highly susceptible. Pigs and Horses are moderately susceptible. Carnivores are relatively resistant.	Convulsion and sudden death with oozing of blood from natural orifices such as rectum and nose prior to death. Occasionally oedema develops in the throat and shoulder over a period of one week before death.	Ring vaccination and reporting of the disease is advised. Vaccination to be done in consultation with the veterinarians and as decided by state animal husbandry authorities. Strict biosecurity measures may be followed. Carcass may be disposed by deep burying covered with lime powder. Contaminated area may be disinfected with 4% formalin or 10% caustic soda. Grazing area may be restricted.
2	Babesiosis (BA)	Cattle. Cross breeds are more susceptible.	High temperature, jaundice like symptoms, yellowish mucosal membrane of eye, rectum and coffee colour urine.	Periodical application of acaricides in and around the animal shed and on the animals. For therapeutic application, Diaminazine or Imidocarb can be useful.
3.	Black Quarter (BQ)	Common disease of cattle and sheep, but occasionally goats and pigs also suffer from the disease.	High fever and lameness followed by swelling in the neck, shoulder, lumbar, gluteal and sacral regions. Skin over the affected area become dark and crepitate on palpation. Loss of feed intake, colic, lateral recumbency, dyspnoea and death.	Affected animals may be treated with suitable antibiotics. Vaccination to be done in consultation with the veterinarians and as decided by state animal husbandry authorities. Strict biosecurity measures may be followed. Grazing area may be restricted. Carcass may be disposed hygienically.

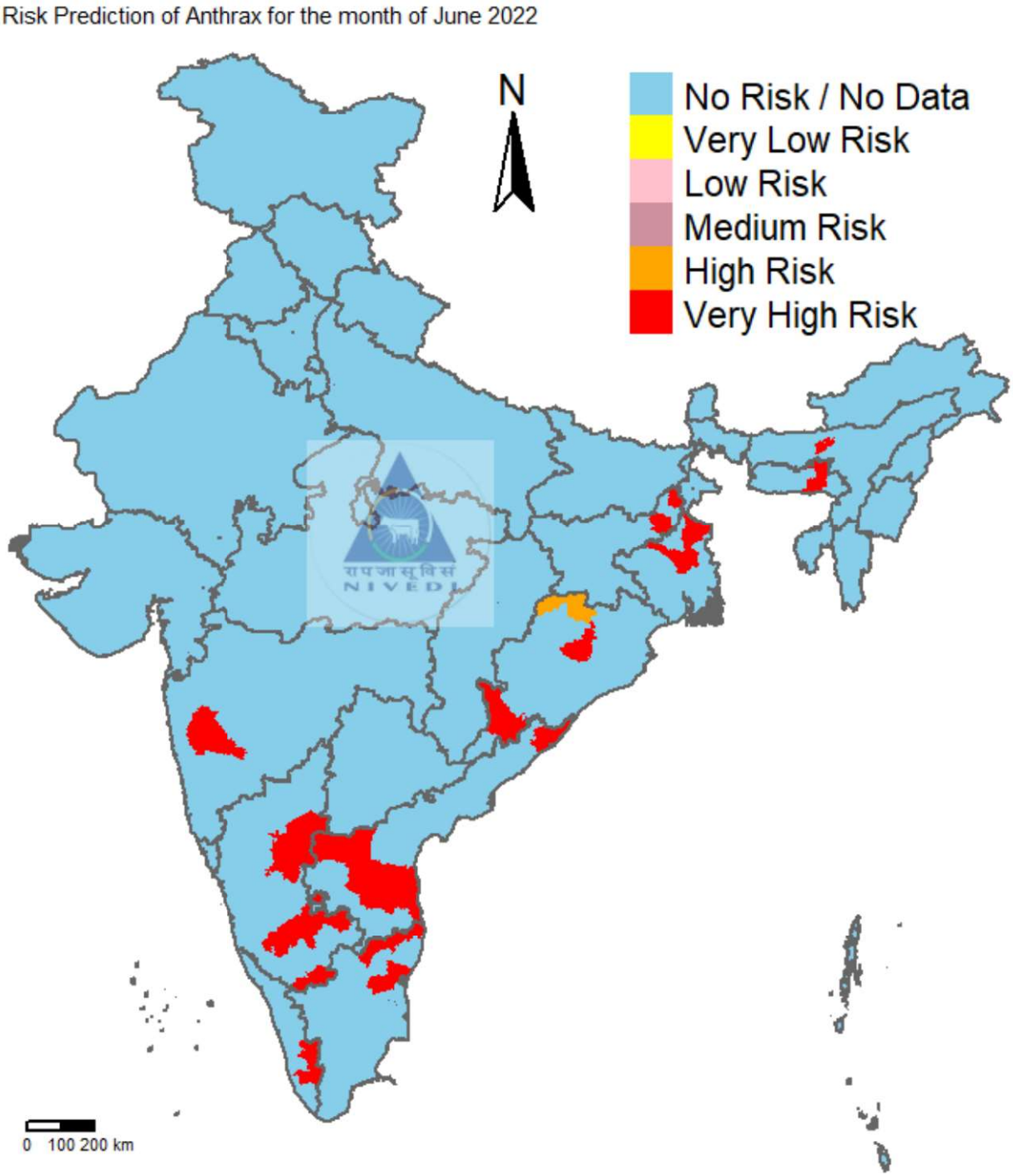
4.	Bluetongue (BT)	Sheep are more susceptible than goats.	Fever, swelling of face, neck, eyelids respiratory distress, nasal discharge, Salivation, necrotic ulcers on tongue, dental pad, gum, lips hyperaemia of muzzle and may bleed at muco-cutaneous junction. Affected tongue may become swollen, cyanotic and purple blue in colour – 'bluetongue'.	Vector control using insecticides and good water management. Vaccination of susceptible animals preferably in the month of May. Do not shear sheep during winter months. Restriction in animal movement, segregation of affected animals and symptomatic treatment. Strict biosecurity measures.
5.	Enterotoxaemia (ET)	Common disease of sheep and goats especially among the young animals.	Dullness, opisthosomas, convulsions, coma and sudden death. Affected adult sheep, which survive for several days May show diarrhoea and staggering.	Affected animals may be treated with suitable antibiotics. Vaccination to be done in consultation with the veterinarians and as decided by State Animal Husbandry Authorities. Strict biosecurity measures may be followed. Carcass may be disposed hygienically. Grazing area to be restricted, stall fed, vitamins and probiotics may be provided.
6.	Fascioliasis (FA)	Cattle, buffalo, sheep and goats.	Progressive anaemia, pale mucous membrane, sub-mandibular oedema (Bottle jaw), loss of appetite, weakness, isolated from flock while grazing, loss in production.	The animal should not be allowed to graze in water stagnant fields or submerged fodder should not be given directly to the animals. The submerged fodder can be processed through hay/silage preparation in order to destroy the metacercariae. The affected animals can be treated with Carbon tetrachloride/ Rafoxanide/Nitroxynil/ Niclofolan /Closantel/Oxyclozanide,

				under the strict supervision of veterinarian.
7.	Foot and Mouth Disease (FMD)	Cattle, buffalo, sheep, goats and pigs are often affected domesticated species, but the disease is more severe in cattle and pigs.	Fever, loss of feed intake, drop in milk production, drooling of saliva like ropey string, vesicles develop on the tongue, lips, gums, and palate and eventually rupture. Concurrent to oral lesions, vesicles also appear in inter digital skin and coronary band of the feet. The animal may open and close its mouth with a characteristic smacking sound. Sheep and goats may show lameness. In pigs, lesions may be seen on snout and also on the feet.	Regular vaccination and seromonitoring. Disinfection with sodium carbonate (4%) or 10% washing soda and strict biosecurity measures to be followed and animal movement may be controlled.
8.	Haemorrhagic septicaemia (HS)	Common disease for cattle and buffaloes, but can also occur among other species such as pigs, sheep, goats and many wild animals.	The disease starts with high fever, respiratory distress and haemorrhages maybe seen on the mucous membranes. There is lacrymation, nasal discharge, drop in milk production and anorexia. As the disease progress ear droops and the animals will be prostrated with cyanosis of mucous membranes. There may be oedema along the head, neck, thorax, vulva and anal areas. Sudden death occurs within few hours of clinical signs.	Affected animals may be treated with suitable antibiotics. Vaccination to be done in consultation with the veterinarians and as decided by state animal husbandry authorities. Strict biosecurity measures may be followed. Carcass may be disposed hygienically and stress factors may be reduced by following good animal husbandry practices.

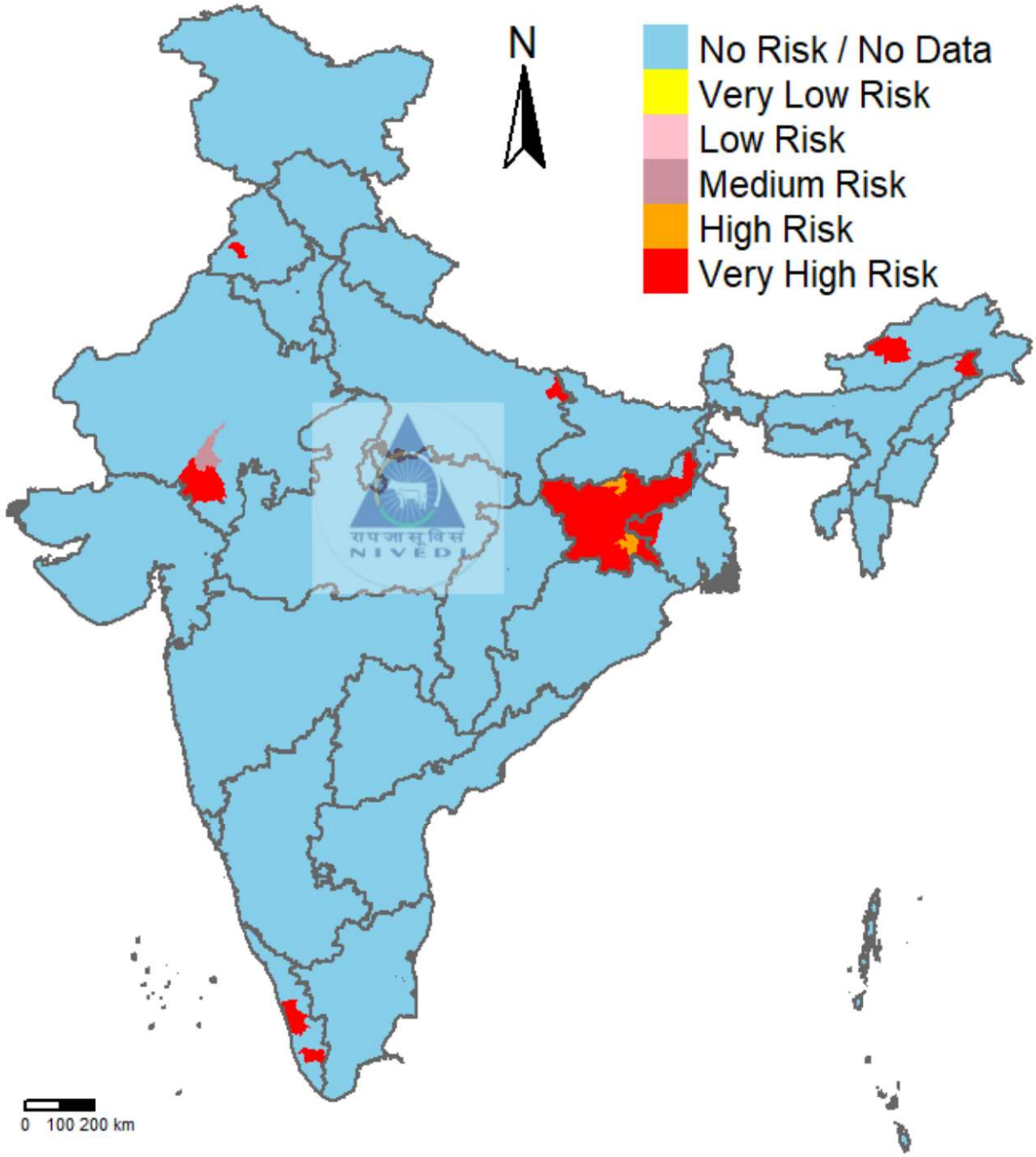
9.	Peste desPetits Ruminants (*PPR*)	Goats and sheep are most affected domestic animals.	Fever, nasal and ocular discharge, respiratory distress, necrotic lesions in buccal mucosa, gum, dental pad, palate, tongue and diarrhoea. Animals may die because of dehydration and pneumonia.	Vaccination of susceptible animals of above 3 months old age. Restriction on animal movement, strict biosecurity measures and proper disposal of carcass.
10.	Sheep and Goat pox (SGP)	Sheep and Goats	Respiratory distress and pock lesions over the non-hairy parts of body, more common in teat, udder, scortum, head, neck, ear, perineum, inner aspect of thighs and under tail.	Vaccination of susceptible animals of above 3 months old age. Symptomatic treatment of affected animals. Restriction on animal movement, strict biosecurity measures and proper disposal of carcass.
11.	Swine Fever (SF)	Pigs	Fever, Conjunctivitis, purplish discolouration of snout, ears, abdomen, inner side of the legs and staggering gait.	Vaccination of susceptible animals. Restriction on animal movement, strict biosecurity measures and proper disposal of carcass.
12.	Theileriosis (TE)	Large Ruminants. Cross bred cattle are more vulnerable.	High temperature, yellowish eye, sometime eye maybe heavily swollen, icteric mucosal membrane of rectum, dark yellowish urine, sometime may reach to coffee colour. Antibiotic is of no use to check the fever.	Periodical application of acaricides in and around the animal shed and on the animals. Therapeutic treatment with Buparvaquone can be useful in both early and advanced stages of the infection.

13.	Trypanosomosis (TR)	Domestic and wild carnivores and herbivores including cattle, buffalo, horse, donkey, camel, dog and cats. Buffaloes are known as carriers.	Fluctuating high fever which is not responded by antibiotics, swollen lymph gland, chronic emaciation and weakness, loss of appetite, gradual loss of production.	The affected animal should be treated with Diaminazine compounds or chloride and sulphate salts of Quinapyramine. Periodical spray of insecticide in and around animal shed to remove the flies.

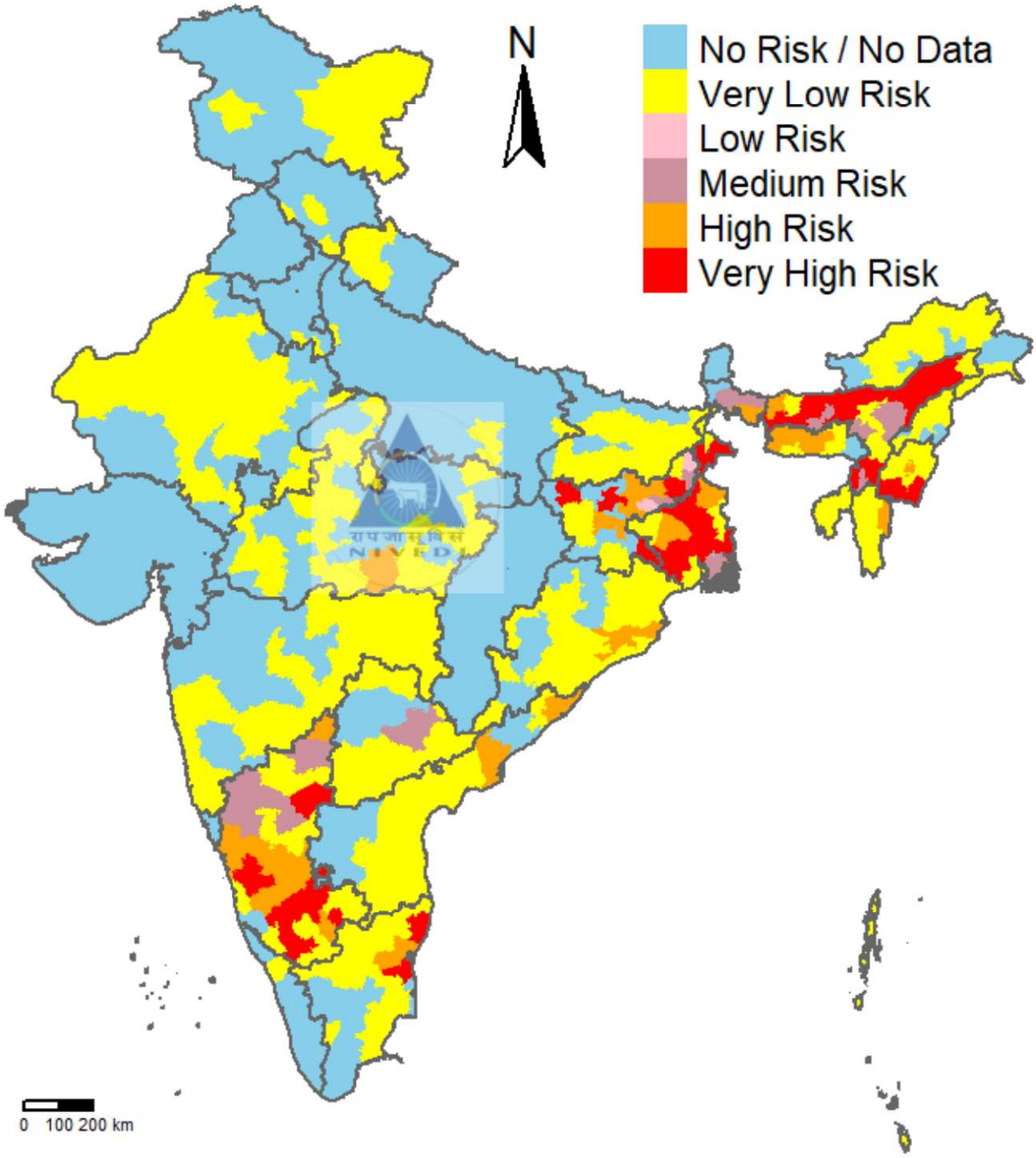
iv) Risk Prediction - Livestock Disease Forewarning Maps



