ICAR - National Institute of Veterinary Epidemiology and Disease Informatics

(ICAR - NIVEDI)

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June

LIVESTOCK DISEASE FOREWARNING REPORT

Powered by Artificial Intelligence

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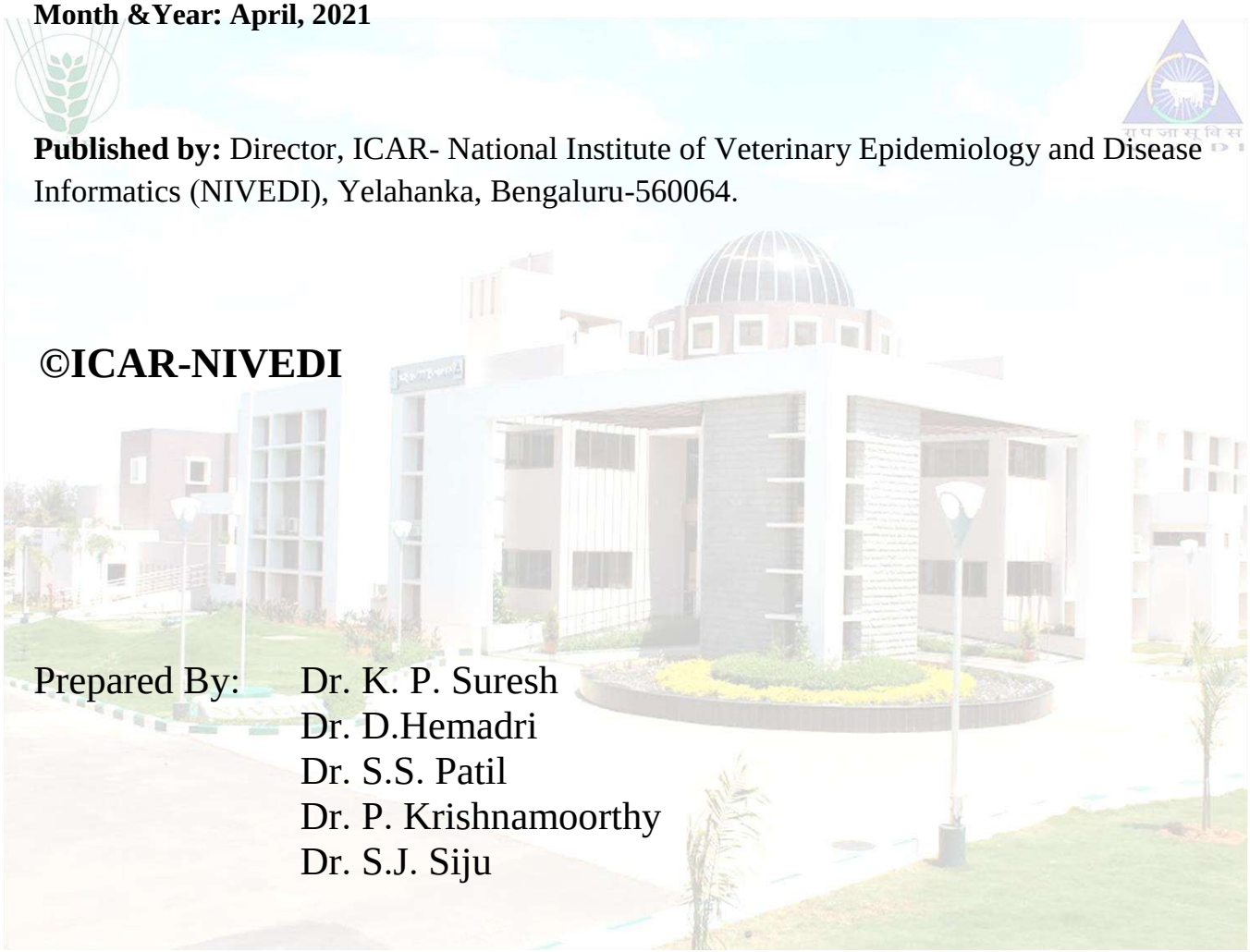

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NADRES WEBSITE MARCH MONTH VISITORS =1352 LDF MOBILE APP RATING = 3

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.

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Director (Acting)

ICAR- NIVEDI

Contents

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 ($NADRES_{v2}$), 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. This will help the farmers to fulfil the dream of doubling the farmer's income by 2020.

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 phenomenon 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 enables 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.

The livestock disease forecasting for June 2021 revealed Jharkhand, Assam, West Bengal, Karnataka and Kerala 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 more in Kerala (13) followed by Jharkhand (8) and Meghalaya (6) whereas predicted PPR outbreaks are more in Jharkhand (12). Further the co-occurrence of FMD and HS can be expected in Himachal Pradesh, Jharkhand, Karnataka, Kerala, Meghalaya, Manipur, Tripura, Odisha, and West Bengal. Among the different diseases in livestock, the predicted outbreaks are expected to be high for BQ (67) and Fasciolosis (54).

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. Further, India has witnessed emergence and re-emergence of various infectious pathogens during the last decade, of which most of the diseases are of zoonotic in nature which urge for the necessity of strengthening of monitoring and surveillance system in the country. 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 2021

Sl. No	State Name	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomosis	Total number of disease events likely to occur
1	Andaman and Nicobar	0	0	0	0	0	3	1	0	0	1	0	0	0	**05**
2	Andhra Pradesh	4	0	1	0	0	0	0	0	0	2	0	0	0	**07**
3	Arunachal Pradesh	0	0	0	0	0	3	2	0	0	0	0	0	0	**05**
4	Assam	0	0	17	0	2	14	0	10	2	4	9	2	0	**60**
5	Bihar	0	0	0	0	0	0	0	0	0	0	0	0	1	**01**
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	2	0	2	1	0	**06**
13	Himachal Pradesh	0	0	0	0	0	0	2	1	2	1	0	0	0	**06**
14	Jammu and Kashmir	0	0	1	0	0	0	0	0	0	5	0	0	0	**06**
15	Jharkhand	2	22	7	0	3	22	8	3	12	2	2	20	23	**126**
16	Karnataka	7	0	13	0	8	1	1	6	4	3	0	1	0	**44**
17	Kerala	2	0	0	0	0	0	13	8	6	0	1	2	1	**33**
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	0	1	3	0	2	0	**07**
21	Manipur	0	0	3	0	0	6	3	1	0	0	7	0	0	**20**
22	Meghalaya	2	0	3	0	0	0	6	3	00	2	6	0	0	**22**
23	Mizoram	0	0	1	0	0	0	1	0	0	0	2	0	0	**04**
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	1	1	3	4	1	0	2	0	**19**
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	2	0	0	2	0	2	0	1	1	0	0	0	**08**
30	Sikkim	0	0	0	0	0	0	0	0	0	0	0	0	0	**00**
31	Tamil Nadu	3	0	2	0	0	0	0	0	1	1	0	0	0	**07**
32	Telangana	0	0	0	0	2	0	0	0	0	1	0	0	0	**03**
33	Tripura	0	3	3	0	0	2	3	2	2	1	0	0	0	**16**
34	Uttar Pradesh	0	0	0	0	1	0	0	1	0	0	0	2	20	**24**
35	Uttarakhand	0	0	0	0	0	0	0	0	2	0	0	0	0	**02**
36	West Bengal	2	1	12	0	0	0	2	8	9	1	0	6	4	**45**
Total number of districts likely to report		**27**	**32**	**67**	**00**	**19**	**54**	**45**	**50**	**49**	**29**	**34**	**40**	**49**	**495**

*Number of predicted disease incidence was summarised considering only High risk and Very high risk

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 V2 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) fromDepartment 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:

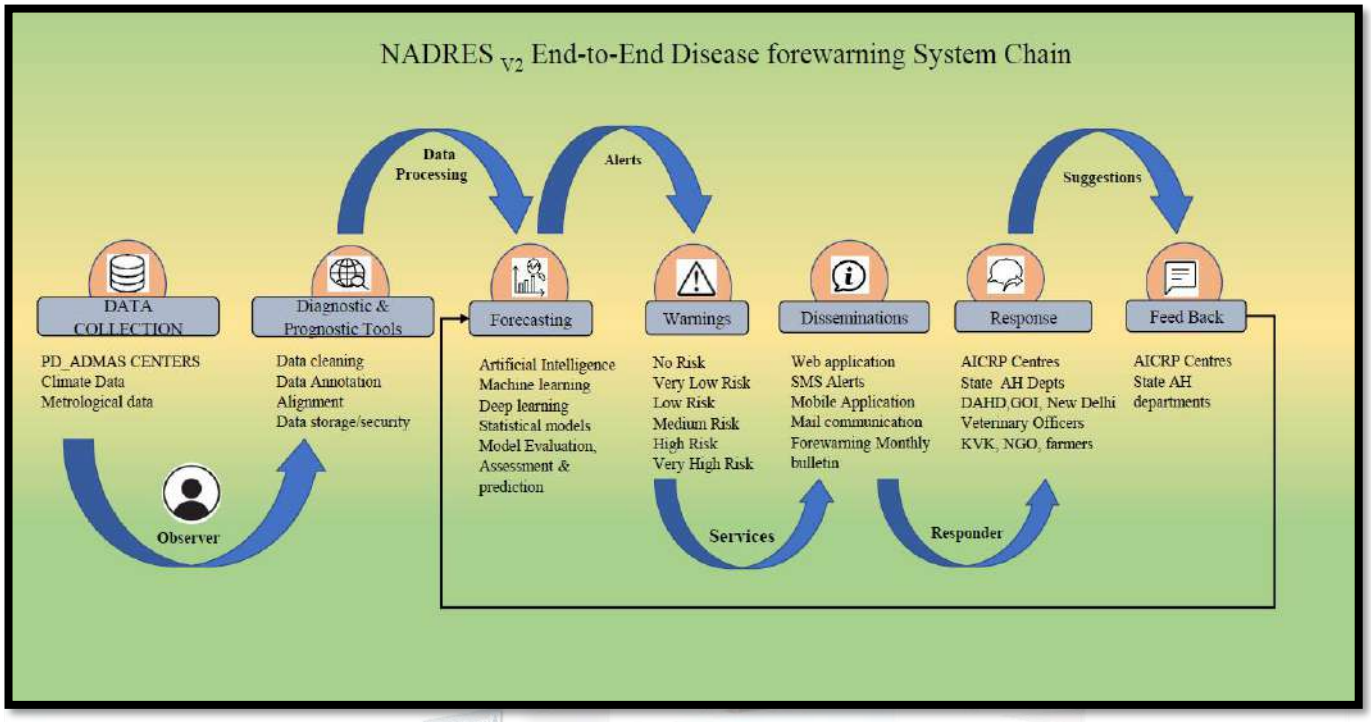

Fig 4.1). NADRES V2 Data Flow Diagram.

B) Artificial Intelligence enabled Data Capturing and Forewarning System:

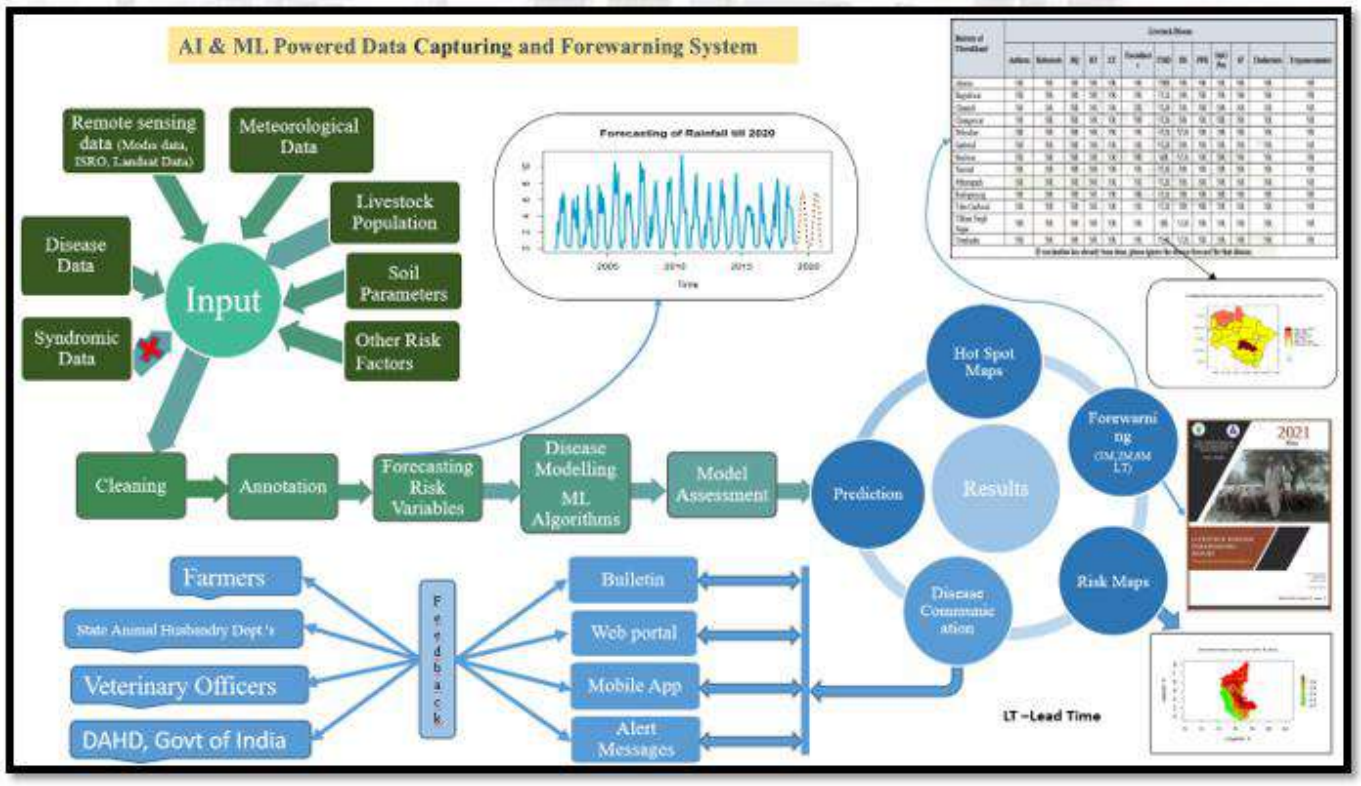

Fig 4.2). Data Capturing and Forewarning system

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.

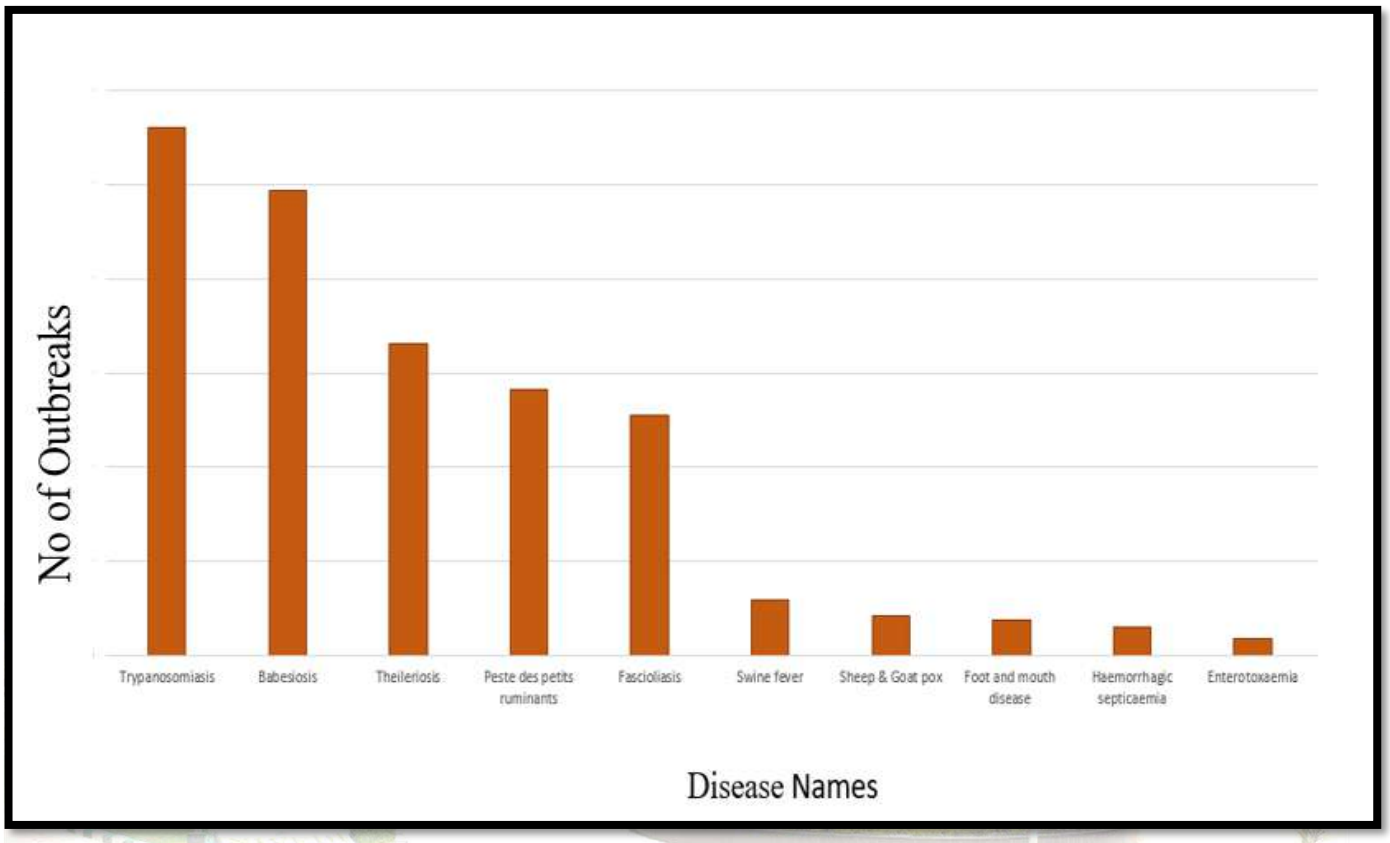

Fig 4.3. 2020 Top Ten diseases

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 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 situation 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,

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

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) reduces 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	98.61
3.	Black Quarter	96.60
4.	Blue Tongue	99.69
5.	Enterotoxaemia	99.85
6.	Fasciolosis	99.69
7.	Foot and mouth disease	96.45
8.	Haemorrhagic septicaemia	97.38
9.	Peste des Petits Ruminants	96.30
10.	Sheep & Goat pox	97.84
11.	Swine fever	99.69
12.	Theileriosis	99.69
13.	Trypanosomosis	99.54

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.

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

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.

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8. Forewarning of livestock disease for the month of June 2021

i). District wise Livestock Disease forewarning:

District wise Livestock Disease Risk Forewarning for June 2021: Andaman and Nicobar

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

District wise Livestock Disease Risk Forewarning for June 2021: Andhra Pradesh

Districts of Andhra Pradesh	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomiasis
Anantapur	NR	NR	NR	NR	NR	NR	NR	NR	VLR	***VHR***	NR	NR	NR
Chittoor	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
East Godavari	NR	NR	***VHR***	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Guntur	NR	NR	VLR	NR	NR	NR	VLR	VLR	VLR	NR	NR	NR	NR
Krishna	NR	NR	NR	NR	NR	NR	NR	VLR	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	VLR	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Visakhapatnam	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR
Vizianagaram	NR	NR	VLR	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
West Godavari	NR	NR	VLR	NR	NR	NR	VLR	VLR	VLR	NR	NR	NR	NR
Y.S.R.	***VHR***	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR

If vaccination is already has 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)

District wise Livestock Disease Risk Forewarning for June 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	VLR	NR	NR	NR	NR	NR	NR
Changlang	NR	NR	NR	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	NR	NR	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	NR	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	NR	NR	***VHR***	VLR	NR	NR	NR	NR	NR	NR
Papum Pare	NR	NR	NR	VLR	NR	***VHR***	VLR	NR	NR	NR	NR	NR	NR
Tawang	NR	NR	NR	NR	NR	NR	NR	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	VLR	NR	NR	NR	NR	NR	NR
Upper Subansiri	NR	NR	NR	NR	NR	NR	***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	NR	NR	NR	***VHR***	***HR***	NR	NR	NR	NR	NR	NR

If vaccination has 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)