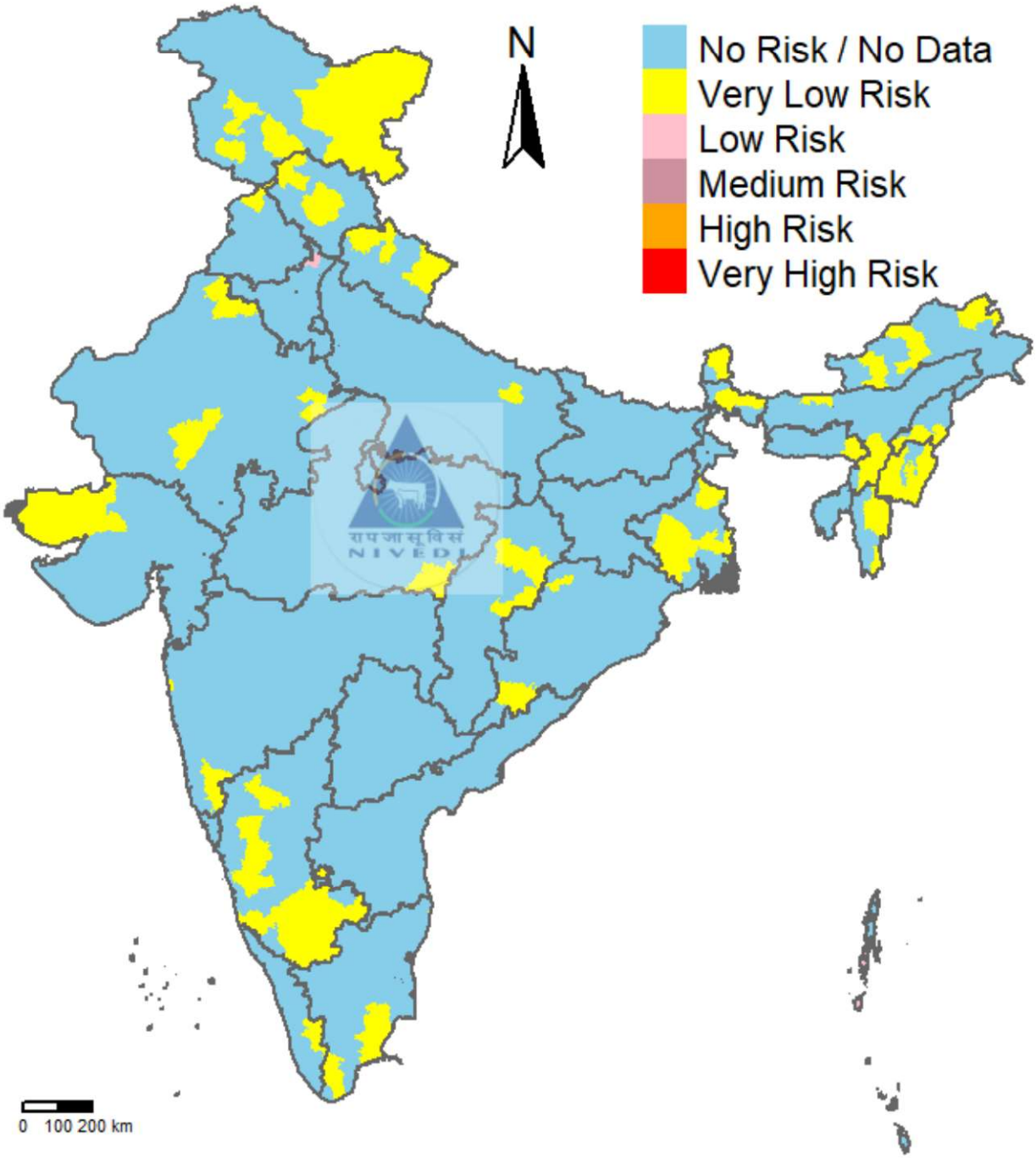
Risk Prediction of Babesiosis for the month of June 2022



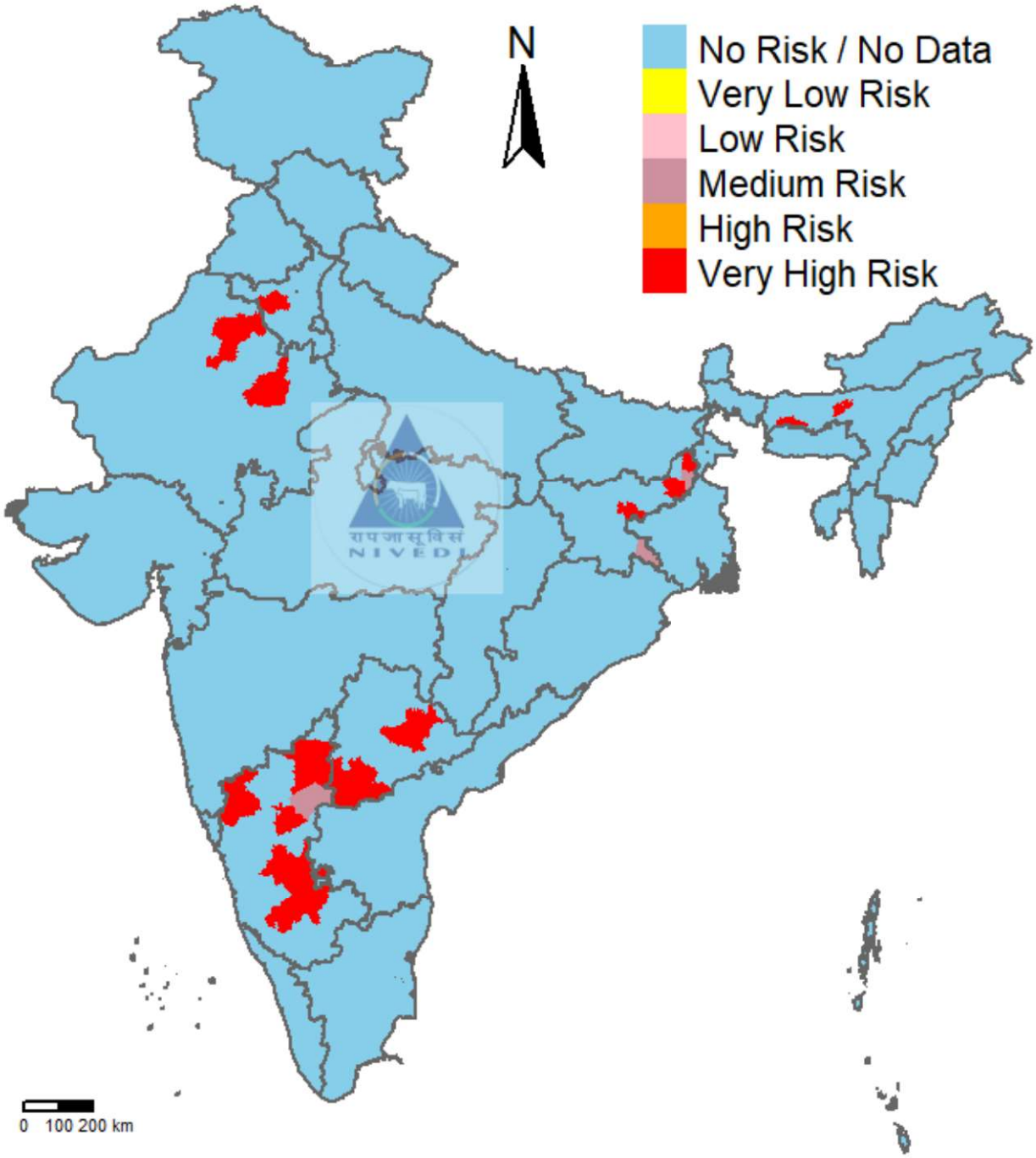
Risk Prediction of Black quarter for the month of June 2022



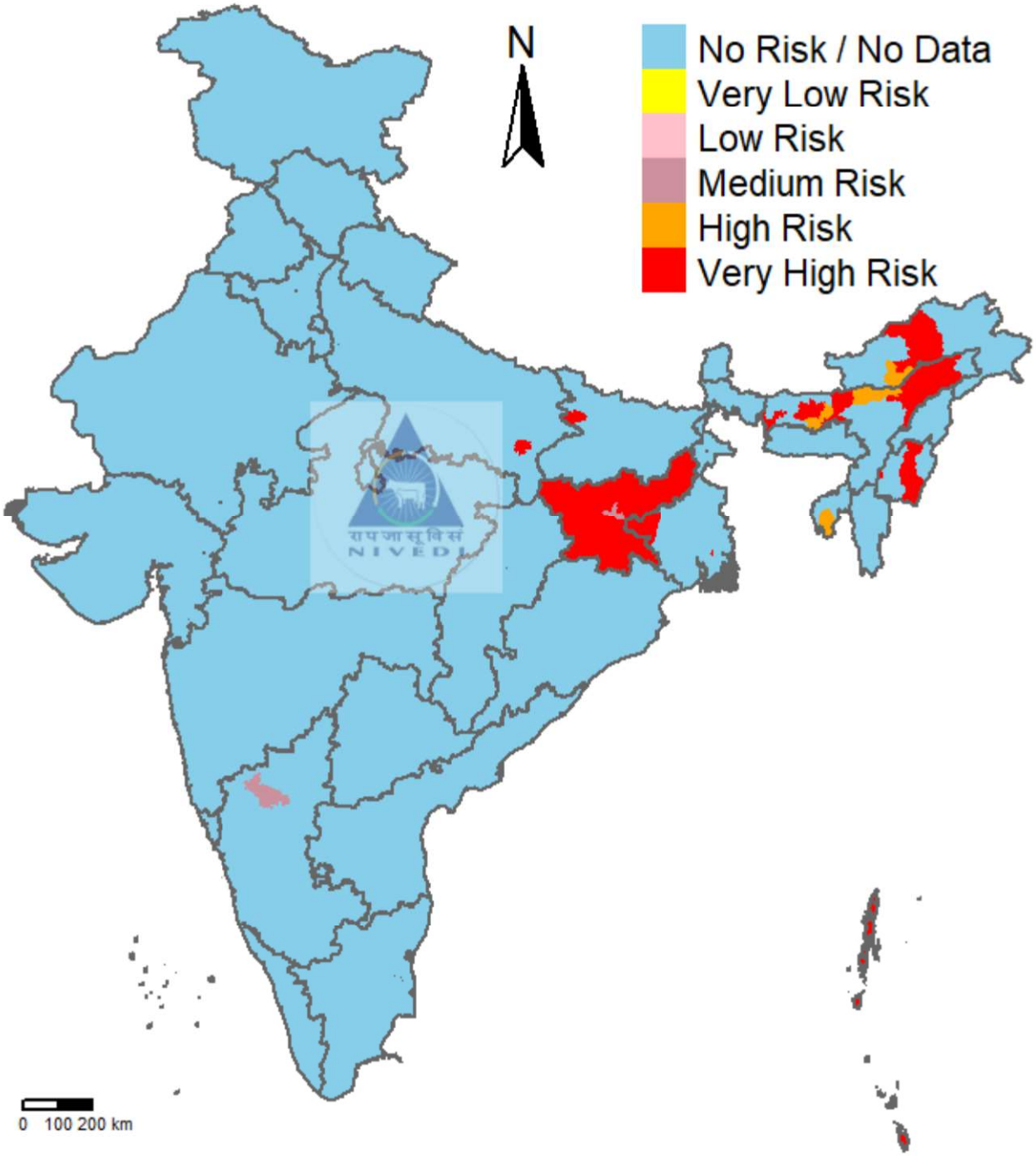
Risk Prediction of Bluetongue for the month of June 2022



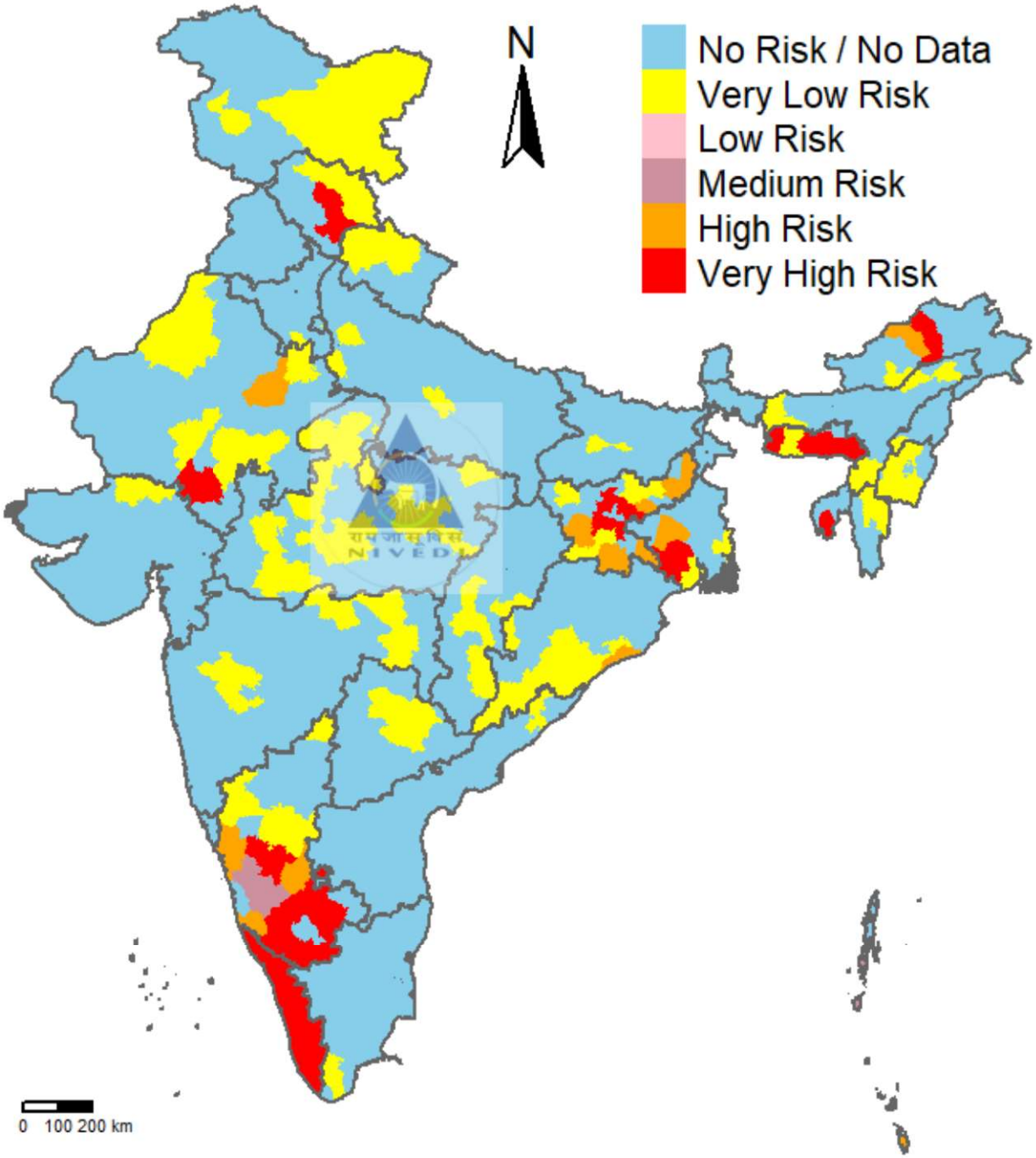
Risk Prediction of Enterotoxemia for the month of June 2022



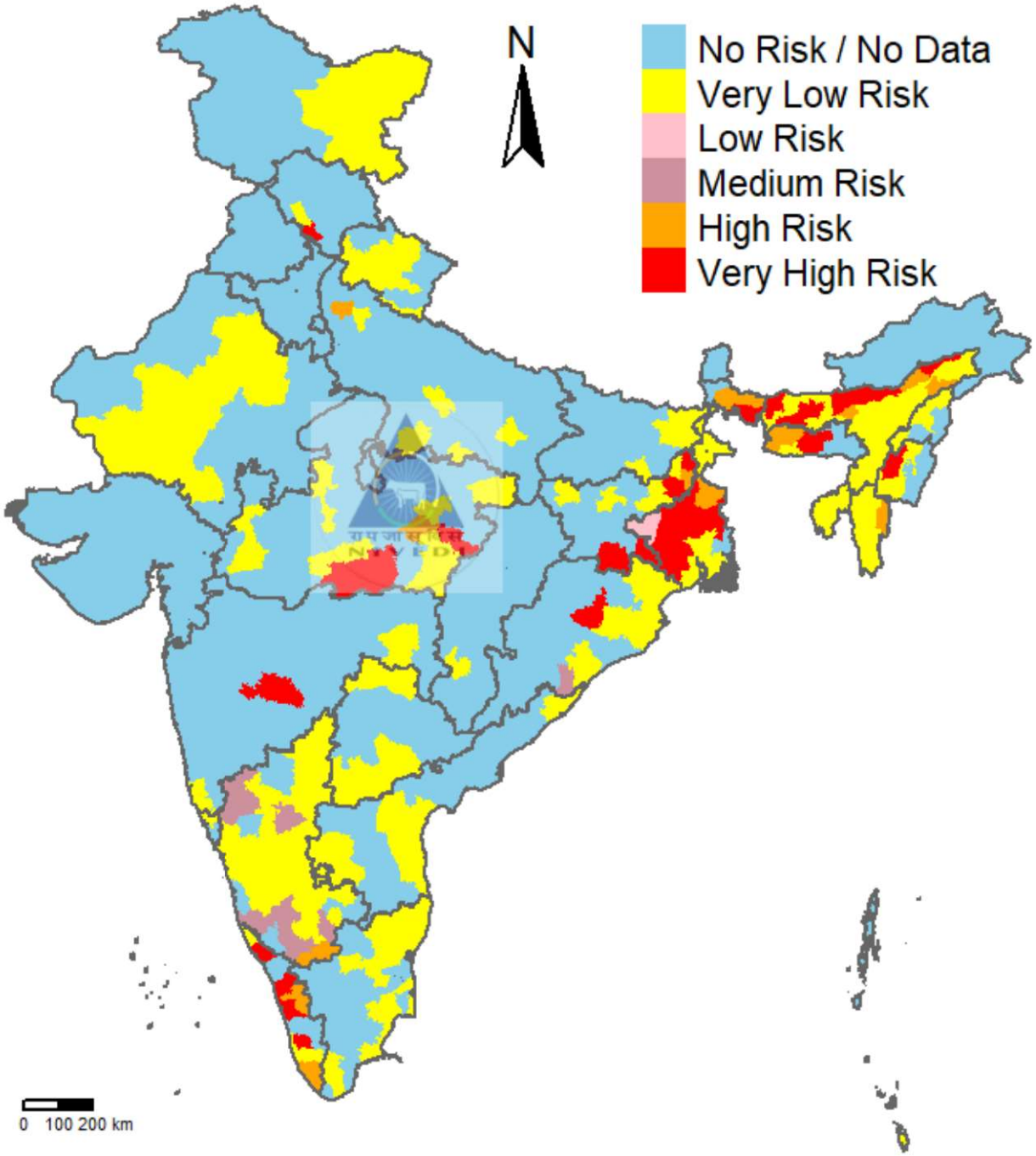
Risk Prediction of Fascioliasis for the month of June 2022



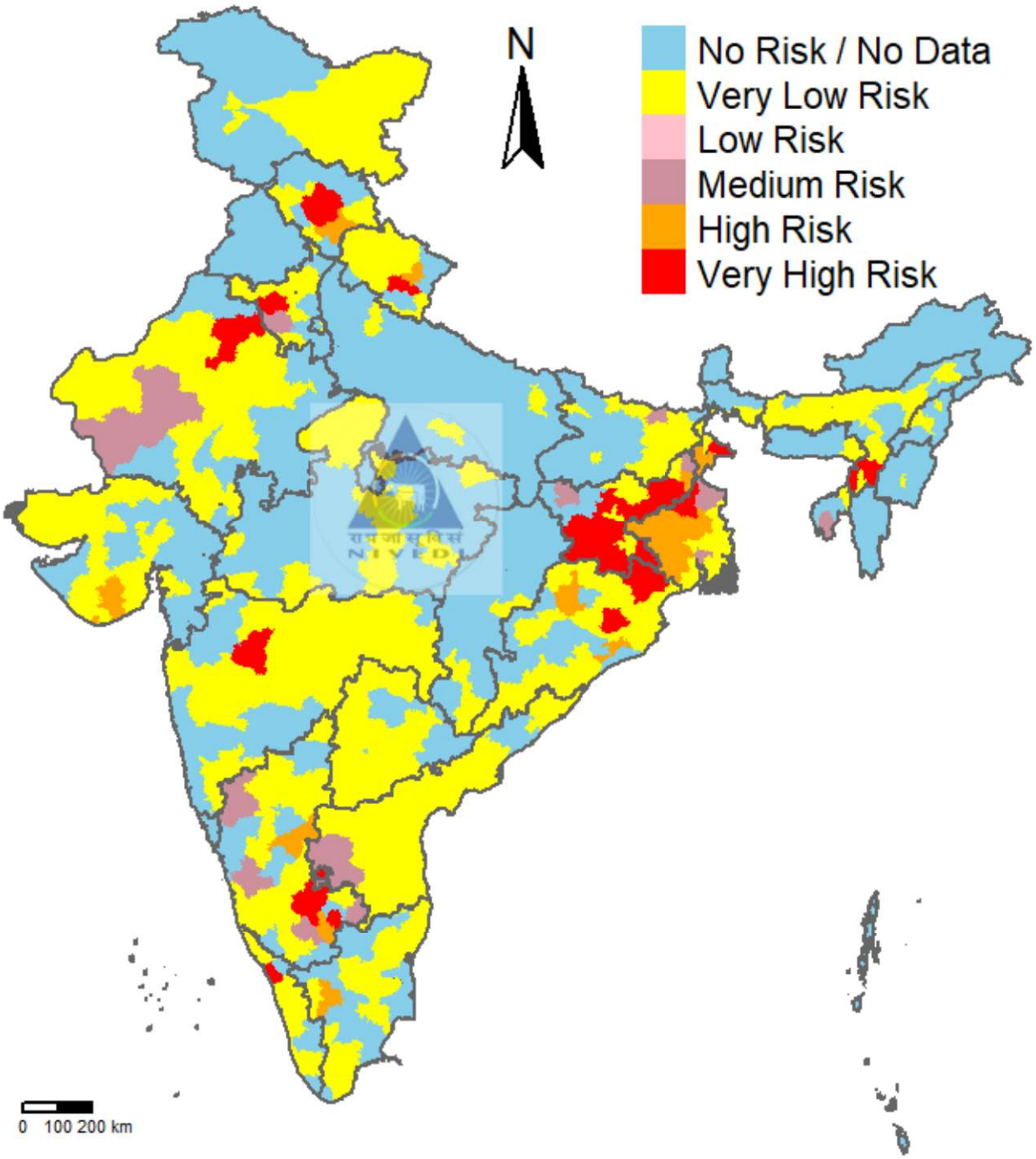
Risk Prediction of Foot and mouth disease for the month of June 2022



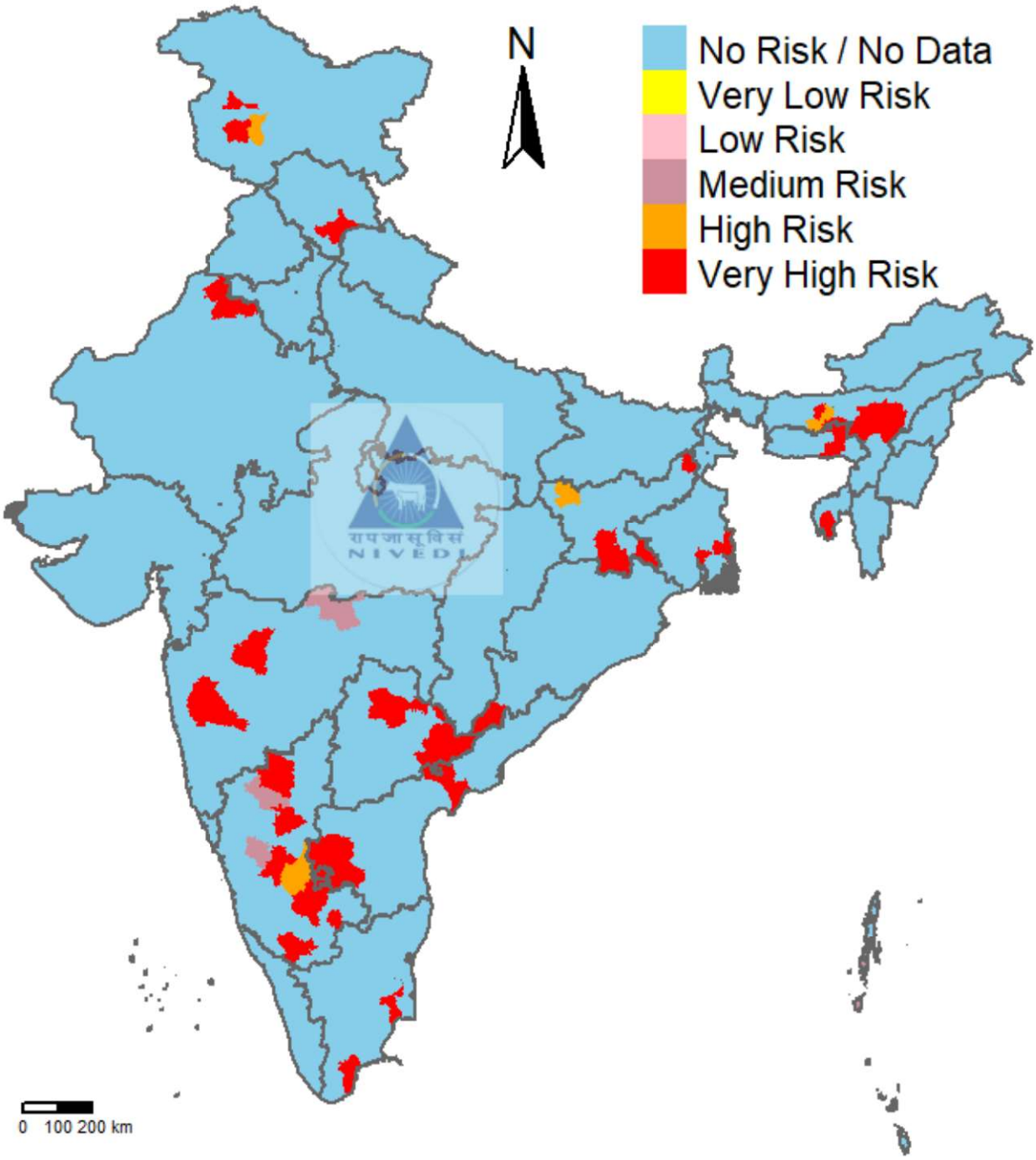
Risk Prediction of Haemorrhagic septicaemia for the month of June 2022



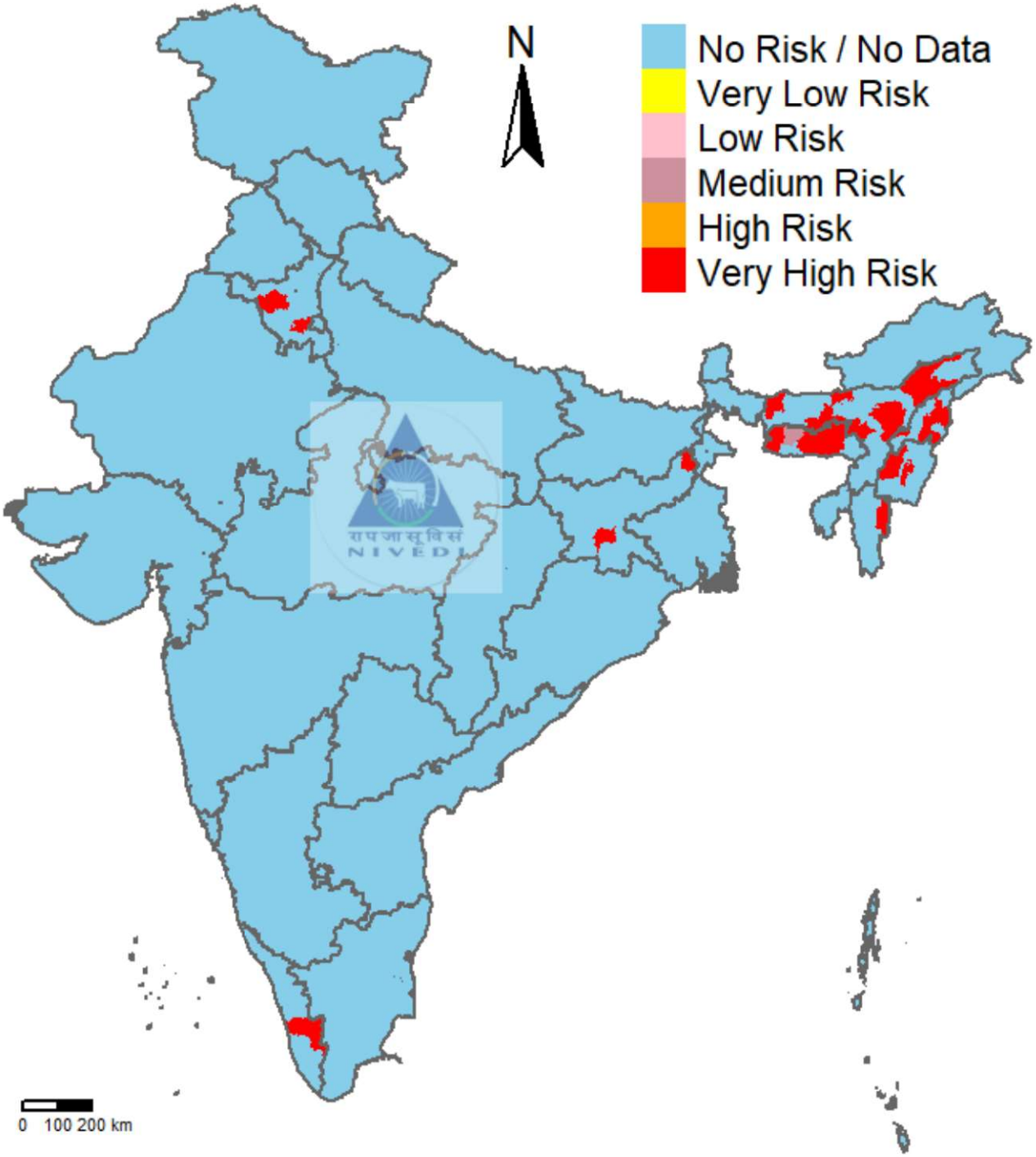
Risk Prediction of Peste des petits ruminants for the month of June 2022