District wise Livestock Disease Risk Forewarning for June 2021: Assam

Districts of Assam	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomiasis
Baksa	NR	NR	***VHR***	NR	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	VLR	NR	NR	NR	NR
Chirang	NR	NR	VLR	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Darrang	NR	NR	VLR	NR	***VHR***	***VHR***	NR	***VHR***	VLR	NR	NR	NR	NR
Dhemaji	NR	NR	***VHR***	VLR	NR	***VHR***	VLR	***VHR***	VLR	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	NR	NR	NR	VLR	NR	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	VLR	NR	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	VLR	NR	NR	***VHR***	NR	VLR	VLR	***HR***	***VHR***	NR	NR
Kamrup Metropolitan	NR	NR	MR	NR	NR	***VHR***	VLR	VLR	***HR***	NR	***VHR***	NR	NR
Karbi Anglong	NR	NR	***HR***	NR	NR	NR	VLR	NR	VLR	***VHR***	***VHR***	***VHR***	NR
Karimganj	NR	NR	***VHR***	NR	NR	NR	VLR	VLR	VLR	NR	NR	NR	NR
Kokrajhar	NR	NR	MR	NR	NR	NR	VLR	***VHR***	VLR	NR	VHR	NR	NR
Lakhimpur	NR	NR	***VHR***	NR	NR	***VHR***	VLR	***VHR***	VLR	NR	VHR	NR	NR
Morigaon	NR	NR	***VHR***	NR	NR	NR	NR	***VHR***	VLR	NR	NR	NR	NR

Continue

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

If vaccination has 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)

District wise Livestock Disease Risk Forewarning for June 2021: Bihar

Districts of Bihar	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomiasis
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	VLR	NR	VLR	NR	NR	NR	NR
Bhagalpur	NR	NR	VLR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Bhojpur	NR	VLR	NR	NR	NR	NR	VLR	NR	VLR	NR	NR	NR	***VHR***
Buxar	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Darbhanga	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Gaya	NR	VLR	VLR	NR	NR	NR	VLR	NR	VLR	NR	NR	NR	NR
Gopalganj	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Jamui	NR	NR	VLR	NR	NR	NR	NR	NR	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	NR	NR	NR	NR	NR
Kishanganj	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Lakhisarai	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Madhepura	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Madhubani	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Munger	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Muzaffarpur	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

Continue

Districts of Bihar	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomiasis
Nalanda	NR	NR	VLR	NR	NR	NR	VLR	NR	VLR	NR	NR	NR	NR
Nawada	NR	NR	VLR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Pashchim Champaran	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Patna	NR	VLR	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	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Saharsa	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Samastipur	NR	NR	VLR	NR	NR	NR	VLR	NR	VLR	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	VLR	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	NR	NR	NR	NR	NR
Siwan	NR	NR	NR	NR	NR	NR	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	VLR	NR	VLR	NR	NR	NR	NR

If vaccination has 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)

District wise Livestock Disease Risk Forewarning for June 2021: Chandigarh

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

If vaccination hasalready 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)

District wise Livestock Disease Risk Forewarning for June 2021: Chhattisgarh

Districts of Chhattisgarh	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomiasis
Bastar	NR	NR	NR	NR	NR	NR	VLR	NR	VLR	NR	NR	NR	NR
Bijapur	NR	NR	NR	NR	NR	NR	NR	NR	VLR	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	NR	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	NR	NR	NR	NR	NR	NR	NR
Narayanpur	NR	NR	NR	NR	NR	NR	NR	NR	NR	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

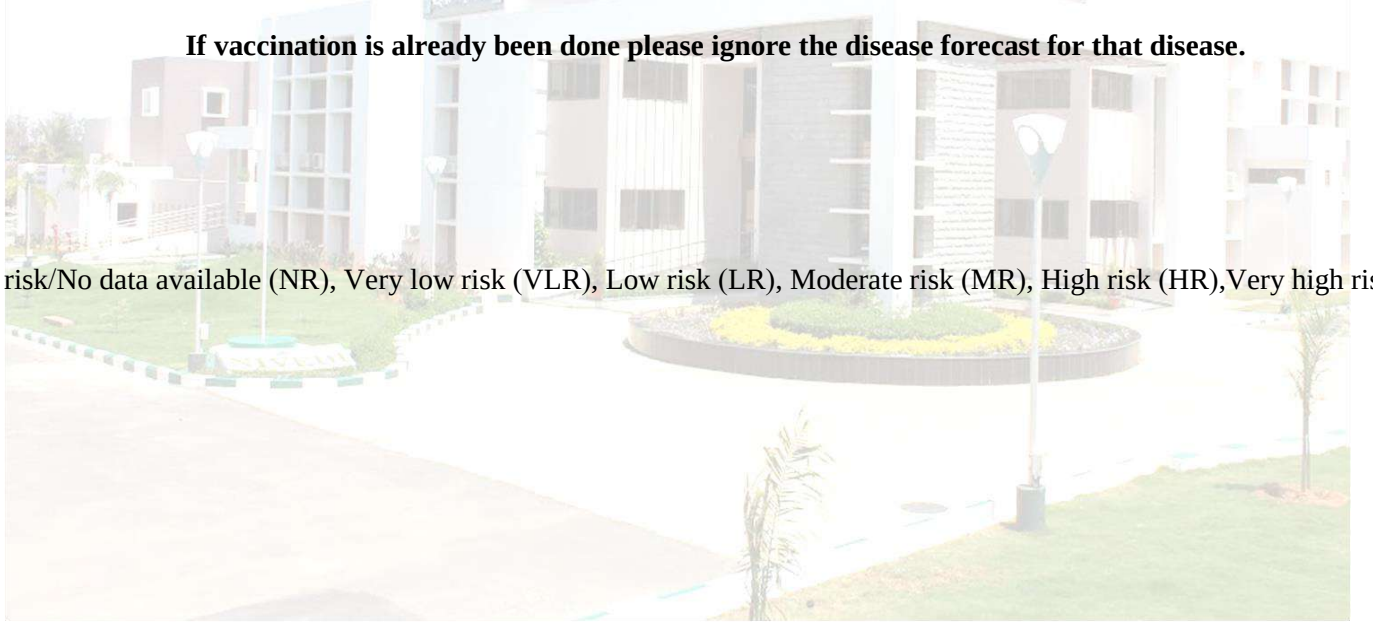
If vaccination hasalready been done, please ignore the disease forecast for that disease.

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

District wise Livestock Disease Risk Forewarning for June 2021: 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**	**Trypanosomiasis**
Dadra and Nagar Haveli	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	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)

District wise Livestock Disease Risk Forewarning for June 2021: Daman and Diu

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

District wise Livestock Disease Risk Forewarning for June 2021: Goa

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

District wise Livestock Disease Risk Forewarning for June 2021: Gujarat

Districts of Gujarat	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomiasis
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	VLR	NR	NR	NR	NR
Banas Kantha	NR	NR	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR	NR
Bharuch	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Bhavnagar	NR	VLR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Dohad	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR
Gandhinagar	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Jamnagar	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Junagadh	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Kachchh	NR	NR	NR	NR	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	VLR	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	VLR	NR	NR	NR	NR
Rajkot	NR	NR	NR	NR	NR	NR	NR	NR	NR	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 vaccination has 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)

District wise Livestock Disease Risk Forewarning for June 2021: Haryana

Districts of Haryana	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomiasis
Ambala	NR	NR	NR	LR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Bhiwani	NR	NR	NR	NR	NR	NR	NR	NR	***HR***	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	NR	NR	NR	NR	NR
Kaithal	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Karnal	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Kurukshetra	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	***VHR***	NR
Mahendragarh	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Mewat	NR	NR	NR	NR	NR	NR	NR	VLR	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	NR	NR	NR	NR	NR
Panipat	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Rewari	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Rohtak	NR	NR	NR	NR	NR	NR	NR	NR	NR	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 vaccination hasalready 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)

District wise Livestock Disease Risk Forewarning for June 2021: Himachal Pradesh

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

*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 2021: Jammu and Kashmir

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

If vaccination hasalready 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)

District wise Livestock Disease Risk Forewarning for June 2021: Jharkhand

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

If vaccination hasalready 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)

District wise Livestock Disease Risk Forewarning for June 2021: Karnataka

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

Continue

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

If vaccination hasalready 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)

District wise Livestock Disease Risk Forewarning for June 2021: Kerala

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

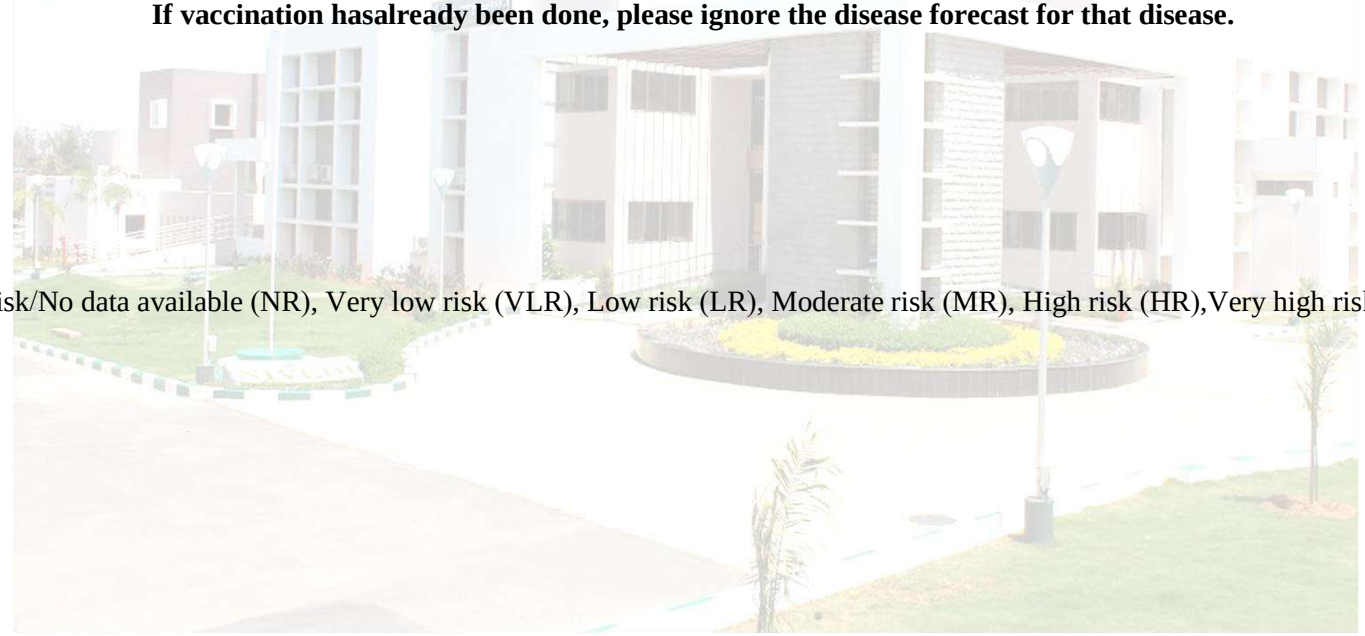
If vaccination hasalready been done please ignore the disease forecast for that disease.

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

District wise Livestock Disease Risk Forewarning for June 2021: Lakshadweep

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

If vaccination hasalready 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)

District wise Livestock Disease Risk Forewarning for June 2021: Madhya Pradesh

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

Continue

Districts of Madhya Pradesh	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomiasis
Khargone(West Nimar)	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR
Mandla	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Mandsaur	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR
Morena	NR	NR	NR	NR	NR	NR	VLR	NR	VLR	NR	NR	NR	NR
Narsimhapur	NR	NR	NR	NR	NR	NR	NR	VLR	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	NR	NR	NR	NR	VLR	NR	VLR	NR	NR	NR	NR
Ratlam	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Rewa	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR
Sagar	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Satna	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sehore	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Seoni	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR
Shahdol	NR	NR	NR	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	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR
Sidhi	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Singrauli	NR	NR	NR	NR	NR	NR	NR	NR	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	VLR	NR	NR	NR	NR	NR	NR
Vidisha	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR

If vaccination hasalready 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)

District wise Livestock Disease Risk Forewarning for June 2021: Maharashtra

Districts of Maharashtra	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomiasis
Ahmadnagar	NR	NR	NR	NR	NR	NR	NR	NR	NR	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	NR	NR	VLR	***HR***	NR	NR	NR
Aurangabad	NR	NR	NR	NR	NR	NR	NR	NR	***VHR***	***VHR***	NR	NR	NR
Bhandara	NR	NR	VLR	NR	NR	NR	VLR	NR	VLR	NR	NR	NR	NR
Bid	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR
Buldana	NR	NR	NR	NR	NR	NR	VLR	NR	VLR	NR	NR	NR	NR
Chandrapur	NR	NR	VLR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Dhule	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Gadchiroli	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Gondiya	NR	NR	VLR	NR	NR	NR	VLR	NR	VLR	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	NR	NR	NR	NR	NR
Jalna	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Kolhapur	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Latur	NR	NR	NR	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	NR	NR	NR	NR	VLR	NR	VLR	NR	NR	NR	NR
Nandurbar	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Nashik	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Osmanabad	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

Continue

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

If vaccination has 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)

District wise Livestock Disease Risk Forewarning for June 2021: Manipur

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

If vaccination hasalready 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)

District wise Livestock Disease Risk Forewarning for June 2021: Meghalaya

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

If vaccination hasalready 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)

District wise Livestock Disease Risk Forewarning for June 2021: Mizoram

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

If vaccination hasalready 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)

District wise Livestock Disease Risk Forewarning for June 2021: Nagaland

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

If vaccination hasalready 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)

District wise Livestock Disease Risk Forewarning for June 2021: NCT of Delhi

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

If vaccination has 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)

District wise Livestock Disease Risk Forewarning for June 2021: Odisha

Districts of Odisha	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomiasis
Anugul	***VHR***	NR	NR	NR	NR	NR	NR	***VHR***	VLR	NR	NR	NR	NR
Balangir	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Baleshwar	NR	NR	VLR	NR	NR	NR	VLR	VLR	VLR	NR	NR	NR	NR
Bargarh	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Baudh	NR	NR	NR	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	***VHR***	NR	NR	NR	VLR	***VHR***	VLR	NR	NR	NR	NR
Debagarh	NR	NR	NR	NR	NR	NR	NR	NR	VLR	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	***VHR***	VLR	NR	NR	NR	NR
Ganjam	NR	VLR	NR	NR	NR	NR	NR	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	VHR	NR	VLR	VLR	NR	NR	NR	NR
Jharsuguda	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Kalahandi	NR	NR	NR	NR	NR	NR	VLR	NR	VLR	NR	NR	NR	NR
Kandhamal	NR	NR	NR	NR	NR	NR	VLR	NR	VLR	NR	NR	NR	NR
Kendrapara	NR	NR	***HR***	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Kendujhar	NR	VLR	VLR	NR	NR	NR	VLR	VLR	VLR	NR	NR	NR	NR
Khordha	NR	NR	***VHR***	NR	NR	NR	***HR***	MR	***VHR***	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	NR	VLR	VLR	***VHR***	NR	NR	NR

Continue

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

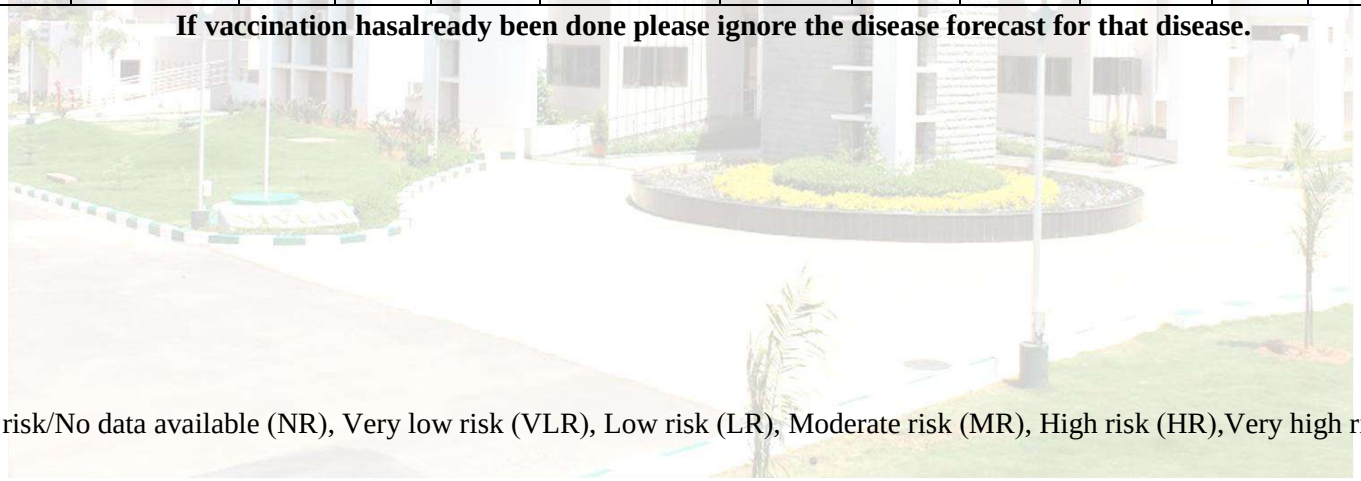
If vaccination hasalready been done, please ignore the disease forecast for that disease.

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

District wise Livestock Disease Risk Forewarning for June 2021: Puducherry

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

If vaccination hasalready 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)

District wise Livestock Disease Risk Forewarning for June 2021: Punjab

Districts of Punjab	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomiasis
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	***HR***	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	NR	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	VLR	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	VLR	NR	NR	NR	NR
Tarn Taran	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

If vaccination hasalready 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)

District wise Livestock Disease Risk Forewarning for June 2021: Rajasthan

Districts of Rajasthan	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomiasis
Ajmer	NR	NR	VLR	NR	NR	NR	VLR	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	VLR	NR	NR	NR	NR	NR	NR
Barmer	NR	NR	NR	NR	NR	NR	VLR	VLR	VLR	NR	NR	NR	NR
Bharatpur	NR	NR	NR	NR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR
Bhilwara	NR	NR	VLR	NR	NR	NR	VLR	VLR	NR	NR	NR	NR	NR
Bikaner	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR
Bundi	NR	NR	VLR	NR	NR	NR	VLR	VLR	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	VLR	NR	***VHR***	NR	NR	NR	NR
Dausa	NR	NR	VLR	NR	NR	NR	VLR	NR	VLR	NR	NR	NR	NR
Dhaulpur	NR	NR	NR	NR	NR	NR	VLR	NR	VLR	NR	NR	NR	NR
Dungarpur	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Ganganagar	NR	NR	VLR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR
Hanumangarh	NR	NR	NR	NR	NR	NR	NR	NR	NR	***VHR***	NR	NR	NR
Jaipur	NR	NR	NR	NR	***VHR***	NR	***VHR***	VLR	VLR	NR	NR	NR	NR
Jaisalmer	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Jalor	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Jhalawar	NR	NR	VLR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR
Jhunjhunun	NR	NR	VLR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Jodhpur	NR	NR	VLR	NR	NR	NR	VLR	VLR	MR	NR	NR	NR	NR
Karauli	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR

Continue

Districts of Rajasthan	Livestock Diseases												
	Anthrax	**Babesiosis**	**BQ**	**BT**	**ET**	**Fascioliasis**	**FMD**	**HS**	**PPR**	**S&G Pox**	**SF**	**Theileriosis**	**Trypanosomiasis**
Kota	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Nagaur	NR	NR	VLR	NR	NR	NR	VLR	VLR	VLR	NR	NR	NR	NR
Pali	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Pratapgarh	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Rajsamand	NR	***HR***	NR	NR	NR	NR	VLR	NR	VLR	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	VLR	VLR	VLR	NR	NR	NR	NR
Sirohi	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Tonk	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR
Udaipur	NR	***VHR***	VLR	NR	NR	NR	***VHR***	NR	VLR	NR	NR	NR	NR

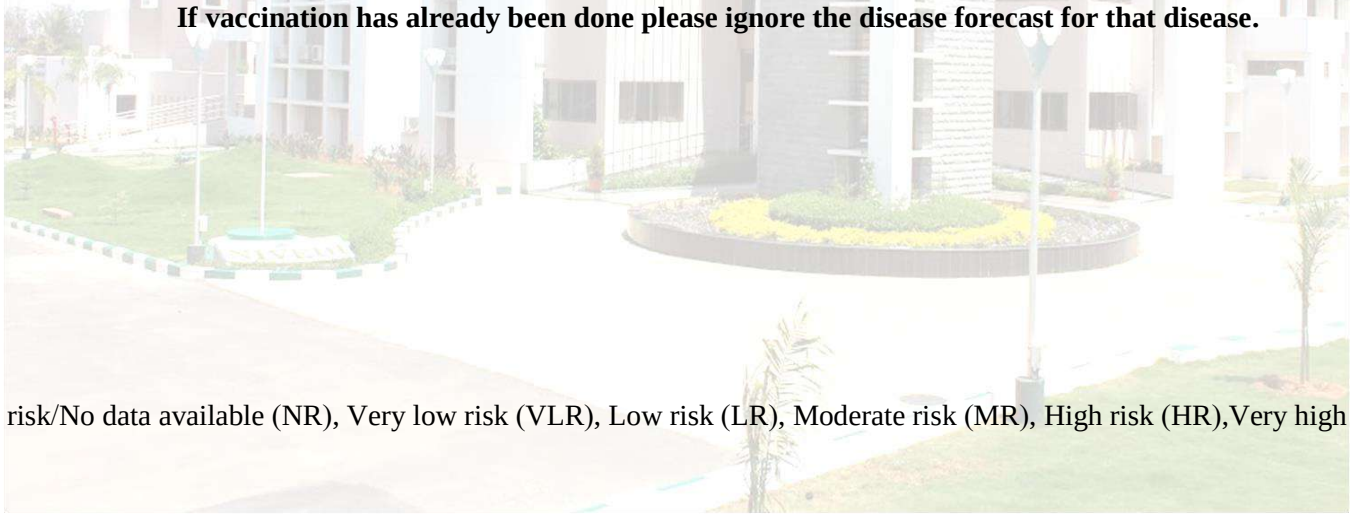
If vaccination hasalready been done please ignore the disease forecast for that disease.