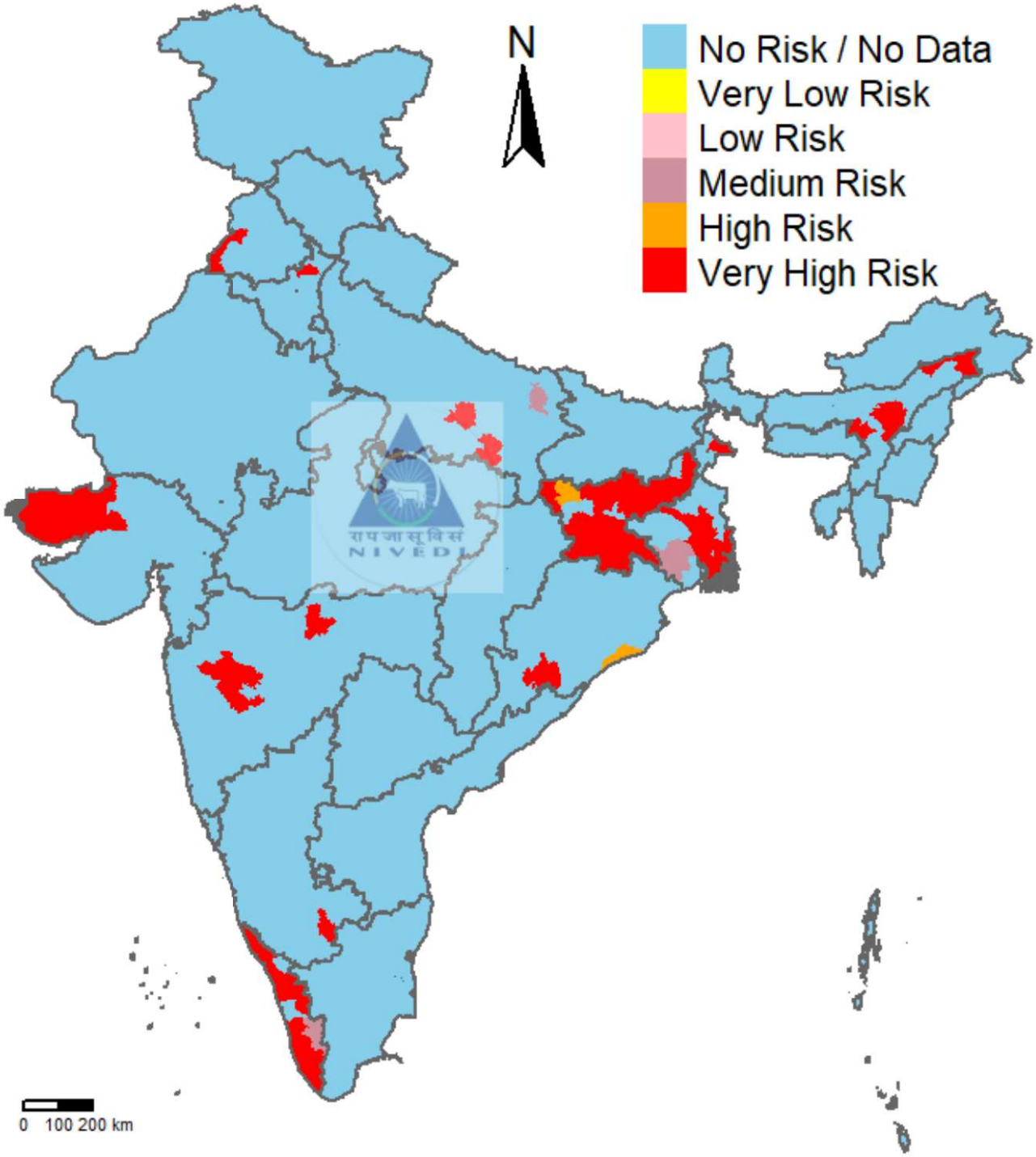
Risk Prediction of Sheep and Goat pox for the month of June 2022



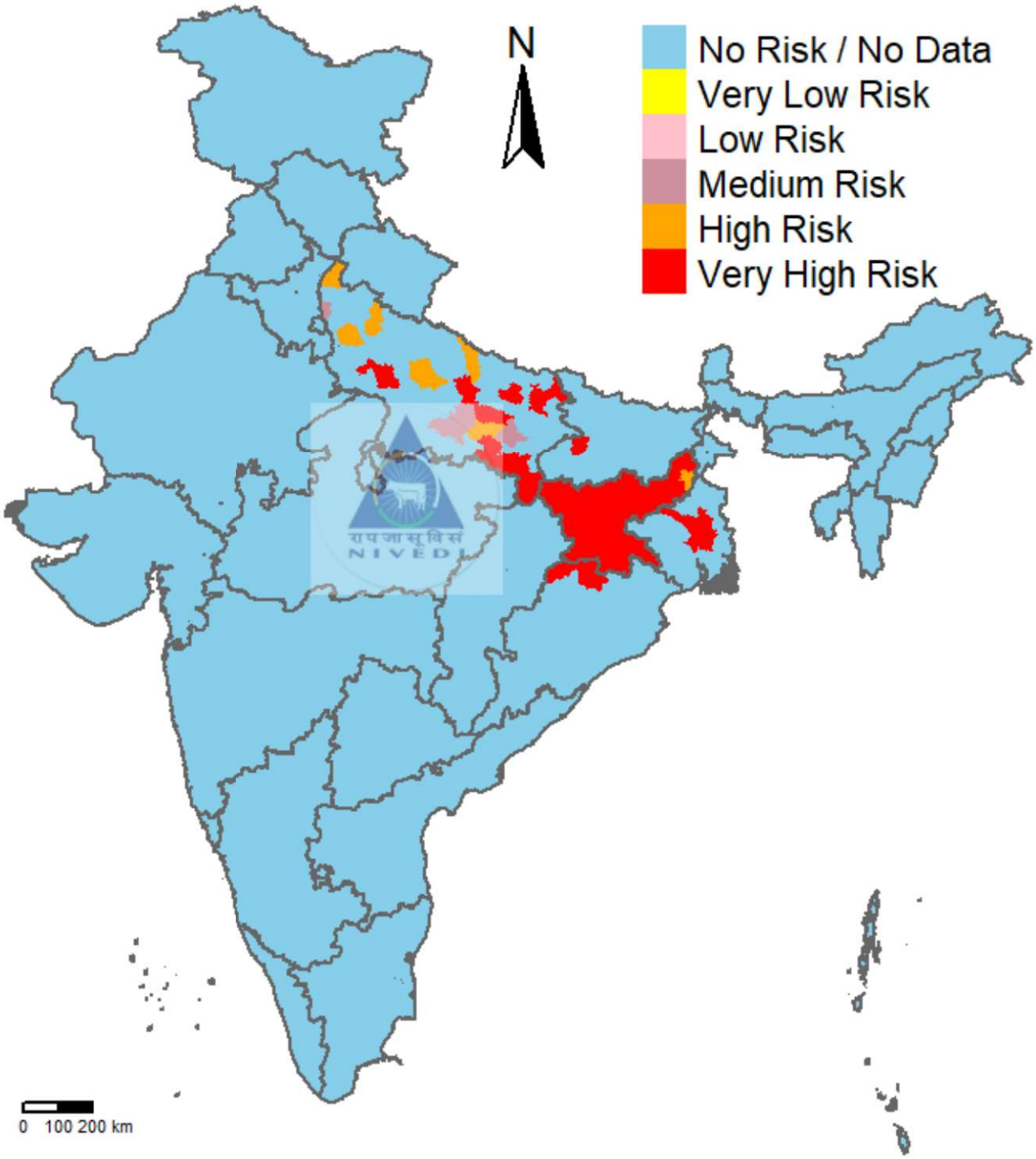
Risk Prediction of Swine fever for the month of June 2022



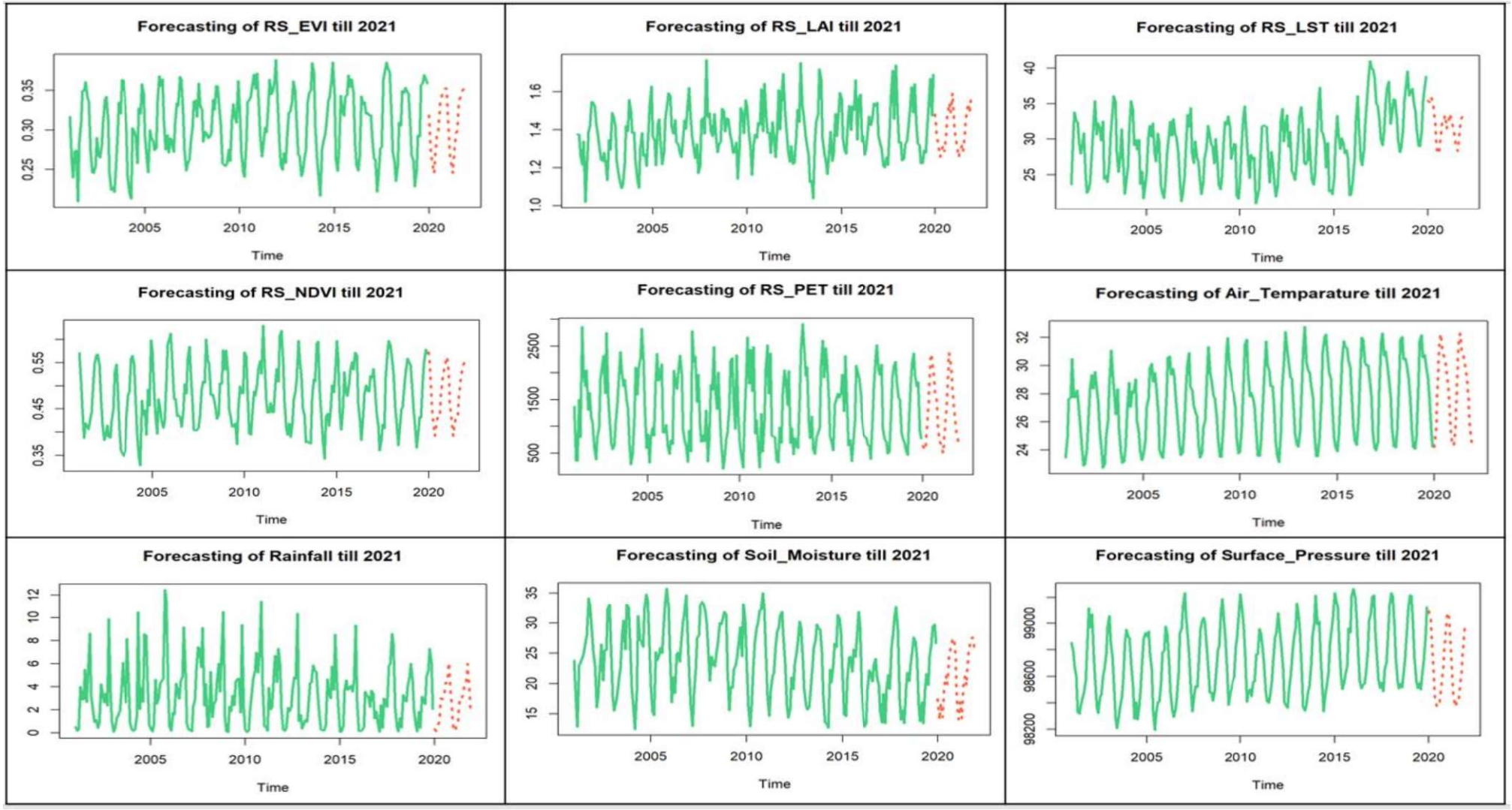
Risk Prediction of Theileriosis for the month of June 2022

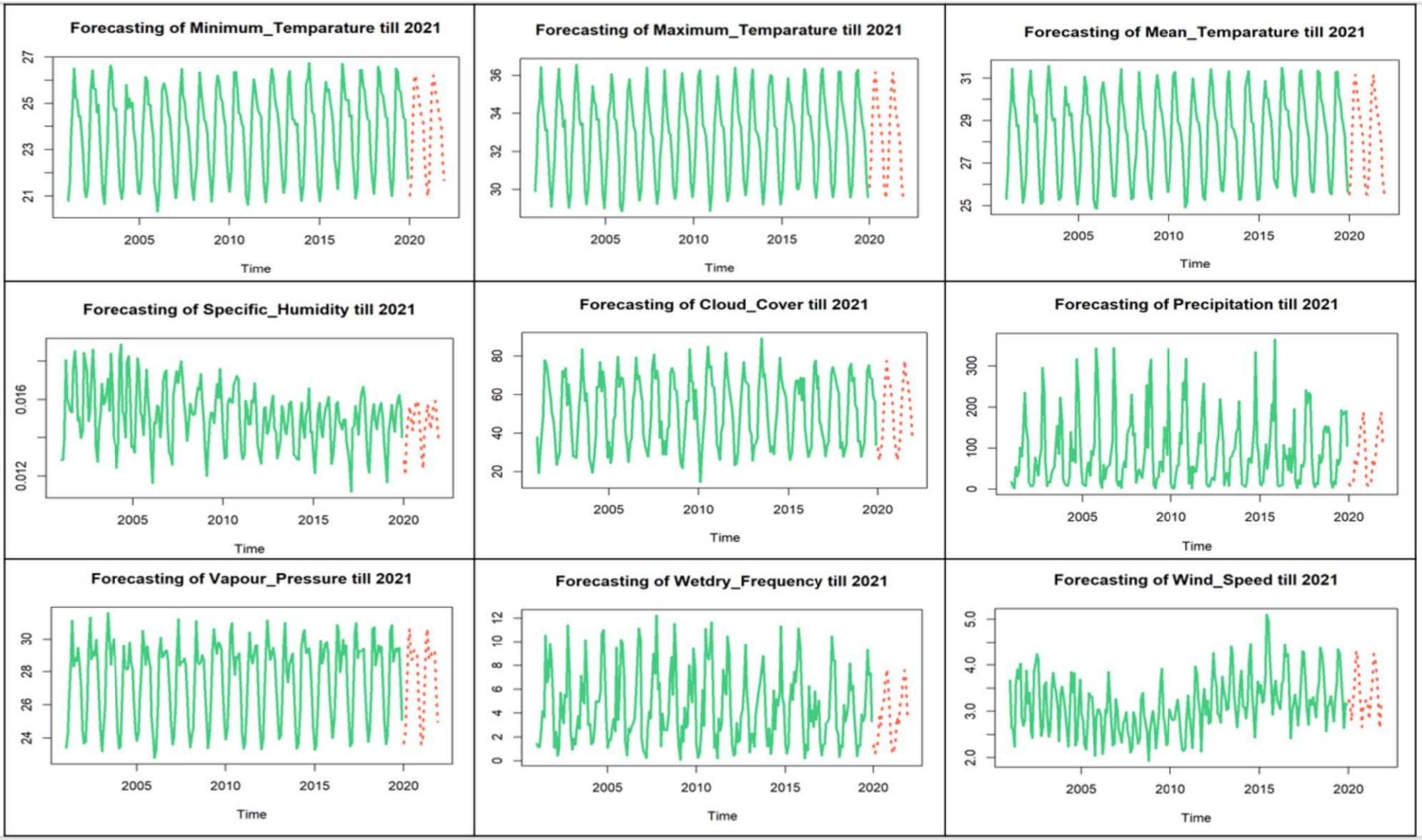


Risk Prediction of Trypanosomiasis for the month of June 2022



V. Forecasting of remote sensing and meteorological parameters till April, 2022(*Ex. Tamil Nadu*)




Forecasting of Minimum_Temparature till 2021
Forecasting of Maximum_Temparature till 2021
Forecasting of Mean_Temparature till 2021
Forecasting of Specific_Humidity till 2021
Forecasting of Cloud_Cover till 2021
Forecasting of Precipitation till 2021
Forecasting of Vapour_Pressure till 2021
Forecasting of Wetdry_Frequency till 2021
Forecasting of Wind_Speed till 2021
Time

VI. SIGNIFICANT WEATHER PARAMETERS TABLE

Disease Names	Significant Parameters
Anthrax	Precipitable Water, Surface Pressure
Babesiosis	Air Temperature, Precipitation, Surface Pressure, Minimum Temperature, Vapour Pressure, Dew Point Temperature, Wind Speed, NDVI and LST Night
Black quarter	Precipitable Water, Precipitation, Surface Pressure, Sea Level Pressure and Vapour Pressure
Bluetongue	Air Temperature, Cloud, Precipitable Water, Precipitation, Surface Pressure, Uwind, Vwind, Vapour Pressure, Elevation, NDVI and PET
Classical Swine Fever	Cloud, Precipitation, relative humidity Minimum Temperature, Vapour Pressure and Rainfall
Enterotoxaemia	Surface Pressure, NDVI and PET
Fascioliasis	Air Temperature, Precipitation, relative humidity, Temperature, Maximum Temperature, Vapour Pressure, Vwind, Rainfall, Soil Moisture, NDVI and EVI
Foot and Mouth Disease	Precipitable Water, Uwind, Vwind, wet_dry frequency, LST Night and EVI
Haemorrhagic Septicaemia	Cloud, Precipitation and Vwind
Peste des Petits Ruminants	Cloud, Precipitable Water, Surface Pressure, Sea Level Pressure, Maximum Temperature, Vwind and NDVI
Sheep & Goat pox	Cloud, Surface Pressure, Maximum Temperature, Vwind, DTP, NDVI and PET
Theileriosis	Air Temperature, Precipitation, Vapour Pressure, NDVI and LST Night
Trypanosomosis	Air Temperature, Precipitation, Surface Pressure, Vapour Pressure, NDVI and LST Night

Table 7.1: Significant weather parameters govern the Livestock disease incidence (forecast).

9. Post prediction Validation

DIMAPUR | Publish Date: 4/14/2019 AH&VS TEAM VISITS AFFECTED AREAS UNDER MEDZIPHEMA,
Source: http://www.nagalandpost.com

Following reports of a good number of buffaloes dying in a recent outbreak of suspected Haemorrhagic septicaemia (HS), a team from Animal Husbandry and Veterinary Services (AH&VS) department visited the affected areas under Medziphema on April 12. (Haemorrhagic septicaemia is a contagious bacterial disease that affects cattle and water buffaloes with a high mortality rate in infected animals).

AH&VS, deputy director & principal investigator, AICRP-ADMAS, Dr S. Amenla Walling, in a press release reported that the team consisted of the department's director, Dr Temsumeren, along with additional director, Dr. Budhi Lama, and other officials from the department. The press release added that the area is prone to such kind of disease outbreaks and the department officials reminded villagers to cooperate with the department and vaccinate their animals against such outbreaks. The team told the villagers that even an outbreak can be contained more effectively if villagers report the matter on time to the nearest Veterinary Health Centre.