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

District wise Livestock Disease Risk Forewarning for June 2021: Sikkim

Districts of Sikkim	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomiasis
East District	NR	NR	NR	NR	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 vaccination has 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)

District wise Livestock Disease Risk Forewarning for June 2021: Tamil Nadu

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

Continue

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

If vaccination hasalready 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)

District wise Livestock Disease Risk Forewarning for June 2021: Telangana

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

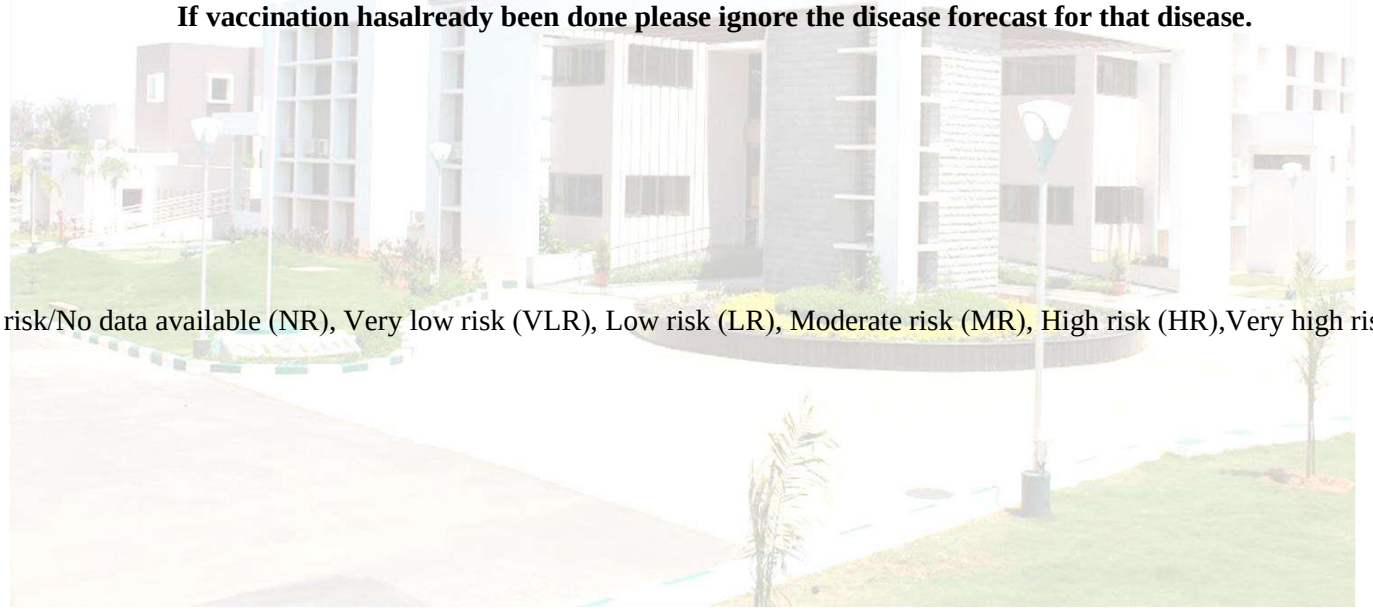
If vaccination hasalready been done, please ignore the disease forecast for that disease.

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

District wise Livestock Disease forewarning for June 2020: Tripura

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

If vaccination hasalready 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)

District wise Livestock Disease Risk Forewarning for June 2021: Uttar Pradesh

Districts of Uttar Pradesh	Livestock Disease												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomiasis
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	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	***HR***
Bahraich	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	***VHR***
Ballia	NR	NR	NR	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	***HR***	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	NR
Bijnor	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	***VHR***
Budaun	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Bulandshahr	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
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

Continue

Districts of Uttar Pradesh	Livestock Disease												
	Anthrax	Babesiosis	BQ	BT	ET	Fascioliasis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomiasis
Fatehpur	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR
Firozabad	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR
Gautam Buddha Nagar	NR	NR	NR	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	VLR	NR	NR	NR	NR	NR	NR	MR	NR	NR	MR	***VHR***
Hamirpur	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Hapur	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Hardoi	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	***VHR***
Jalaun	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Jaunpur	NR	NR	NR	NR	NR	NR	NR	NR	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	NR	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	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	***VHR***
Lalitpur	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	***VHR***
Lucknow	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
MahaJanuarya Nagar	NR	NR	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR
Mahoba	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

Continue

Districts of Uttar Pradesh	Livestock Disease												
	Anthrax	**Babesiosis**	**BQ**	**BT**	**ET**	**Fascioliasis**	**FMD**	**HS**	**PPR**	**S&G Pox**	**SF**	**Theileriosis**	**Trypanosomiasis**
Mahrajganj	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	***VHR***
Mainpuri	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	***VHR***
Mathura	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	***VHR***
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	***VHR***
Mirzapur	NR	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	***VHR***
Moradabad	NR	NR	NR	NR	NR	NR	NR	NR	MR	NR	NR	NR	***VHR***
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	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	***HR***
Rae Bareli	NR	VLR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	***VHR***	***VHR***
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	NR
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	***VHR***
Shahjahanpur	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Shamli	NR	NR	NR	NR	NR	NR	NR	NR	NR	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	VLR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	***VHR***
Sultanpur	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Unnao	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Varanasi	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	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)

District wise Livestock Disease Risk Forewarning for June 2021: Uttarakhand

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

If vaccination hasalready 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)

District wise Livestock Disease Risk Forewarning for June 2021: West Bengal

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

If vaccination hasalready 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)

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	Fasciolosis
2.	Nicobars	One	Foot and Mouth Disease
3.	South Andaman	One	Swine Fever

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	Anthrax
2.	East Godavari	One	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.	Lower Subansiri, Papum Pare and West Siang	Three	Fasciolosis
2.	Upper Subansiriand West Siang	Two	Foot and Mouth Disease

4. Assam

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

5. Bihar

Sl. No	Disease prone districts	Number of districts prone for disease	Disease Name
1.	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.	Bhiwani and Hisar	Two	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.	Mandi and Shimla	Two	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.	Baramula	One	Black Quarter
2.	Anantnag, Badgam, Kulgam, Pulwama and Shupiyan	Five	Sheep & Goat pox

10. Jharkhand

Sl. No	Disease prone districts	Number of districts prone for disease	Disease Name
1.	Dumka and Sahibganj	Two	Anthrax
2.	Except two district (Godda and Ramgarh) remaining all twenty-two districts are reported.	Twenty-two	Babesiosis
2.	Bokaro, Dumka,Hazaribagh, Pakur, Palamu, Purbi Singhbhum and Sahibganj	Seven	Black Quarter
3.	Bokaro, Dumka and Sahibganj	Three	Enterotoxaemia
4.	Except two districts (Chatra and Ramgarh) remaining all twenty-two districts are reported.	Twenty-two	Fasciolosis
5.	Bokaro, Deoghar, Dumka, Lohardaga, Pakur, Palamu, Ranchi and Sahibganj	Eight	Foot and Mouth Disease
6.	Dumka, Pakur and Sahibganj	Three	Haemorrhagic Septicaemia
7.	Bokaro,Deoghar,Dhanbad,Dumka, Gumla,Khunti, Lohardaga, Pashchimi Singhbhum, Purbi Singhbhum, Ranchi and Simdega	Twelve	Peste des Petits Ruminants
8.	Khunti and Sahibganj	Two	Sheep & Goat pox
			Swine Fever
9.	Except four districts (Chatra , Godda, Latehar and Ramgarh) remaining all twenty districts are reported.	Twenty	Theileriosis
10.	Except one district (Ramgarh) remaining all twenty-three districts are reported.	Twenty-three	Trypanosomiasis

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, Belgaum, Bidar, Chikmagalur, Davanagere, Dharwad, Gulbarga, Hassan, Haveri, Mysore, Shimoga, Tumkur and Uttara Kannada	Thirteen	Black Quarter
3.	Belgaum, Chitradurga, Davanagere, Gulbarga, Hassan, Koppal, Tumkur and Yadgir	Eight	Enterotoxaemia
4.	Bagalkot	One	Fascioliasis
5.	Bangalore urban	One	Foot and Mouth Disease
6.	Bellary, Chamarajanagar, Hassan, Ramanagara, Shimoga and Yadgir	Six	Haemorrhagic Septicaemia
7.	Bidar, Kolar, Ramanagara and Tumkur	Four	Peste des Petits Ruminants
8.	Bijapur, Davanagere and Mysore	Three	Sheep & Goat pox
9.	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.	Except one district (Kasaragod) remaining all thirteen districts are reported.	Thirteen	Foot and Mouth Disease
3.	Ernakulum, Kannur, Kollam, Kottayam, Malappuram, Palakkad, Thiruvananthapuram and Thrissur	Eight	Haemorrhagic Septicaemia

4.	Ernakulum, Kollam, Kozhikode, Palakkad, Thiruvananthapuram and Thrissur	six	Peste des Petits Ruminants
5.	Ernakulum	One	Swine Fever
6.	Palakkad and Wayanad	Two	Theileriosis
7	Thiruvananthapuram	One	Trypanosomiasis

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.	Aurangabad	One	Peste des Petits Ruminants
3.	Amravati, Aurangabad and Pune	Three	Sheep & Goat pox
4.	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.	Bishnupur,Chandel, Imphal East, Imphal West,Senapati and Thoubal.	Six	Fascioliasis
3.	Imphal West, Tamenglong	Three	Foot and Mouth Disease

	and Thoubal		
4.	Tamenglong	One	Haemorrhagic Septicaemia
5.	Bishnupur, Chandel, Imphal East, Imphal West, Tamenglong, Thoubal and Ukhrul	Seven	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.	Southwest Garo Hills, West Garo Hills and West Khasi Hills	Three	Black Quarter
3.	East Jaintia Hills, East Khasi Hills, Jaintia Hills, Ribhoi, West Garo Hills and West Khasi Hills	Six	Foot and Mouth Disease
4.	Southwest Garo Hills, West Garo Hills and West Khasi Hills	Three	Haemorrhagic Septicaemia
5.	East Khasi Hills and Ribhoi	Two	Sheep & Goat pox
6.	East Garo Hills, East Khasi Hills, Ribhoi, Southwest Garo Hills, West Garo Hills and West Khasi Hills	Six	Swine Fever

17. Mizoram

Sl. No	Disease prone districts	Number of districts prone for disease	Disease Name
1.	Champhai	One	Black Quarter
2.	Aizawl	One	Foot and Mouth Disease
3.	Aizawl and Champhai	Two	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.	Jajapur	One	Fascioliasis
4.	Khordha	One	Foot and Mouth Disease
5.	Anugul, Cuttack and Gajapati	Three	Haemorrhagic Septicaemia
6.	Dhenkanal, Khordha, Mayurbhanj and Sambalpur	Four	Peste des Petits Ruminants
7.	Malkangiri	One	Sheep & Goat pox
8.	Puri and Rayagada	Two	Theileriosis

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.	Rajsamand and Udaipur	Two	Babesiosis
2.	Churu and Jaipur	Two	Enterotoxaemia
3.	Jaipur and Udaipur	Two	Foot and Mouth Disease
4.	Churu	One	Peste des Petits Ruminants
5.	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.	Kancheepuram and Viluppuram	Two	Black Quarter
3.	Tiruppur	One	Peste des Petits Ruminants
4.	Thanjavur	One	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	One	Sheep & Goat pox

25. Tripura

Sl. No	Disease prone districts	Number of disease prone for districts	Disease Name
1.	Dhalai, South Tripura and West Tripura	Three	Babesiosis
2.	North Tripura, South Tripura and West Tripura	Three	Black Quarter
3.	South Tripura and West Tripura	Two	Fascioliasis
4.	North Tripura, South Tripura and West Tripura	Three	Foot and Mouth Disease
5.	North Tripura and West Tripura	Two	Haemorrhagic Septicaemia
6.	South Tripura and West Tripura	Two	Peste des Petits Ruminants
7.	South Tripura	One	Sheep & Goat pox

26. Uttar Pradesh

Sl. No	Disease prone districts	Number of districts prone for disease	Disease Name
1.	Banda	One	Enterotoxaemia
2.	Meerut	One	Haemorrhagic Septicaemia
3.	Allahabad and Rae Bareli	Two	Theileriosis
4.	Allahabad, Baghpat, Bahraich, Bara Banki, Bijnor, Etah, Gorakhpur, Hardoi, Kushinagar, Lalitpur, Mahrajganj, Mainpuri, Mathura, Meerut, Mirzapur, Moradabad, Pratapgarh, Rae Bareli, Sant Ravidas Nagar (Bhadohi) and Sonbhadra	Twenty	Trypanosomiasis

27. Uttarakhand

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

29. West Bengal

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

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.

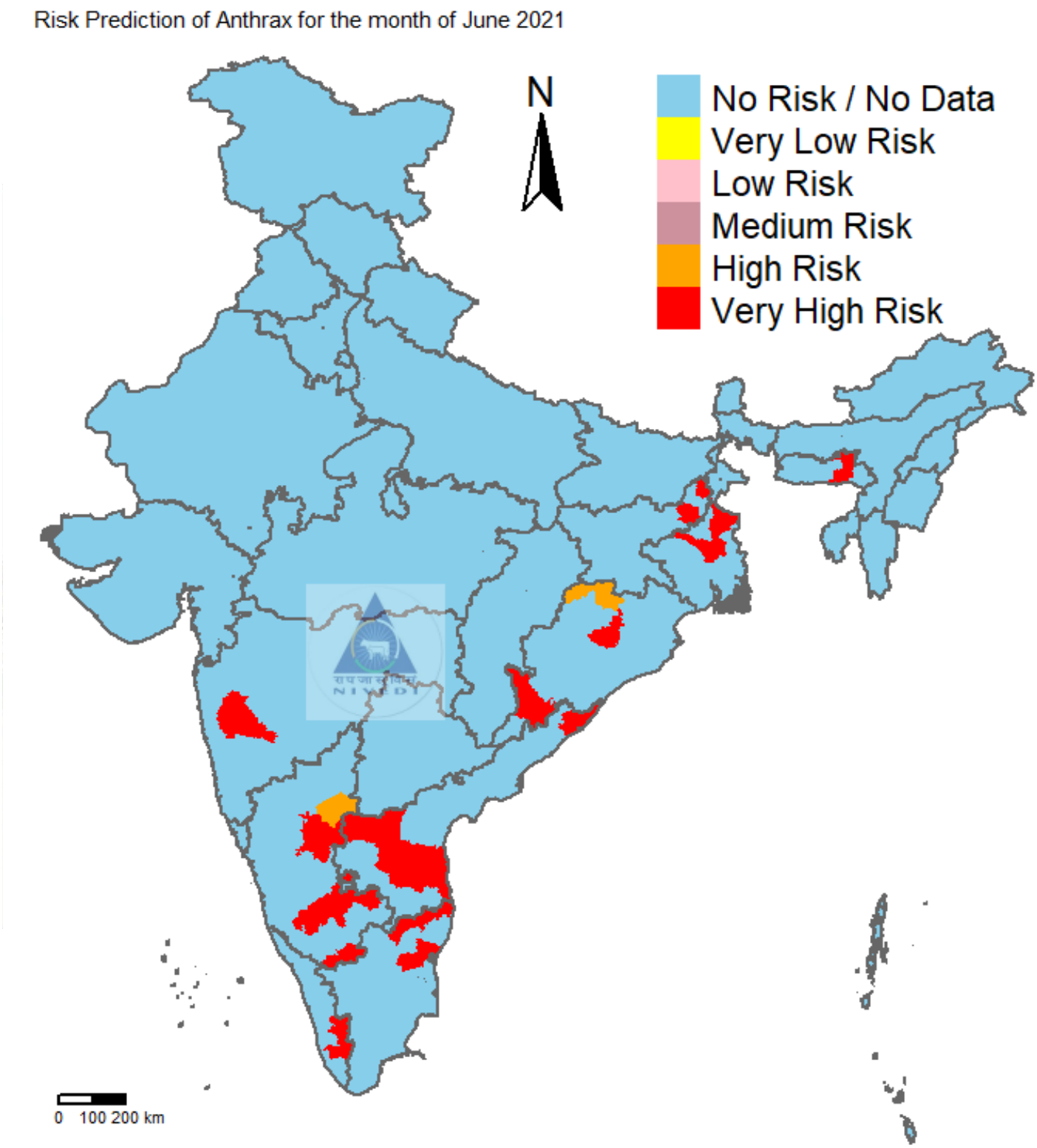
4.	Bluetongue (BT)	Sheep are more susceptible than goats.	Fever, swelling of face, neck, eyelids respiratory distress, nasal discharge, Salivation, necrotic ulcers on tongue, dental pad, gum, lips hyperaemia of muzzle and may bleed at muco-cutaneous junction. Affected tongue may become swollen, cyanotic 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.	Fasciolosis (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.

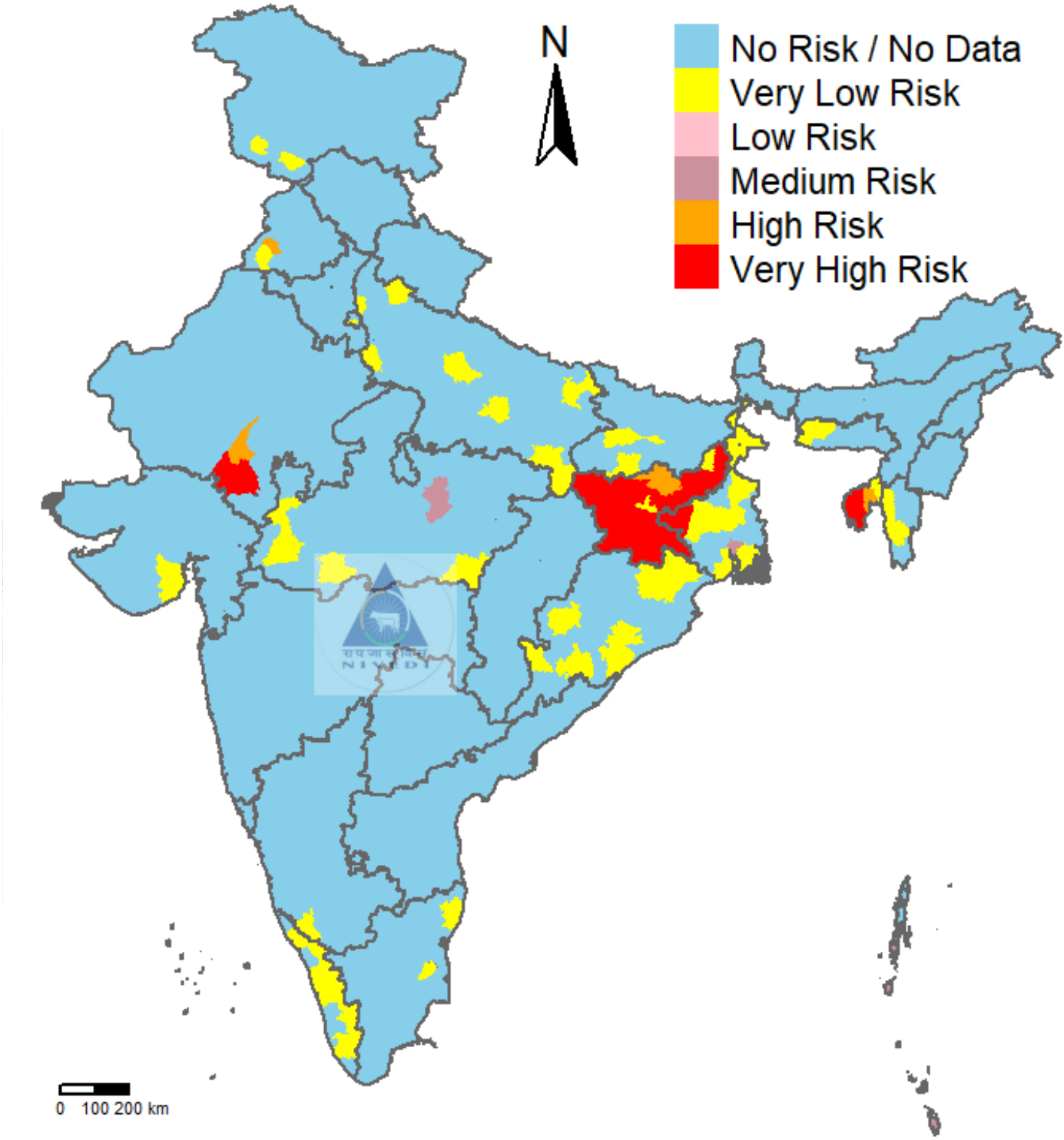
9.	Peste desPetits Ruminants*(*PPR*)*	Goats and sheep are most affected domestic animals.	Fever, nasal and ocular discharge, respiratory distress, necrotic lesions in buccal mucosa, gum, dental pad, palate, tongue and diarrhoea. Animals may die because of dehydration and pneumonia.	Vaccination of susceptible 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.	Trypanosomiasis (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.