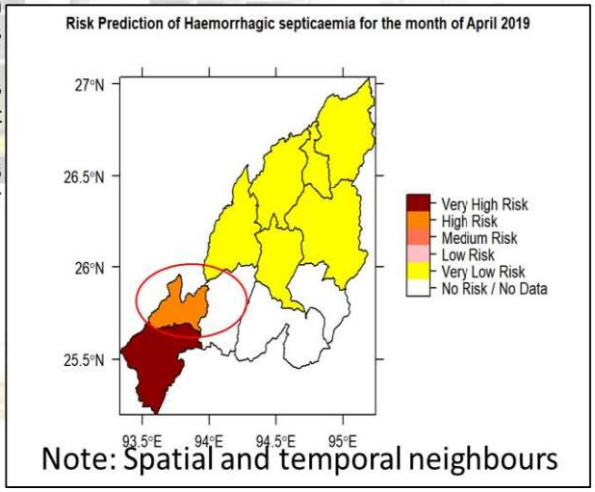
The villagers admitted in the meeting that they had not reported the recent outbreak to the department initially. The director appreciated the CVO Dimapur and his Rapid Response Team for their quick action after receiving information and for remaining stationed in the outbreak area to date. Free medicine was also distributed among the villagers. The department, through the press release also appealed to everyone to report such matters to the nearest Veterinary Health Centre (so that qualified staff may intervene quickly), instead of publicizing it in other ways. It stated that the department is prepared to extend services to any outbreak of diseases in animals to control such things.

The press release also pointed out that to control the recent outbreak, the department had to direct its officials to make their own transport arrangements to go to the affected areas because the State Election department did not consider an appeal to exempt the department's emergency duty vehicle from election duty.

Meanwhile, when contacted, Dr S. Amenla Walling told Nagaland Post that it is difficult to say if the disease has been fully contained since its free grazing season for the animals, but the department is doing its best under the circumstances.

NIVEDI PREDICITONS

Districts of Nagaland	HS prediction for February 2019	HS prediction for March 2019	HS prediction for April 2019
Peren	VLR	VLR	VHR
Dimapur	VLR	NR	HR
Kohima	VLR	VLR	NR
Wokha	VLR	NR	VLR



ProMED
INTERNATIONAL SOCIETY
FOR INFECTIOUS DISEASES

FMD POST PREDICTION

District wise Livestock Disease Risk Forewarning for April 2021: Arunachal Pradesh

Districts of Arunachal Pradesh	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomiasis
Anjaw	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Changlang	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Dibang Valley	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
East Kameng	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
East Siang	NR	NR	NR	NR	NR	NR	*VHR*	NR	VLR	NR	*VHR*	NR	NR
Kurung Kumey	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Lohit	NR	VLR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Lower Dibang Valley	NR	NR	VLR	NR	NR	NR	VLR	VLR	VLR	NR	*VHR*	NR	NR
Lower Subansiri	NR	NR	NR	NR	NR	NR	*VHR*	NR	NR	NR	NR	VLR	NR
Papum Pare	NR	NR	NR	NR	NR	NR	*VHR*	NR	*VHR*	NR	*VHR*	NR	NR
Tawang	NR	NR	NR	NR	NR	NR	*HR*	NR	NR	NR	NR	NR	NR
Tirap	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Upper Siang	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Upper Subansiri	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
West Kameng	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
West Siang	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

If vaccination has already been done please ignore the disease forecast for that disease.

Published Date: 2021-04-14 14:06:16
Subject: PRO/SOAS> Foot & mouth disease - India: (Arunachal Pradesh) mithun
Archive Number: 20210414.8306219

FOOT & MOUTH DISEASE - INDIA: (ARUNACHAL PRADESH) MITHUN
****

A ProMED-mail post
http://www.promedmail.org
ProMED-mail is a program of the
International Society for Infectious Diseases
http://www.isid.org

Date: Tue 13 Apr 2021 6:32 AM IST
Source: The Sentinel [edited]
https://www.sentinelassam.com/north-east-india-news/arunachal-news/many-mithuns-infected-with-fmd-foot-and-mouth-disease-533689

A large number of mithuns [or gayal, a large domestic bovine] have been affected by FMD (foot-and-mouth disease) in various parts of Arunachal Pradesh, and a few have died, said official sources on Monday [13 Apr 2021].

Animal Husbandry & Veterinary Department Deputy director Dr Taba Heli, a top mithun expert in North Eastern region, reported that the disease has taken a severe form in the entire Siang belt, particularly in East Siang, West Siang, and Upper Siang districts.

Though the number of deaths is yet to be known, the disease has spread in scattered areas of Papum Pare district also. The Department has allocated district funds for procurement of medicines to take all possible steps to contain the disease, he said. Mithun deaths have been reported also from Itanagar and Jullang area.

Pointing out that mithuns are the pride of indigenous people in the state, Nyishi Elite Society president Bengia Tolum has urged the department to take all possible steps to save them.

--
Communicated by:
ProMED-SoAs from HealthMap Alerts
<promed-SoAs@promedmail.org>

Andaman and Nicobar Report June-2020

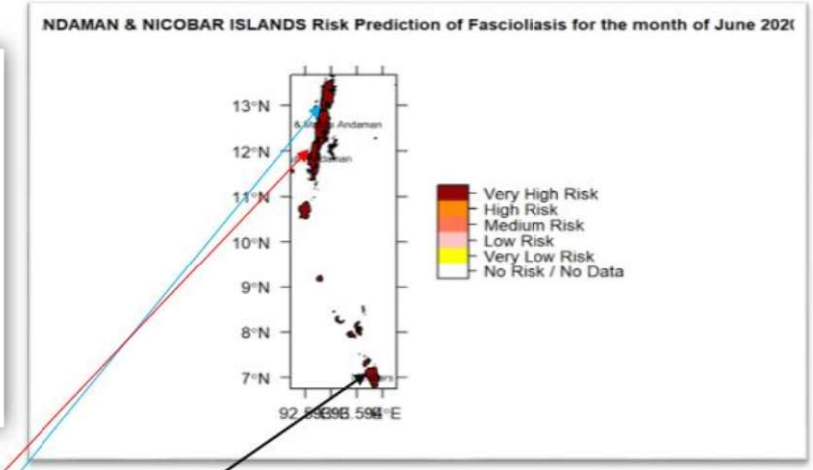
NIVEDI Prediction

District wise Livestock Disease forewarning for June 2020: Andaman and Nicobar

Districts of Andaman and Nicobar	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fasciolosis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomiasis
Nicobars	NR	MR	NR	NR	NR	VHR	NR	NR	NR	NR	NR	NR	NR
North & Middle Andaman	NR	NR	NR	NR	NR	VHR	NR	NR	NR	NR	NR	NR	NR
South Andaman	NR	MR	MR	NR	NR	VHR	NR	NR	NR	MR	NR	NR	NR

If vaccination is already been done please ignore the disease forecast for that disease.

*No risk/No data available (NR), Very low risk (VLR), Low risk (LR), Moderate risk (MR), High risk (HR),Very high risk (VHR)



Andaman and Nicobar Report June-2020

monthly report June 2020

ICAR NIVEDI <pcadmas@gmail.com>

Wed, Jul 8, 2020 at 10:53 PM

Sir,
Please find attached herewith monthly report for the month of June 2020.

Regards

Dr. Jai Sunder, ARS, FASA
Pr. Scientist (Veterinary Microbiology)
Division of Animal Sciences
ICAR-CIARI, Port Blair- 744 101
A&N Islands
09434281840
03192-245983

June_20.docx
25K

Number of cases of of parasitic cases and other diseases reported from A & N Islands during the month of June 2020

CASES	FASCIOLIASIS	ASCARIASIS	AMPHISTOME	STRONGYLOIDS	COCCIDIOSIS	MASTITIS	TOTAL
South Andaman	24	48	192	34	2	7	307
N&M Andaman	258	43	14	5	3	10	333
Nicobar	79	31	0	0	0	0	110
TOTAL	**361**	**122**	**206**	**39**	**5**	**17**	**750**

Dr. Jai Sunder
PI, AICRP-ADMAS
Port Blair

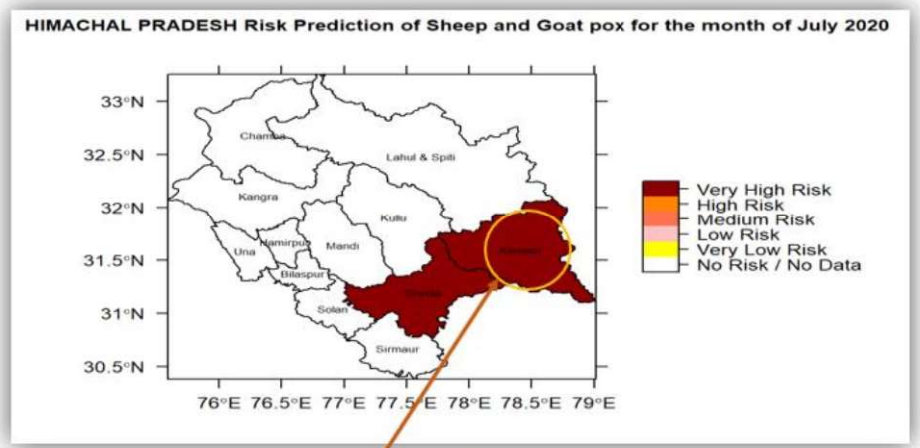
HIMACHAL PRADESH REPORT AUGUST-2020

NIVEDI Prediction

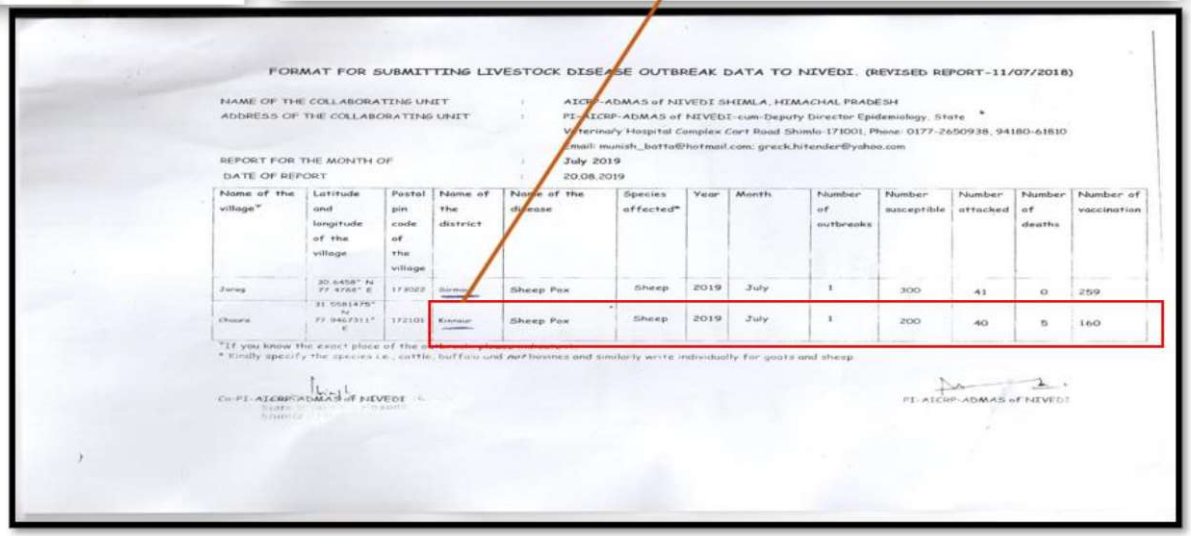
District wise Livestock Disease forewarning for July 2020: Himachal Pradesh

Districts of Himachal pradesh	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fasciolosis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomiasis
Bilaspur	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Chamba	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR
Hamirpur	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Kangra	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Kinnaur	NR	NR	NR	VLR	NR	NR	NR	NR	NR	VHR	NR	NR	NR
Kullu	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Lahul & Spiti	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mandi	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Shimla	NR	NR	NR	NR	NR	NR	NR	NR	NR	VHR	NR	NR	NR
Sirmaur	NR	NR	NR	NR	NR	NR	NR	MR	NR	NR	NR	NR	NR
Solan	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Una	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

If vaccination has already been done please ignore the disease forecast for that disease.



HINACHAL PRADESH Report July-2020



FORMAT FOR SUBMITTING LIVESTOCK DISEASE OUTBREAK DATA TO NIVEDI. (REVISED REPORT-11/07/2018)

NAME OF THE COLLABORATING UNIT : AICRP-ADMAS of NIVEDI SHIMLA, HIMACHAL PRADESH

ADDRESS OF THE COLLABORATING UNIT : PI-AICRP-ADMAS of NIVEDI-cum-Deputy Director Epidemiology, State Veterinary Hospital Complex Cart Road Shimla-171001, Phone: 0177-2650938, 94180-61810 Email: munish_batta@hotmail.com; greck.hitender@yahoo.com

REPORT FOR THE MONTH OF : July 2019

DATE OF REPORT : 20.08.2019

Name of the village*	Latitude and longitude of the village	Postal pin code of the village	Name of the district	Name of the disease	Species affected*	Year	Month	Number of outbreaks	Number susceptible	Number attacked	Number of deaths	Number of vaccination
Jarag	30.6458° N 77.4768° E	173022	Sirmaur	Sheep Pox	Sheep	2019	July	1	300	41	0	259
Chaura	31.5581475° N 77.9467311° E	172101	Kinnaur	Sheep Pox	Sheep	2019	July	1	200	40	5	160

*If you know the exact place of the outbreak please provide it.

* Kindly specify the species i.e., cattle, buffalo and not bovines and similarly write individually for goats and sheep

Co-PI-AICRP-ADMAS of NIVEDI

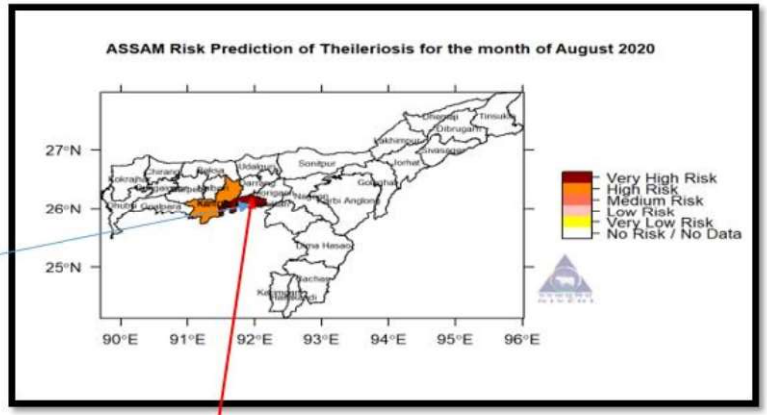
PI-AICRP-ADMAS of NIVEDI

ASSAM REPORTAUGUST-2020

NIVEDI Prediction

District wise Livestock Disease forewarning for August 2020: Assam

Districts of Assam	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fasciolosis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomiasis
Baksa	NR	NR	VHR	NR	NR	NR	NR	VHR	VLR	NR	NR	NR	NR
Barpeta	NR	NR	VHR	NR	NR	NR	VLR	VHR	NR	NR	VHR	NR	NR
Bongaigaon	NR	NR	VHR	NR	NR	NR	NR	VHR	VHR	NR	VHR	NR	NR
Cachar	NR	NR	VHR	NR	NR	VHR	NR	VHR	NR	NR	NR	NR	NR
Chirang	NR	NR	VHR	NR	NR	NR	NR	HR	NR	NR	NR	NR	NR
Darrang	NR	VHR	VHR	NR	NR	NR	NR	HR	VHR	NR	NR	NR	NR
Dhemaji	NR	NR	VHR	NR	NR	VHR	NR	VHR	NR	NR	VHR	NR	NR
Dhubri	NR	NR	VHR	NR	NR	VHR	VLR	VHR	HR	NR	NR	NR	NR
Dibrugarh	NR	NR	VHR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR
Dima Hasao	NR	NR	VLR	NR	NR	NR	VLR	VLR	VLR	NR	NR	NR	NR
Goalpara	NR	NR	VHR	NR	VHR	NR	VLR	VHR	VLR	NR	VHR	NR	NR
Golaghat	NR	NR	VLR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR
Hailakandi	NR	NR	MR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR
Jorhat	NR	NR	VHR	NR	NR	VHR	NR	VLR	VLR	NR	VHR	NR	NR
Kamrup	NR	NR	VLR	NR	NR	VHR	VLR	VLR	HR	NR	VHR	HR	NR
Kamrup Metropolitan	NR	NR	VHR	NR	NR	VHR	VLR	VHR	HR	NR	VHR	VHR	NR
Karbi Anglong	NR	NR	VLR	NR	VHR	NR	VLR	VLR	NR	VHR	NR	NR	NR
Karimganj	NR	NR	VHR	NR	NR	NR	NR	VHR	VLR	NR	NR	NR	NR
Kokrajhar	NR	NR	VHR	NR	VHR	NR	VLR	VLR	NR	NR	VHR	NR	NR
Lakhimpur	NR	NR	VLR	NR	VHR	VHR	NR	VLR	VLR	NR	VHR	NR	NR
Morigaon	NR	NR	VHR	NR	NR	NR	NR	VHR	VLR	NR	VHR	NR	NR



Assam Report August-2020

Gmail - Monthly Reports_June_July_August2020_Guwahati Centre

Gmail

ICAR NIVEDI <pcadmas@gmail.com>

Monthly Reports_June_July_August2020_Guwahati Centre

1 message

Dr Durlav Prasad Bora <drdpbora@gmail.com> Mon, Oct 5, 2020 at 4:27 PM
To: pcadmas@gmail.com

Dear Sir
I am sending herewith the monthly reports for the months of June, July and August, 2020.
Kindly acknowledge the receipt of the same.