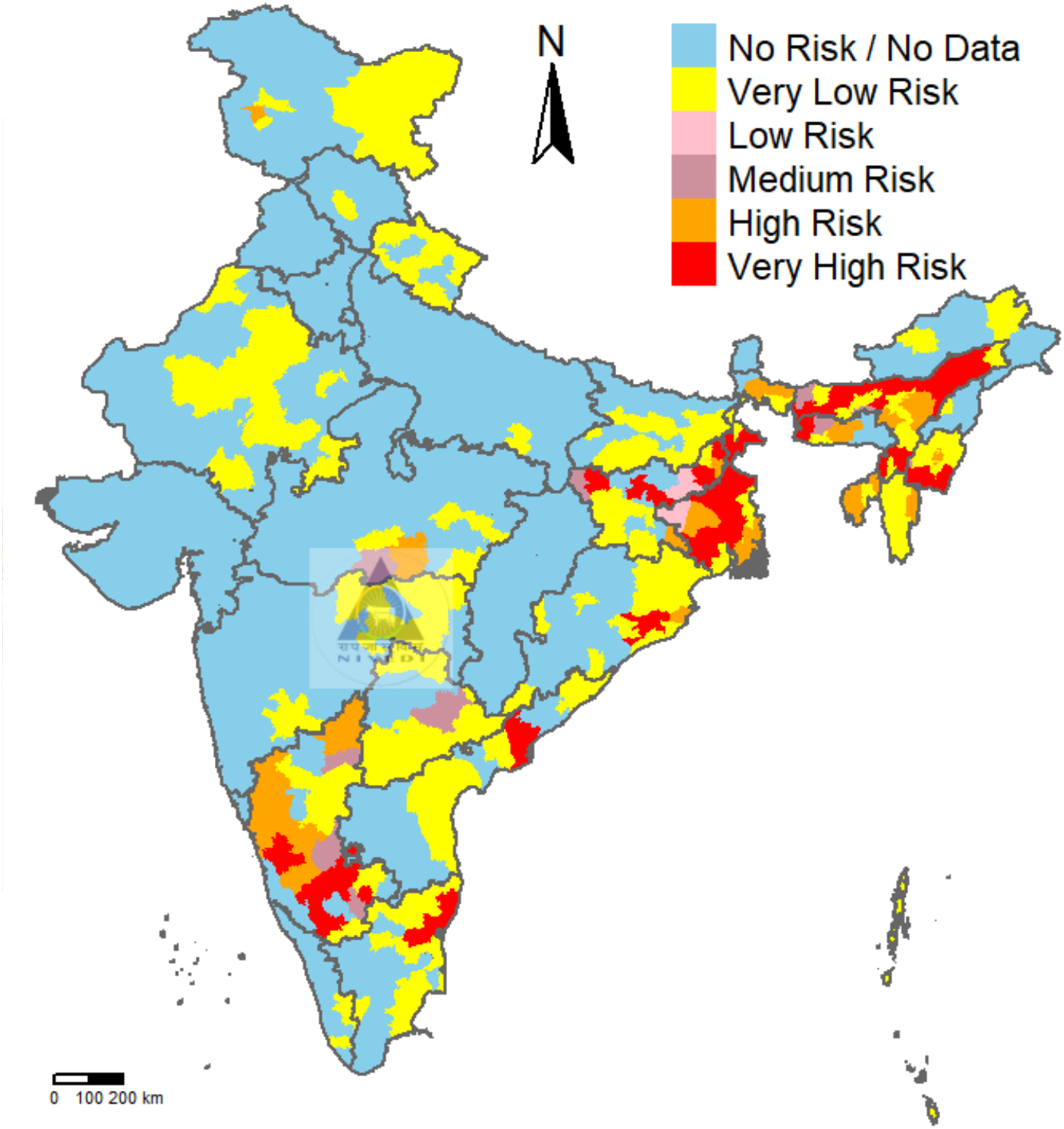
iv) Risk Prediction - Livestock Disease Forewarning Maps



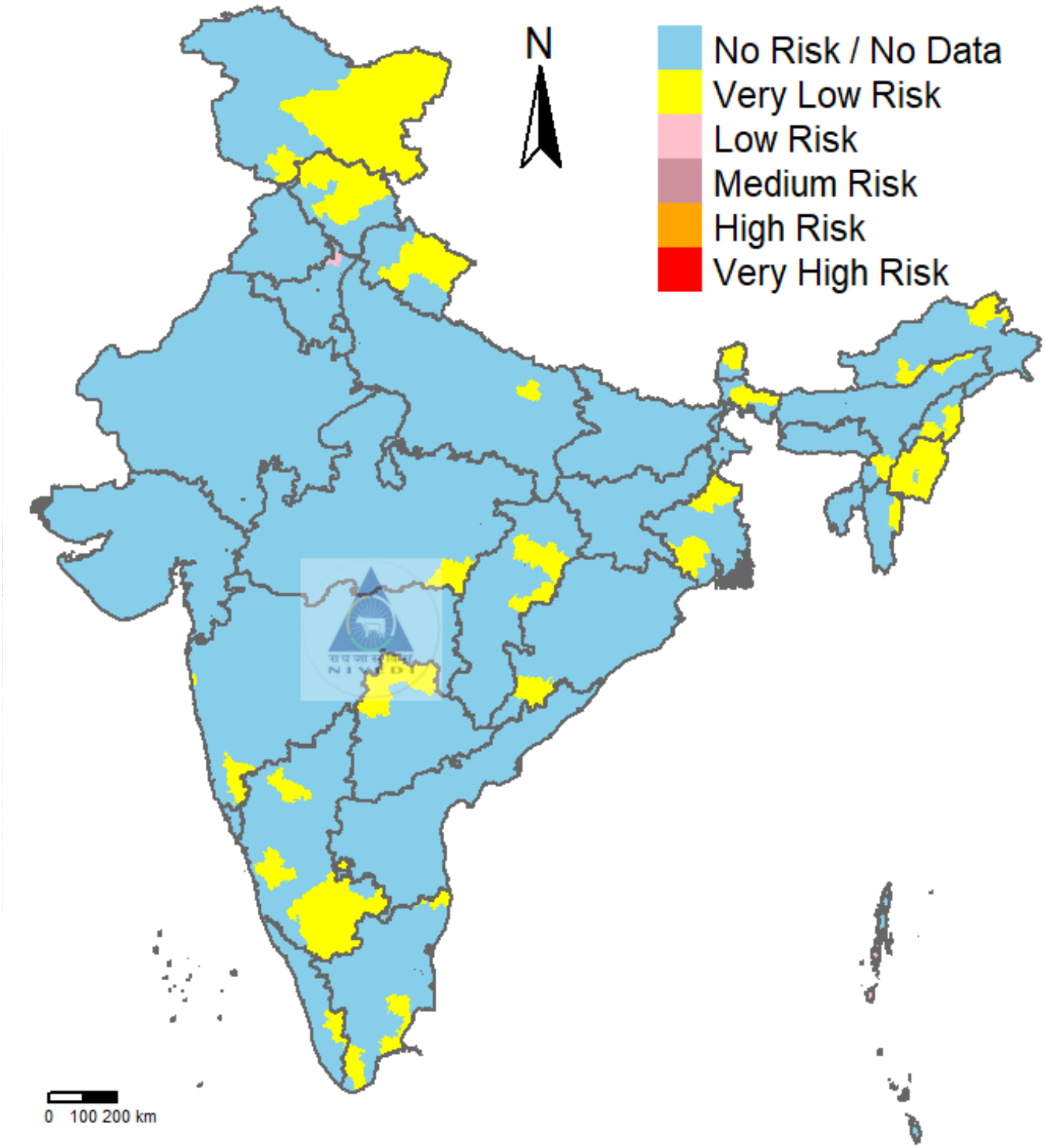
Risk Prediction of Babesiosis for the month of June 2021