Best Regards
Durlav P Bora
PI, AICRP on ADMAS
Guwahati Centre

--
Dr Durlav Prasad Bora MVSc,PhD (IVRI)
Assistant Professor (Sr. Scale)
Department of Microbiology
College of Veterinary Science
Assam Agricultural University
Khanapara, Guwahati-781022
ASSAM (INDIA)
Ph# +919954533400
+919435594808
Researchgate: https://www.researchgate.net/profile/Durlav_Bora3
ORCID ID: https://orcid.org/0000-0002-9629-7929
Scopus Author ID: 7003869722
Web of Science ResearcherID: AAE-4450-2020

3 attachments

Monthly report_August2020_ICAR-ADMAS.doc
517?K

Monthly report_June2020_ICAR-ADMAS.doc
51?8K

Monthly report_July 2020_ICAR-ADMAS.doc
51?8K

Project Directorate on (PD_ADMAS)
Animal Disease Monitoring and Surveillance
INDIAN COUNCIL OF AGRICULTURAL RESEARCH
Hebbal, Bangaluru - 560023

99/761(03)/2020-21/DRV/ Dtd:

Name of the AICRP on ADMAS centre : Assam Agricultural University, Khanapara, Guwahati Centre
Address of the AICRP on ADMAS Centre : College of Veterinary Science, Khanapara, Guwahati-781022
Report for the month of : August, 2020
Date of report : 05.10.2020

Name of the village	Latitude and longitude of the village	Postal pin code of the village	Name of the district	Name of the disease	Species affected *	Year	Month	Number of outbreaks	Number susceptible	Number attacked	Number of deaths	Number vaccinat
Vill- Dalongghat	26°71 N 92°90 E	784528	Darrong	Paramphistomiosis	Cattle	2020	August	1	1500	8	Nil	Nil
Vill: Christanbasti	26°15 N 91°77 E	781005	Kamrup (M)	Babesiosis	Dog	2020	August	1	40	2	1	Nil
Baruah chariali	26°75 N 94°20 E	785001	Jorhat	Babesiosis	Dog	2020	August	1	40	2	1	Nil
Mirza	26°29 N 91°69 E	781125	Kamrup (M)	Theileriosis	Cattle	2020	August	1	700	2	-	Nil
Vill: Halogaon	26°14 N 91°73 E	781103	Kamrup (M)	Ranikhet disease	Local birds	2020	August	1	700	20	12	Nil

(D P Bora)

KARNATAKA REPORT SEPTEMBER-2021

ProMED
INTERNATIONAL SOCIETY
FOR INFECTIOUS DISEASES

Published Date: 2021-09-30 11:40:53
Subject: PRO/SOAS> Foot & mouth disease - India (10): (Karnataka) cattle
Archive Number: 20210930.8698795

FOOT & MOUTH DISEASE - INDIA (10): (KARNATAKA) CATTLE

A ProMED-mail post
http://www.promedmail.org
ProMED-mail is a program of the
International Society for Infectious Diseases
http://www.isid.org

Date: Fri 24 Sep 2021 18:33 IST
Source: The Hindu [edited]
https://www.thehindu.com/news/national/karnataka/foot-and-mouth-disease-reported-in-hassan/article36652024.ece

District wise Livestock Disease Risk Forewarning for September 2021: Karnataka

Districts of Karnataka	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fasciolosis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis
Gulbarga	NR	NR	VLR	VLR	NR	NR	VLR	VLR	NR	*VHR*	NR	NR	NR
Hassan	NR	NR	*VHR*	VLR	NR	NR	*VHR*	VLR	VLR	*VHR*	NR	NR	NR
Haveri	*VHR*	NR	VLR	NR	NR	NR	*HR*	*HR*	NR	*HR*	NR	NR	NR
Kodagu	NR	NR	*HR*	NR	NR	NR	*VHR*	VLR	NR	NR	NR	NR	NR
Kolar	NR	NR	NR	VLR	NR	NR	*HR*	VLR	NR	NR	NR	NR	NR
Koppal	*VHR*	NR	VLR	VLR	NR	NR	LR	MR	VLR	NR	NR	NR	NR
Mandya	NR	NR	NR	VLR	NR	NR	*VHR*	VLR	NR	NR	NR	NR	NR
Mysore	NR	NR	*VHR*	NR	NR	NR	*VHR*	VLR	VLR	NR	NR	NR	NR
Raichur	*VHR*	NR	VLR	NR	NR	NR	VLR	LR	VLR	NR	NR	NR	NR
Ramanagara	NR	NR	NR	VLR	NR	NR	*VHR*	NR	VLR	NR	NR	NR	NR
Shimoga	NR	NR	*VHR*	NR	*VHR*	NR	*VHR*	MR	VLR	NR	NR	NR	NR
Tumkur	*VHR*	NR	*HR*	VLR	NR	NR	*VHR*	*VHR*	VLR	NR	NR	NR	NR
Udupi	NR	NR	NR	NR	NR	NR	*HR*	NR	NR	NR	NR	NR	NR
Uttara Kannada	NR	NR	NR	NR	NR	NR	*HR*	VLR	NR	NR	NR	NR	NR
Yadgir	NR	NR	VLR	VLR	NR	NR	VLR	VLR	VLR	NR	NR	NR	NR

The outbreak of foot-and-mouth disease (FMD) among cattle in Hassan has left both farmers and veterinarians worried.

Cases have been reported from Arkalgud, Arsikere, Channarayapatna, and Sakleshpur taluks. While the farming community, depending on cattle for regular income, are worried about their livelihood, the veterinarians are struggling hard to provide treatment, amidst a shortage of staff members.

The Department of Veterinary and Animal Husbandry has reported over 150 cases in the district so far. As of [Fri 24 Sep 2021], the animals in 16 villages of the district are being treated. So far the death of one animal had been reported. However, farmers claim more animals have died over the last month. The death of cattle has an impact on milk production, affecting milk producers.

The vaccination for cattle is done once in six months under the National Animal Disease Control Programme. However, the vaccination drive was not done in the last year, owing to the COVID-19 pandemic. "The outbreak of foot and mouth disease is due to the failure of the government in conducting the vaccination. If the vaccination had been done as per the schedule, farmers would not have suffered", H Yoga Ramesh, president of Potato Club in Arkalgud, told media.

Following reports of the disease, veterinarians have been treating affected animals. "Against 24 sanctioned posts of veterinary doctors in Arkalgud taluk, we are only five people. Every doctor is in charge of 2 or more hospitals. We are struggling hard to treat animals", said a veterinarian.

Unless the vacancies were filled up the department cannot deliver services fully. There was a shortage of staff members of other cadres as well, he added.

Considering the cases, the department has launched a ring vaccination programme. Under this, the animals in a 5-kilometre [3.1 mi] radius of the village, where the disease breakout was reported, would be vaccinated. "We have sufficient stock for the ring vaccination. We are planning a mass vaccination in October [2021], where we will cover 6.58 lakh [658 000] animals," said KR Ramesh, Deputy Director of Veterinary and Animal Husbandry in Hassan.

--
Communicated by:
ProMED-SoAs from HealthMap Alerts
<promed-SoAs@promedmail.org>

9.1 Correlational Assessment

The number of outbreaks predicted and outbreaks actually reported were reported in table 9.1. It has been observed from the table that outbreaks predicted two months in advance and timely alerts were issued that helped the stakeholders to take appropriate preventive measures with in time and accordingly the reported outbreaks were very less. Though the use of artificial intelligence system is more beneficial for accurately predicting the livestock disease outbreaks, there are yet number of limitations, namely, there are expected to be under reporting and also non-reporting cases which created the uncertainties in the model predictions while translating model inputs in to model outputs. However, identifying these uncertainties in the prediction using statistical models and highlighting the importance of quality data may improve the model accuracy and confidence while building the model for livestock disease forecasting.

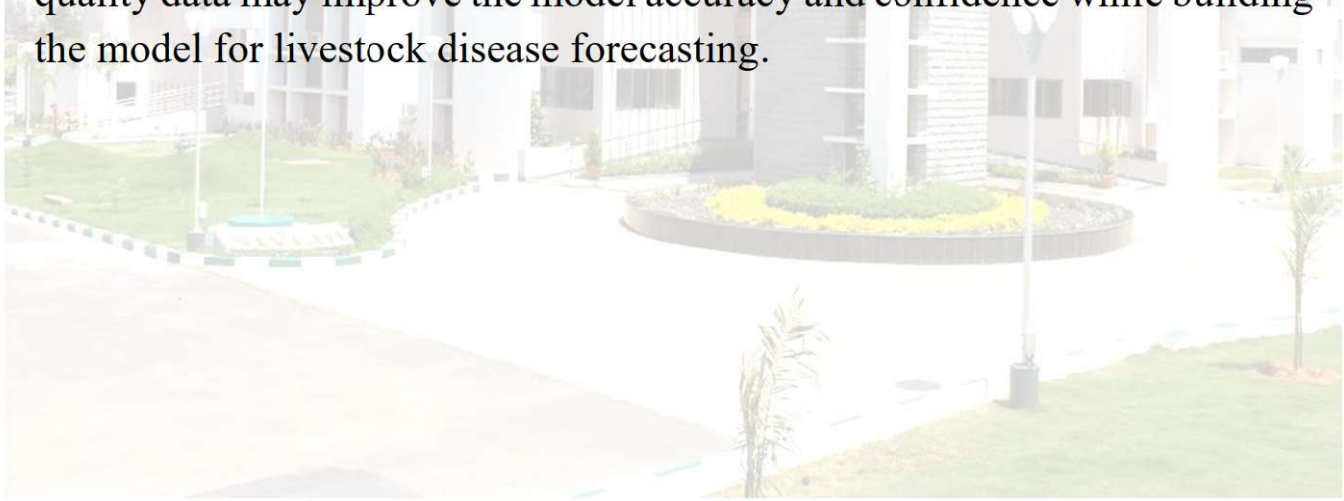


Table 9.1: Number of districts predicted for livestock diseases risk events and reported outbreaks

Sl No	Livestock diseases	January-2021		February-2021	
		No. of districts predicted for the disease risk events	No. of districts reported the disease outbreaks*	No. of districts predicted for the disease risk events	No. of districts reported the disease outbreaks*
1	Anthrax	20	3	29	4
2	Babesiosis	47	56	44	42
3	Black quarter	37	0	47	5
4	Bluetongue	0	1	0	2
5	Enterotoxaemia	20	6	21	8
6	Fascioliasis	56	50	46	50
7	Foot and mouth disease	69	13	54	21
8	Haemorrhagic septicaemia	40	9	47	6
9	Peste des petits ruminants	52	21	69	16
10	Sheep & Goat pox	41	9	35	6
11	Swine fever	43	6	54	4
12	Theileriosis	41	72	51	43
13	Trypanosomosis	37	81	45	43

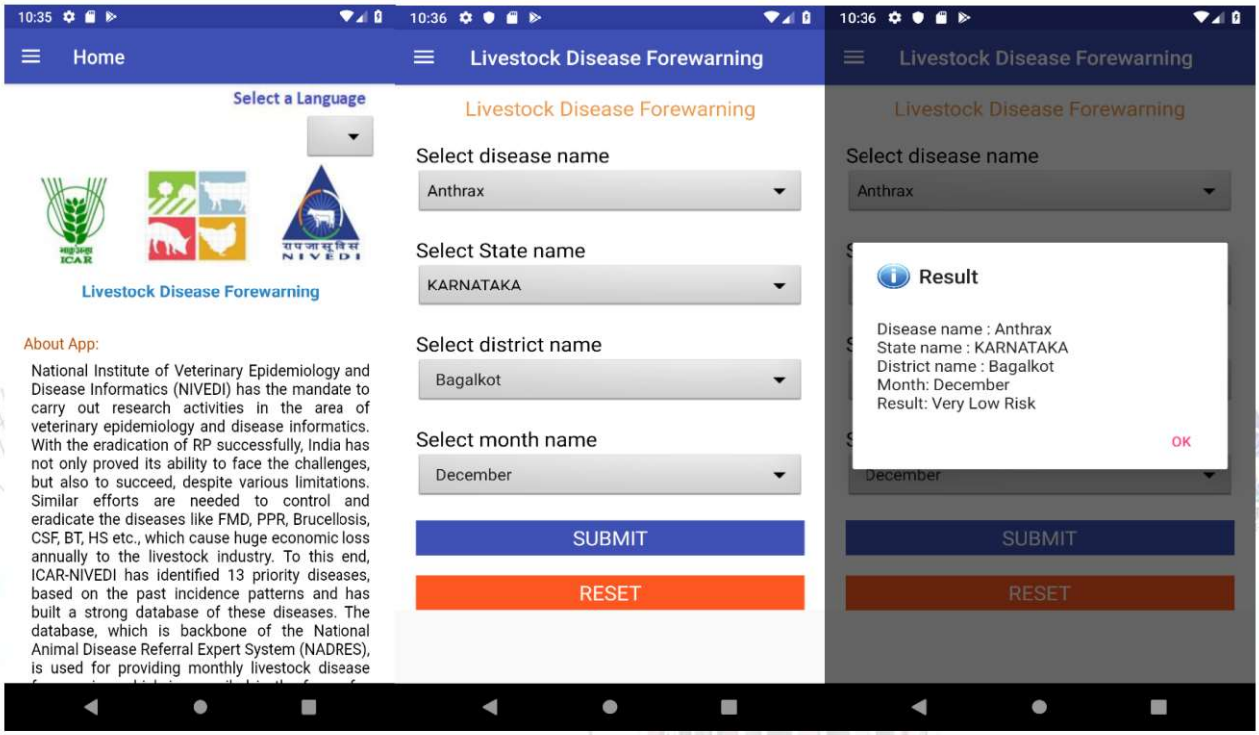
*Which takes in to account of action taken for prediction and non-reporting of cases

10. Launch of Mobile Android app&link to download

Livestock forewarning application **(**LDF**)** can be downloaded following the link provided:http://www.nivedi.res.in/android_nadres/LDF.apkand google play storelinkalso provided https://play.google.com/store/apps/details?id=info.androidhive.ldf

Further launch of LDF application was done, the news provided below**.**

Livestock Disease Forewarning (LDF Mobile App)



To extend the reach of the NADRES forewarning bulletin among the various stakeholders, a Mobile Application named Livestock Disease forewarning app "LDF-Mobile *App"* was developed. The forewarning methodology adapted in the "mobile app" remains the same as monthly bulletin; it provides user interface to know the predicted forewarning results stored in NADRES MySQL database. A PHP web-based service is developed in Java to extract the results of forewarning two months in advance by keying state name, district name and disease name and display the same in the mobile app. In addition to forewarning, the LDF-Mobile App also provides the details of clinical samples to be collected in case of outbreaks of the listed diseases for laboratory confirmation and immediate preventive measures to be taken up in case of positive prediction/disease confirmation. The LDF mobile app is available at ICAR-NIVEDI website. It is available on Google play store.

11.FARMERS EMPOWERMENT THROUGH IT: DISEASE RISK COMMUNICATION (COLLABORATION WITH FRUITS, NIC, GOVT. OF KARNATAKA)

In addition to NADRES V_2 (The National Animal Disease Referral Expert System), ICAR-NIVEDI collaborated with NIC, Govt. of Karnataka, Karnataka State for sending the SMS alerts directly to farmers who have registered in FRUITS (Farmers Registration and Unified Beneficiary Information System). The information alerts on risk prediction of three livestock diseases were sent through SMS to farmers is presented in Table 11.A. During 2022, a total of **7,86,945** SMS alerts were sent to farmers.

Table 11.A: Number of famers received the SMS alert through FRUITS application during March 2022.

Disease Name	District Name	No. of farmers received SMS	Disease Name	District Name	No. of farmers received SMS
Anthrax	Bellary	2915	FMD	Bangalore Urban	25754
	Davanagere	25375		Bangalore Rural	36869
	Koppal	15380		Chikkaballapur	38695
	Mysore	113070		Dakshina Kannada	37590
	Tumkur	91427		Kodagu	2975
BQ	Hassan	82780		Koppal	15381
	Mysore	113037		Ramanagar	58704
	Tumkur	91427			
				Grand Total	**786945**

12. Appendix

a) R Code

```
#parsmonth_number=8; year_number=2006; current_year=2017;

nadres_func=function (current_year, year_number, month_number)

{

args= commandArgs(trailingOnly=TRUE)

if (length(args)<3) {

stop("Correct number of arguments must be supplied", call.=FALSE)

  }

current_year=args[1]

year_number=args[2]

month_number=args[3]

df_total<-NULL

month_name=data.frame(month=c(1:12),

month_names=c("February","February","October","October","May","October","October","October
","October","October","January","January")

)

ss<-fread(file="NADRES.csv",header=T,check.names = F)

col_pars=names(ss)

vars= paste(col_pars[7:ncol(ss)],collapse = "+")

options(verbose = F)

for(disease in c(8,10,11,12,24,31,35,37,48,60,62,65,70,72,79))

{

# disease=8

rs<-dbSendQuery(mydb,"SELECT
index_state.state_name,index_state.state_id,index_district.district_id, index_district.district_name,
```

```
year_list.year, outbreak_data_final.month, ls_sp_index.species_name,disease_master.disease_id,
disease_master.disease_name, outbreak_data_final.number_of_outbreaks,
outbreak_data_final.number_susceptible, outbreak_data_final.number_of_attacks,
outbreak_data_final.number_of_deaths


 FROM ls_sp_index INNER JOIN (year_list INNER JOIN (disease_master INNER JOIN
(index_district INNER JOIN (index_state INNER JOIN outbreak_data_final ON
index_state.state_id= outbreak_data_final.state_id) ON index_district.district_id =
outbreak_data_final.district_id) ON disease_master.disease_id= outbreak_data_final.disease_id)
ON year_list.year = outbreak_data_final.year) ON ls_sp_index.species_id=
outbreak_data_final.species_id; ")
data = fetch(rs, n=-1)

 # year change

data<-subset(data,data$year>=year_number&data$disease_id==disease)

df<-sqldf("SELECT
state_id,state_name,district_id,district_name,disease_id,disease_name,month,sum(number_of_outbr
eaks)as outbreak FROM data GROUP BY
state_id,district_id,state_name,district_name,month,disease_id,disease_name",drv="SQLite")

ss1<-subset(ss,ss$disease_id==disease)

attach(ss1,warn.conflicts = F)

attach(df,warn.conflicts = F)

dd<-merge(ss1, df, by = c("state_id","district_id","disease_id","month"),all.x=TRUE)

attach(dd,warn.conflicts = F)

out<-data.frame(outbreak)

out<-ifelse(outbreak>=1,1,0)

out[is.na(out)]<-0

final<-cbind(dd,out)

 final1<-final[which(final$disease_id==disease),]

cat("For disease: ",as.character(unique(ss1["disease_name"])),"\n")
```

```
ncs= ncol(final1)-5

temp = data.frame(final1[,8:ncs])

for(i in 1:ncol(temp)){

temp[is.na(temp[,i]), i] <- mean(temp[,i], na.rm = TRUE)

 }

 final2<-
cbind(final1$state_id,final1$state_name.x,final1$district_id,final1$district_name.x,final1$disease_i
d,final1$disease_name.x,final1$out,final1$month,temp)

setnames(final2,old=c("final1$state_id","final1$state_name.x","final1$district_id","final1$district_
name.x","final1$disease_id","final1$disease_name.x","final1$out","final1$month"),new=c("state_id
","state_name","district_id","district_name","disease_id","disease_name","out","month"))



formula=paste("out ~",vars)

as.formula(formula)

model<-glm(formula,data= final2, family = binomial(link="logit"),maxit=20)

new<-data.frame(final2[,8:ncol(final2)])

prediction<-predict(model,type="response")

n2=randomForest(as.formula(formula),final2)
 prediction_rf<-predict(n2,type="response")

 gbm_model=gbm.step(data=final2, gbm.x = 8:ncol(final2), gbm.y = 7, family = "bernoulli",
tree.complexity = 1, learning.rate = 0.01,
 bag.fraction= 0.5, n.trees = 5,keep.fold.fit=T,tolerance.method="fixed" , step.size= 5,n.folds =
10)
 prediction_gbm<-predict(gbm_model,n.trees=gbm_model$gbm.call$best.trees,type="response")
 prediction=numeric()
 for (i in 1:length(prediction_glm)) {
  # if(prediction_glm[i]>prediction_rf[i])
  # {
  #   if(prediction_glm[i]>prediction_gbm[i])
  #   {
  #     prediction[i]=prediction_glm[i]
  #   }
    if(prediction_glm[i] >= prediction_gbm[i] &&prediction_glm[i] >= prediction_rf[i])
    {
```

```
  prediction[i]=prediction_glm[i];
 }

 if(prediction_gbm[i] >= prediction_glm[i] &&prediction_gbm[i] >= prediction_rf[i])
 {
  prediction[i]=prediction_gbm[i];
 }

 if(prediction_rf[i] >= prediction_glm[i] &&prediction_rf[i] >= prediction_gbm[i]) {
  prediction[i]=prediction_rf[i];
 }

 }
summary(prediction)
vv<-round(prediction,2)

 df1<-cbind(final2,vv)

df_total<-rbind(df_total,df1)

gc()

}

f=function(m){

if(m<=0.0) i=1

else if(m>=0.0 && m<=0.20) i=2

else if(m>=0.21 && m<=0.40) i=3

else if(m>=0.41 && m<=0.60) i=4


else if(m>=0.61 && m<=0.80) i=5

elsei=6

}

df_total$cate=factor(mapply(f,df_total$vv),levels=1:6,labels=c("","","","MR","","HR"))

write.csv(df_total,"nadres_outbreak.csv")

###### ACCURACY

df_total=read.csv("nadres_outbreak.csv",header = T)
```

```
dir.create(path = paste(month_name[month_number,2],current_year))

df_poa=df_total

df_poa$cate=factor(mapply(f,df_poa$vv),levels=1:6,labels=c(0,0,0,0,1,1))

df_poa=df_poa[which(df_poa$month==month_name[month_number,1]),]

df_p=df_poa[,c("disease_name","out","cate")]

df_acc=cbind(data.frame(c(1:ow(df_tot_res))),data.frame(df_tp_tn[,1]),(df_tp_tn[,2]/df_tot_res[,2])*
100)

df_acc=setNames(df_acc,c("No","Disease","Accuracy"))

print(df_acc)

dis_acc=paste(paste(month_name[month_number,2]," ",current_year,"/",sep= ""),"Disease
Accuracy ",month_name[month_number,2]," ",current_year,".csv",sep="")

write.csv(df_acc,dis_acc,row.names = F)

##########PLOT

i=1

plot_dir=paste(paste(month_name[month_number,2],"
",current_year,"/",sep=""),month_name[month_number,2]," ",current_year," N",sep="")

dir.create(path = plot_dir)

disease = c(8,10,11,12,31,35,37,48,60,65,70,72,79)

while(i<=length(disease))

{

kar=readOGR(dsn = "1shp/2011_Dist.shp",verbose = FALSE)

cols=as.character(unique(df_total[df_total$disease_id==disease[i],"disease_name"]))

df_disease=df_total[which(df_total$month==month_name[month_number,1]
&df_total$disease_id==disease[i]),]

df_disease=df_disease[,c(2:5,(ncol(df_disease)-1))]
```

```
df_disease=setNames(df_disease,c("ST_CEN_CD","state_name","DT_CEN_CD","district_name","
vv"))

kar@data=merge(data.frame(kar@data),data.frame(df_disease),by=c("ST_CEN_CD","DT_CEN_C
D"),all.x=T)

kar$vv[is.na(kar$vv)]<-0

#View(kar@data)

colours<-c("#FFFFFF","#FFFF00","#FFC1C1","#FF7150","#FF8500","#FF0000")

kar$lb=factor(mapply(f,kar$vv),levels=1:6,labels=c("No Risk / No Data","Very Low
Risk","LowRisk","MediumRisk","HighRisk","Very High Risk"))

cols=gsub("&", "and",cols)

disname= gsub("\\."," ",cols)

cat("Plot for disease:",disname,"\n")

plot_loc=paste(plot_dir,"/",disname,"/",sep="")

dir.create(plot_loc)

file_name=paste(plot_loc,disname,".png",sep="")

plot_title= paste(disname," risk prediction(",month_name[month_number,2],"
",current_year,")",sep="")

png(file_name)

print(spplot(obj=kar,c("lb"),col.regions=colours,main= plot_title,scales=list(draw = TRUE)))

dev.off()

i=i+1
```

b) Abbreviations

NADRES	:	National Animal Disease Referral Expert System
R	:	R environment for statistical computing
BQ	:	Black Quarter
BT	:	Bluetongue
ET	:	Enterotoxaemia
FMD	:	Foot and Mouth disease
HS	:	Haemorrhagic Septicaemia
PPR	:	Peste des Petits Ruminants
SGP	:	Sheep and Goat pox
SF	:	Swine Fewer
hPa	:	Hectopascals
NR	:	No risk/No data available
VLR	:	Very low risk
LR	:	Low risk
MR	:	Moderate risk
HR	:	High risk
VHR	:	Very high risk

13. INFECTIONWITHSARS-COV-2INANIMALS

Aetiology, Epidemiology, Diagnosis, PreventionandControl

Lastupdatedon 3July2020

SARS-Coronavirus-2 (SARS-CoV-2) is the pathogenic agent that causes the disease COVID-19 and was first reported in December 2019. SARS-CoV-2 is thought to have emerged from an animal source and then spilled-over to the human population. Although genetically closely related viruses have been isolated from *Rhinolophus* bats, the exact source of SARS-CoV-2 and route of introduction into the human population has not been established.

The current pandemic of COVID-19 is being sustained through human-to-human transmission. Animal infections with SARS-CoV-2 have been reported by several countries. Several animal species have proven to be susceptible (Table 1) to infection with SARS-CoV-2 either naturally or by experimental infection. Important livestock species (pigs and poultry) have been demonstrated not to be susceptible to infection through experimental studies. Further studies are needed to understand if and how different animals could be affected by SARS-CoV-2.

It is important to monitor infections in animals to better understand their epidemiological significance for animal health, biodiversity, and human health. Evidence from risk assessments, epidemiological investigations, and experimental studies do not suggest that live animals or animal products play a role in SARS-CoV-2 infection of humans.

Infection with SARS-CoV-2 is not included in the OIE List of Diseases. However, consistent with the reporting obligations of Members outlined in Articles 1.1.4. and 1.1.6. of the OIE *Terrestrial Animal Health Code* relating to emerging diseases, the disease should be notified to the OIE through the OIE's World Animal Health Information System or via email.

Aetiology

Classification of the causative agent

Corona viruses (CoVs) are enveloped, positive-sense, single-stranded RNA viruses. SARS-CoV-2 is a *beta coronavirus*, a genus that includes several coronaviruses (SARS-CoV, MERS-CoV, bat SARS-like CoV, andothers) isolated from humans, bats, camels, and other animals.

Susceptibility to physical and chemical action.

SARS-CoV-2 is inactivated by 62–71 % ethanol, 0.5% hydrogen peroxide or 0.1% sodium hypochlorite, within 1 minute, or 0.05–0.2 % benzalkonium chloride or 0.02 % chlorhexidine digluconate.

Survival:

In experimental conditions, SARS-CoV-2 remained viable in the environment after aerosolisation for at least 180 minutes. Experiences with other CoVs such as SARS-CoV, MERS-CoV, or endemic human corona viruses show that:

They can persist on surfaces such as metal, glass or plastic for up to 9 days, but can be efficiently inactivated by surface disinfection procedures, as listed above.

SARS-CoV was found to remain infectious for 14 days at 4 °C, but for only 2 days at 20 °C in sewage water.

.

Epidemiology

Hosts

Although current evidence suggests that SARS-CoV-2 emerged from an animal source, that source has yet to be identified. The pandemic is driven by person-to-person transmission through respiratory droplets from coughing, sneezing, and talking. Genetic sequence data reveal that SARS-CoV-2 is genetically closely related to other corona viruses circulating in *Rhinolophus* bat (horseshoe bat) populations. To date, there is not enough scientific evidence to identify the source of SARS-CoV-2 or to explain the original route of transmission to humans (which may involve an intermediate host).

Several animal species have tested positive for SARS-CoV-2, mostly as a result of close contact with humans infected with SARS-CoV-2. In addition, preliminary findings from experimental infection studies suggest that poultry and pigs are not susceptible to SARS-CoV-2 infection. The list of animal species for which information on natural or experimental infection is available is presented in Table 13.1.

Table13.1 . Summaryof findingsinanimalstodate

Species	**Type of infection**	**Susceptibility** (none/low/high)	**Clinical signs**	**Transmission**
Pigs	Experimental	None	No	No
Poultry (chicken, ducks, and turkeys)	Experimental	None	No	No
Dogs	Natural and experimental	Low	No (possible in some cases)	No
Cats(domestic)	Natural and experimental	High	Yes (none to very mild in some cases)	Yes, between cats
Tigersandlions	Natural	High	Yes	Yes, between animals
Ferrets	Experimental	High	No (very mild in some cases)	Yes, between ferrets
Minks (Americanminks, *Neovisonvison*)	Natural	High	Yes	Yes, between minks and suggested from mink to humans
Egyptian fruit bats (*Rousettus aegyptiacus*)	Experimental	High	No	Yes, between Fruitbats
Golden Syrian hamsters	Experimental	High	Yes (none to very mild in some cases)	Yes, between hamsters
Macaques (*Macacafascicularis*and *Macacamulatta*)	Experimental	High	Yes	Yes

Transmission

Information on the routes of transmission of SARS-CoV-2 among animals is limited. However, as for other respiratory viruses, it appears to be transmitted to animals and between animals by direct contact (e.g droplets). SARS-CoV-2 has been found in secretions from the respiratory tract and in faeces.

Viraemia, incubation and infectious period

In laboratory settings, the incubation period in animals appears to be similar to the one seen in humans (i.e., between 2 and 14 days, with a mean duration of 5 days). However, more studies are required to solidly estimate the mean duration of incubation and the infectious periods.

Sources of virus

The main source of the virus is respiratory droplets and respiratory secretions, although it is possible to isolate SARS-CoV-2 from faeces of infected animals.

Pathogenesis

In laboratory settings, infected animals showed presence of the virus in the respiratory tract and, in some cases, lesions in the trachea and lungs, associated with dyspnoea and cough.

Occurrence and impact

There have been sporadic reports of companion animals and captive wild animals infected with SARS-CoV-2. With regard to production animals, to date, SARS-CoV-2 has only affected mink farms in the Netherlands, with high morbidity and low mortality.

Diagnosis

Knowledge about the susceptibility of different animal species to SARS-CoV-2 infection and clinical signs is, to date, limited (see Table 1).

Clinical diagnosis

Knowledge about clinical disease manifestations in animals is limited. Current evidence suggests clinical signs may include, but are not limited to, coughing, sneezing, respiratory distress, nasal discharge, ocular discharge, vomiting or diarrhoea, fever and lethargy. As in humans, asymptomatic infections occur.

Lesions

More studies are needed to systematically categorise the lesions resulting from infection with SARS-CoV-2 in animals.

In transgenic mice expressing the human version of the SARS-CoV-2 ACE2 receptor, the typical histopathology outcome was interstitial pneumonia with significant inflammatory cell infiltration around the bronchioles and blood vessels, and viral antigens were detected in bronchial epithelial cells and alveolar epithelial cells. These pathological findings were not seen in wild type mice infected with SARS-CoV-2. In golden Syrian hamsters, histopathological changes were reported in the respiratory tract and spleen. Rhesus macaques infected with SARS-CoV-2 presented lesions similar to those seen in humans. Juvenile cats infected with SARS-CoV-2 presented massive lesions in the

nasal and tracheal mucosa epithelia, and lungs. SARS-CoV-2 can replicate in the upper respiratory tract of ferrets without causing severe disease and only resulting in pathological findings such as severe lymphoplasmacytic perivasculitis and vasculitis, increased numbers of type II pneumocytes, macrophages, and neutrophils in the alveolar septa and alveolar lumen, and mild peri bronchitis in the lungs.

Differential diagnosis

All other causes for respiratory or digestive illness should be excluded before a tentative diagnosis for infection with SARS-CoV-2 is made. Existence of an epidemiological link with a confirmed infection in humans or other animals should be considered when narrowing down the list of differential diagnoses.

Laboratory confirmatory tests are necessary for a final diagnosis.

Laboratory diagnosis

Samples

Depending on the type of test, samples may include single or combinations of oropharyngeal, nasal, and rectal swabs, and blood. Faecal samples may be used in situations where direct sampling is not possible due to risks to the animal or testing staff. Tests should be validated for the purpose, species and matrix to be analysed.

Procedures

Agent identification

- Reverse-transcription polymerase chain reaction (RT-PCR);
- Reverse transcription loop-mediated isothermal amplification (RT-LAMP);
- Other molecular tests developed for use in humans;
- Virus isolation;
- Virus genome sequencing.

Detection of immune response:

- ELISA antibody test;
- Virus neutralisation test (VNT);
- Several other tests for antibody detection.

Prevention and control

Biosecurity and hygiene measures are key to preventing transmission of SARS-CoV-2.

People who are suspected or confirmed to be infected with SARS-CoV-2 should restrict contact with mammalian animals, including pets, just like they would with people during their illness.

Animals suspected or confirmed to be infected with SARS-CoV-2 should remain separated from other animals and humans.

References

1. Bylaiah, S., Shedole, S., Suresh, K.P., Gowda, L., Shivananda, B., Shivamallu, C. and Patil, S.S., 2022. Disease Prediction Model to Assess the Impact of Changes in Precipitation Level on the Risk of Anthrax Infectiousness among the Livestock Hosts in Karnataka, India. *International Journal of Special Education*, *37*(3).
2. Suma, A. P., Suresh, K. P., Gajendragad, M. R., Kavya, B.A. (2017). Forecasting Anthrax in Livestock in Karnataka State using Remote Sensing and Climatic Variables, Int. J. Sci. Res, 6 (5), 78-96.
3. Suresh KP, Bhavya AP, Chandan S, Raghu R A, Silina E, Stupin V, Shiva P K, Bibek R S and Sharanagouda S P, 2022, Seroprevalence of sheeppox and goatpox virus in Asia and African continent: A systematic review and meta-analysis (Scientometrics), Veterinary world, 51(2):455-464Suresh, K.P., Hemadri, D., Kruli, R., Dheeraj, R. and Roy, P., 2019. Application of Artificial Intelligence for livestock disease prediction. 69(3), 60-62.
4. Nandi, S., Suresh, K.P. and Mondal, S., 2013. Ammonia and urea levels in blood and ovarian follicular fluid in cattle fed with normal and protein rich or imbalanced diet: A meta-analysis. *Indian Journal of Animal Sciences*, *83*(5), pp.557-559.
5. Sowjanya Kumari, S., Panduranga, B.A., Nayak, A., Kumar, K.V., Bokade, P.P., Suresh, K.P., Shome, B.R. and Balamurugan, V., 2021. Peste Des Petits Ruminants in Atypical Hosts and Wildlife: Systematic Review and Meta-Analysis of the Prevalence between 2001 and 2021. *Archives of Razi Institute*, *76*(6), pp.1589-1606.
6. M. Denis, V. Vanderweerd, R. Verbeeke, A. Laudisoit, L. Wynants, D. Van Der Vliet (2020). COVIPENDIUM: information available to support the development of medical counter measures and interventions against COVID-19 (Version 2020-05-05). Transdisciplinary Insights. http://doi.org/10.5281/zenodo.3782325
7. QuestionsandAnswersonCOVID19,(consultedon11/05/2020), https://www.oie.int/en/scientific-expertise/specific-information-and-recommendations/questions-and-answers-on-2019novel-coronavirus/
8. Considerations for sampling, testing, and reporting of SARS-CoV-2 in animals, (consulted on 11/05/2020), https://www.oie.int/fileadmin/Home/eng/Our_scientific_expertise/docs/pdf/COV-19/Sampling_Testing_and_Reporting_of_SARS-CoV 2_in_animals_final_7May_2020.pdf
9. Cohen J. (2020). From mice to monkeys, animals studied for corona virus answers. *Science*, Vol.368, Issue 6488; pp.221-222 https://science.sciencemag.org/content/368/6488/221
10. CDC, Corona virus Disease 2019 (COVID-19)–pets & other animals (consulted on 29/05/2020) https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/positive-pet.html

EPIDEMIOLOGY OF COVID-19

Epidemiology of COVID-19 ALL INDIA											
Number of Infections (5 laks Increment)	**No of days taken to reach since 22 Jan-2020**	**date reached since 22 Jan-2020**	**Cumulative Number of deaths**	**CFR**	**avg. daily deaths**	**R_0 for confirmed cases**	**Required herd Immunity (Threshold) R_0**	**Total Vaccine Administered (cum)**	**% of Immunity by Infection**	**% of immunity by vaccination**	**total % of Immunity gained**
1st 5 Lakh Cases	156 days	26-06-20	15685	3.06	116.0	1.872	46.58		0.04		0.04
Cum 10 Lakh Cases	20 days	16-07-20	25602	2.49	481.1	1.802	44.51		0.07		0.07
Cum 15 Lakh Cases	12 days	28-07-20	34193	2.23	711.5	1.762	43.25		0.11		0.11
cum 20 Lakh Cases	9 days	06-08-20	41585	2.04	809.4	1.732	42.26		0.14		0.14
cum 25 Lakh Cases	8 days	14-08-20	49036	1.97	932.2	1.732	42.26		0.18		0.18
cum 30 Lakh Cases	8 days	22-08-20	56706	1.90	964.3	1.722	41.93		0.22		0.22
cum 35 Lakh Cases	7 days	29-08-20	63498	1.82	973.0	1.702	41.25		0.25		0.25
cum 40 Lakh Cases	6 days	04-09-20	69561	1.74	996.3	1.692	40.9		0.29		0.29
cum 45 Lakh Cases	6 days	10-09-20	76271	1.70	1111.0	1.692	40.9		0.32		0.32
cum 50 Lakh Cases	5 days	15-09-20	82066	1.64	1157.6	1.692	40.9		0.36		0.36
cum 55 Lakh Cases	6 days	21-09-20	88935	1.62	1146.0	1.692	40.9		0.39		0.39
cum 60 Lakh Cases	6 days	27-09-20	95542	1.59	1101.5	1.692	40.9		0.43		0.43
cum 65 Lakh Cases	6 days	03-10-20	101782	1.57	1039.3	1.692	40.9		0.47		0.47

cum 70 Lakh Cases	7 days	10-10-20	108334	1.55	937.0	1.702	41.25		0.50		0.50
cum 75 Lakh Cases	8 days	18-10-20	114610	1.53	784.5	1.722	41.93		0.54		0.54
cum 80 Lakh Cases	10 days	28-10-20	120527	1.51	591.7	1.752	42.92		0.57		0.57
cum 85 Lakh Cases	10 days	07-11-20	126121	1.48	559.3	1.772	43.57		0.61		0.61
cum 90 Lakh Cases	12 days	19-11-20	132162	1.47	503.2	1.972	49.29		0.65		0.65
cum 95 Lakh Cases	13 days	02-12-20	138648	1.46	498.9	2.332	57.12		0.68		0.68
cum 100 Lakh Cases	16 days	18-12-20	145136	1.45	405.3	3.083	67.56		0.72		0.72
cum 105 Lakh Cases	26 days	13-01-21	151727	1.45	253.6	2.673	62.59		0.75		0.75
cum 110 Lakh Cases	39 days	21-02-21	156385	1.42	119.4	2.052	51.27	10651012	0.79	0.76	1.55
cum 115 Lakh Cases	25 days	18-03-21	159370	1.39	119.4	2.092	52.2	35923500	0.83	2.58	3.40
cum 120 Lakh Cases	10 days	28-03-21	161843	1.35	247.5	2.202	54.59	55180875	0.86	3.96	4.82
cum 125 Lakh Cases	7 days	04-04-21	165101	1.32	464.4	2.202	54.59	76405697	0.90	5.48	6.38
cum 130 Lakh Cases	4 days	08-04-21	167642	1.29	640.5	2.112	52.65	91881530	0.93	6.59	7.53
cum 135 Lakh Cases	3 days	11-04-21	170179	1.26	838.0	2.012	50.3	102000401	0.97	7.32	8.29
cum 140 Lakh Cases	3 days	14-04-21	173123	1.24	981.0	1.902	47.42	111913288	1.00	8.03	9.04
cum 145 Lakh Cases	2 days	16-04-21	175649	1.21	1260.0	1.822	45.12	117305344	1.04	8.42	9.46
cum 150 Lakh Cases	2 days	18-04-21	178769	1.19	1560.0	1.742	42.59	121207098	1.08	8.70	9.78
cum 155 Lakh Cases	2 days	20-04-21	182533	1.18	1882.0	1.701	41.21	127428887	1.11	9.15	10.26
cum 160 Lakh Cases	2 days	22-04-21	186920	1.17	2193.0	1.641	39.06	132754608	1.15	9.53	10.68
cum 165 Lakh Cases	1 days	23-04-21	189544	1.18	2624.0	1.611	37.93	135658324	1.18	9.74	10.92

cum 170 Lakh Cases	2 days	25-04-21	195123	1.15	2789.0	1.581	36.75	139185173	1.22	9.99	11.21
cum 175 Lakh Cases	1 days	26-04-21	197894	1.13	2771.0	1.561	35.94	142524947	1.26	10.23	11.48
cum 180 Lakh Cases	2 days	28-04-21	204832	1.14	3469.0	1.531	34.68	147053392	1.29	10.55	11.85
cum 185 Lakh Cases	1 day	29-04-21	208330	1.13	3498.0	1.521	34.25	149268772	1.33	10.71	12.04
cum 190 Lakh Cases	1 day	30-04-21	211853	1.12	3523.0	1.511	33.82	151998107	1.36	10.91	12.27
cum 195 Lakh Cases	1 day	01-05-21	215542	1.11	3689.0	1.510	33.77	153626325	1.40	11.03	12.43
cum 200 Lakh Cases	2 days	03-05-21	222408	1.11	3433.0	1.501	33.38	156082136	1.44	11.20	12.64
cum 205 Lakh Cases	1 days	04-05-21	226188	1.10	3780.0	1.491	32.93	157750752	1.47	11.32	12.79
cum 210 Lakh Cases	1 days	05-05-21	230168	1.10	3980.0	1.491	32.93	159931238	1.51	11.48	12.98
cum 215 Lakh Cases	2 days	07-05-21	238270	1.10	4051.0	1.481	32.48	165190000	1.54	11.86	13.40
cum 220 Lakh Cases	1 day	08-05-21	242347	1.10	4077.0	1.481	32.48	167493857	1.58	12.02	13.60
cum 225 Lakh Cases	1 day	09-05-21	246116	1.09	3769.0	1.471	32.02	168304868	1.61	12.08	13.69
cum 230 Lakh Cases	2 days	11-05-21	254197	1.11	4040.0	1.471	32.04	173862643	1.65	12.48	14.13
cum 235 Lakh Cases	1 day	12-05-21	258317	1.10	4120.0	1.461	31.58	176045577	1.69	12.63	14.32
cum 240 Lakh Cases	1 day	13-05-21	262317	1.09	4000.0	1.461	31.58	178361846	1.72	12.80	14.52
cum 245 Lakh Cases	2 days	15-05-21	270284	1.10	3983.0	1.461	31.58	181544536	1.76	13.03	14.79
cum 250 Lakh Cases	2 days	17-05-21	278719	1.11	4217.0	1.461	31.58	183817204	1.79	13.19	14.98
cum 255 Lakh Cases	2 days	19-05-21	287122	1.13	4201.0	1.451	31.10	186410600	1.83	13.38	15.21
cum 260 Lakh Cases	2 days	21-05-21	295525	1.14	4202.0	1.451	31.10	189344105	1.87	13.59	15.45
cum 265 Lakh Cases	2 days	23-05-21	303720	1.15	4098.0	1.451	31.10	191877460	1.90	13.77	15.67

cum 270 Lakh Cases	2 days	25-05-21	311388	1.15	3834.0	1.451	31.10	196463495	1.94	14.10	16.04
cum 275 Lakh Cases	2 days	27-05-21	318895	1.16	3754.0	1.451	31.10	201438120	1.97	14.46	16.43
cum 280 Lakh Cases	3 days	30-05-21	329100	1.18	3402.0	1.451	31.10	208907723	2.01	14.99	17.00
cum 285 Lakh Cases	4 days	03-06-21	340702	1.20	2901.0	1.451	31.10	219831571	2.05	15.78	17.83
cum 290 Lakh Cases	5 days	08-06-21	344082	1.22	2565.0	1.451	31.10	223642281	2.08	16.86	18.94
cum 295 Lakh Cases	5 days	13-06-21	374305	1.27	4155.0	1.451	31.10	250656362	2.12	17.99	20.10
cum 300 Lakh Cases	9 days	22-06-21	390660	1.30	1817.0	1.461	31.58	289961746	2.15	20.81	22.96
cum 305 Lakh Cases	10 days	02-07-21	401050	1.31	1039.0	1.471	32.04	339447068	2.19	24.36	26.55
cum 310 Lakh Cases	13 days	15-07-21	412531	1.33	884.0	1.481	32.50	390286930	2.22	28.01	30.23
cum 315 Lakh Cases	13 days	28-07-21	422662	1.34	780.0	1.481	32.50	445696580	2.26	31.99	34.25
cum 320 Lakh Cases	13 days	10-08-21	429179	1.34	501.0	1.502	33.40	517799432	2.30	37.16	39.46
cum 325 Lakh Cases	14 days	24-08-21	434756	1.34	398.0	1.511	33.82	594552135	2.33	42.67	45.00
cum 330 Lakh Cases	12 days	05-09-21	440752	1.34	499.0	1.521	34.25	686693339	2.37	49.28	51.65
cum 335 Lakh Cases	15 days	20-09-21	445385	1.33	309.0	1.511	33.82	817737078	2.40	58.69	61.09
cum 340 Lakh Cases	22 days	12-10-21	451189	1.33	264.0	1.511	33.82	963825324	2.44	69.17	71.61
cum 345 Lakh Cases	37 days	20-11-21	465349	1.35	383.0	-	-				
cum 350 Lakh Cases	39 days	04-01-22	482017	1.38	427.0	-	-				
cum 355 Lakh Cases	4 days	08-01-22	483463	1.36	362.0	-	-				
cum 360 Lakh Cases	3 days	11-01-22	484213	1.35	250.0	-	-				
cum 365 Lakh Cases	2 days	13-01-22	485131	1.33	459.0	-	-				

cum 370 Lakh Cases	2 days	15-01-22	485752	1.31	311.0	-	-				
cum 375 Lakh Cases	2 days	17-01-22	486451	1.30	350.0	-	-				
cum 380 Lakh Cases	2 days	19-01-22	487202	1.28	376.0	-	-				
cum 385 Lakh Cases	1 day	20-01-22	487693	1.27	491.0	-	-				
cum 390 Lakh Cases	2 days	22-01-22	488884	1.25	596.0	-	-				
cum 395 Lakh Cases	1 day	23-01-22	489409	1.24	525.0	-	-				
cum 400Lakh Cases	2 days	25-01-22	490462	1.23	527.0	-	-				
cum 405 Lakh Cases	2 days	27-01-22	491700	1.21	619.0	-	-				
cum 410 Lakh Cases	2 days	29-01-22	493198	1.20	749.0	-	-				
cum 415 Lakh Cases	3 days	01-02-22	496242	1.20	1015.0	-	-				
cum 420 Lakh Cases	2 days	03-02-22	499424	1.19	1591.0	-	-				
Cum 425 Lakh cases											

DATASOURCE

1.WORLD WIDE DATA SET: https://data.humdata.org/dataset/novel-coronavirus-2019-ncov-cases
2.VACCINATION DATA SET: https://api.covid19india.org/

CFR: Case Fatality rate , number of deaths for every 100 cases
Prepared by Spatial Epidemiology Lab , ICAR-NIVEDI, Bengaluru.

Customer/Client Feedback Form

Feedback for the Livestock Diseases Risk Forewarning Bulletin of April -2022, Volume 10 and Issue 04

(Please return this duly fill in after receiving the outbreak report of April -2022)

1. **Details of the number of districts with diseases reported vs. forecast in your state.**

Sl. No	Disease Name	No. of districts in which outbreaks occurred but not alerted**	Measures taken in case of disease forecasted: Yes or No.**	Any other
1.	Anthrax			
2.	Babesiosis			
3.	Black Quarter			
4.	Bluetongue			
5.	Enterotoxaemia			
6.	Fascioliasis			
7.	Foot and mouth disease			
8.	Haemorrhagic septicaemia			
9.	Peste des Petits Ruminants			
10.	Sheep & Goat pox			
11.	Swine fever			
12.	Theileriosis			
13.	Trypanosomosis			

**Details may be written here.

2. **What are the preventive measures taken in case of predicted outbreaks?**

3. **How would you rate your satisfaction with the following aspects of the services you have received or accessed?**

Description	**Very satisfied**	**Satisfied**	**Unsatisfied**	**Not sure**
Quality of services provided				
Timeliness of alerts received				
Benefits from forecasting of livestock diseases				
Your awareness of this service				

4. **Suggestions for further improvement of report.**

Sign and Signature with Designation

AICRP centre:

Dated:

भाकृअनुप
ICAR

हर कदम, हर डगर
किसानों का हमसफर
भारतीय कृषि अनुसंधान परिषद

Agrisearch with a human touch

ICAR-National Institute of Veterinary Epidemiology and Disease Informatics (ICAR_NIVEDI),

P. B. No.6450, Yelahanka, Bengaluru-560064

Phone: +91-80-23093111, Fax: +91-80-23093222, E-mail: director.nivedi@icar.gov.in