Risk Prediction of Black quarter for the month of June 2021



Risk Prediction of Bluetongue for the month of June 2021



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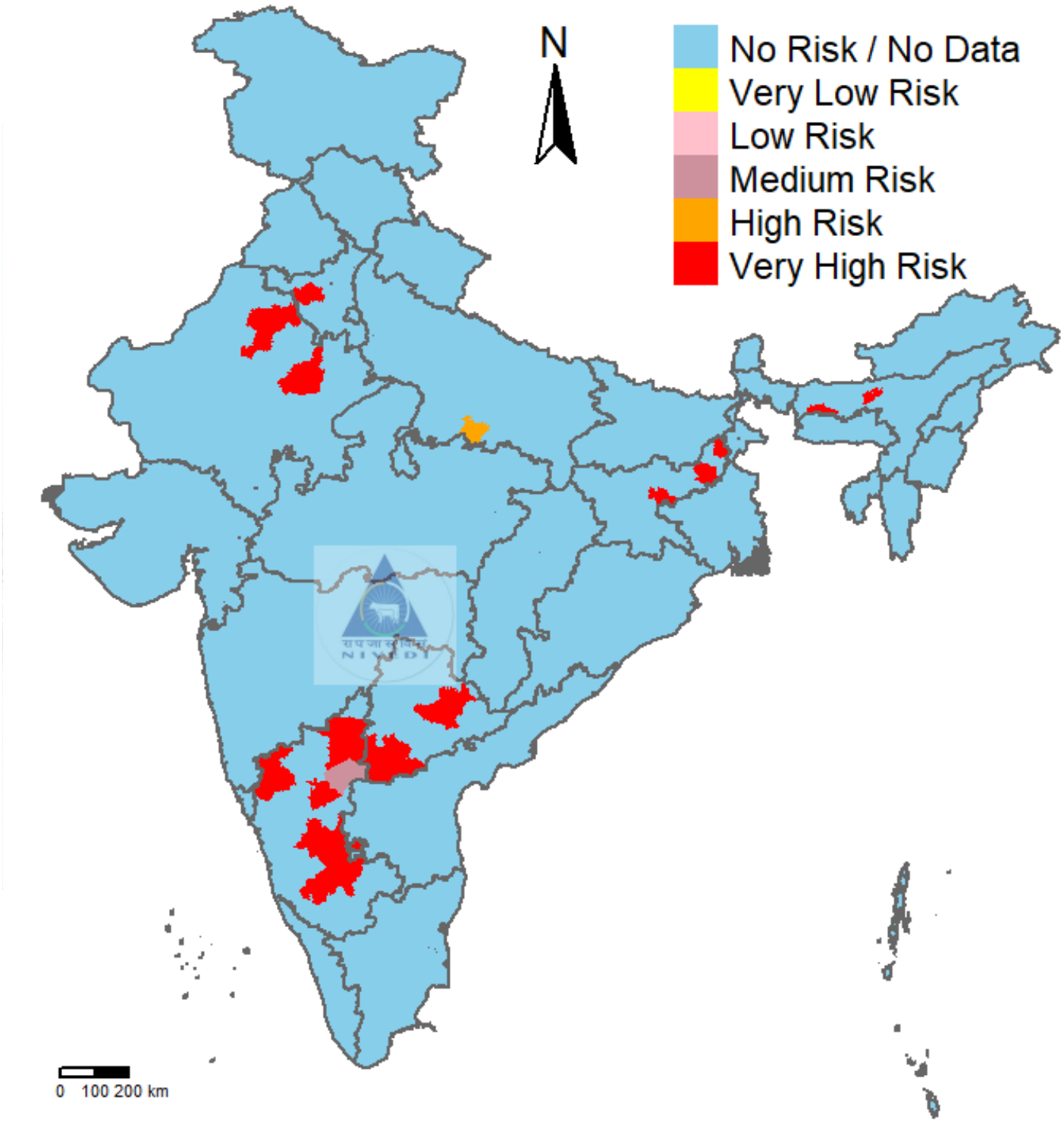
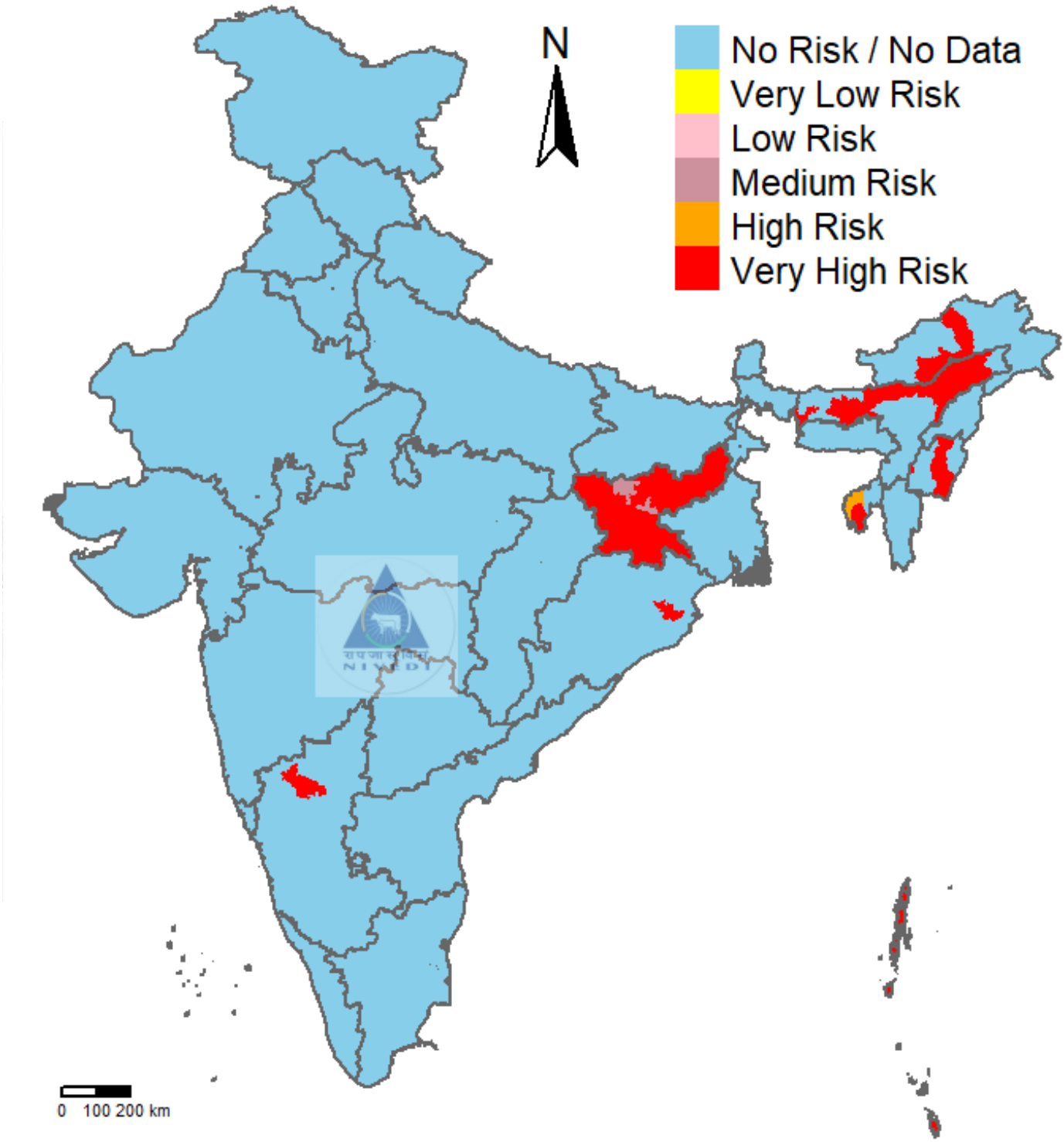
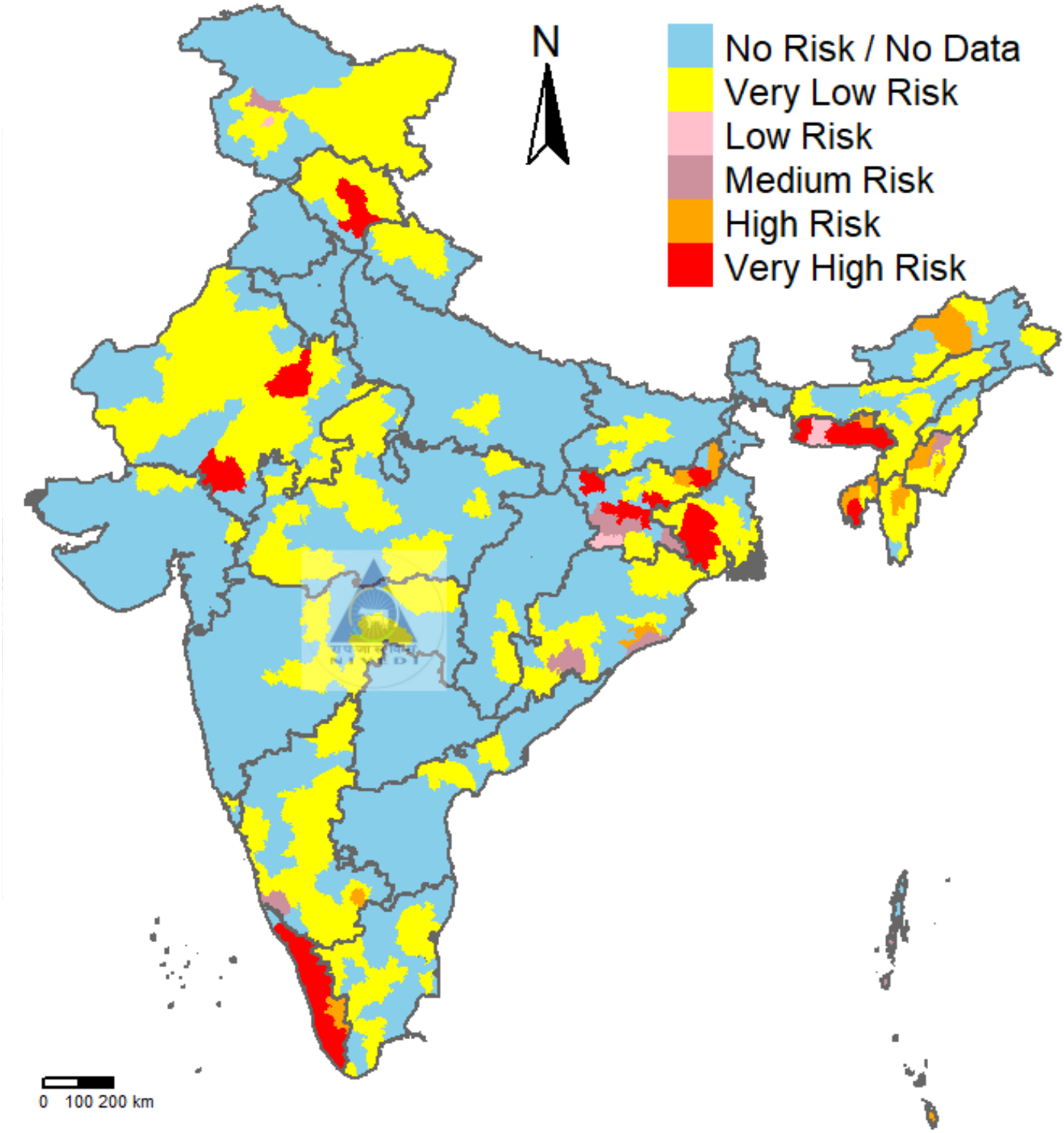
Risk Prediction of Enterotoxemia for the month of June 2021



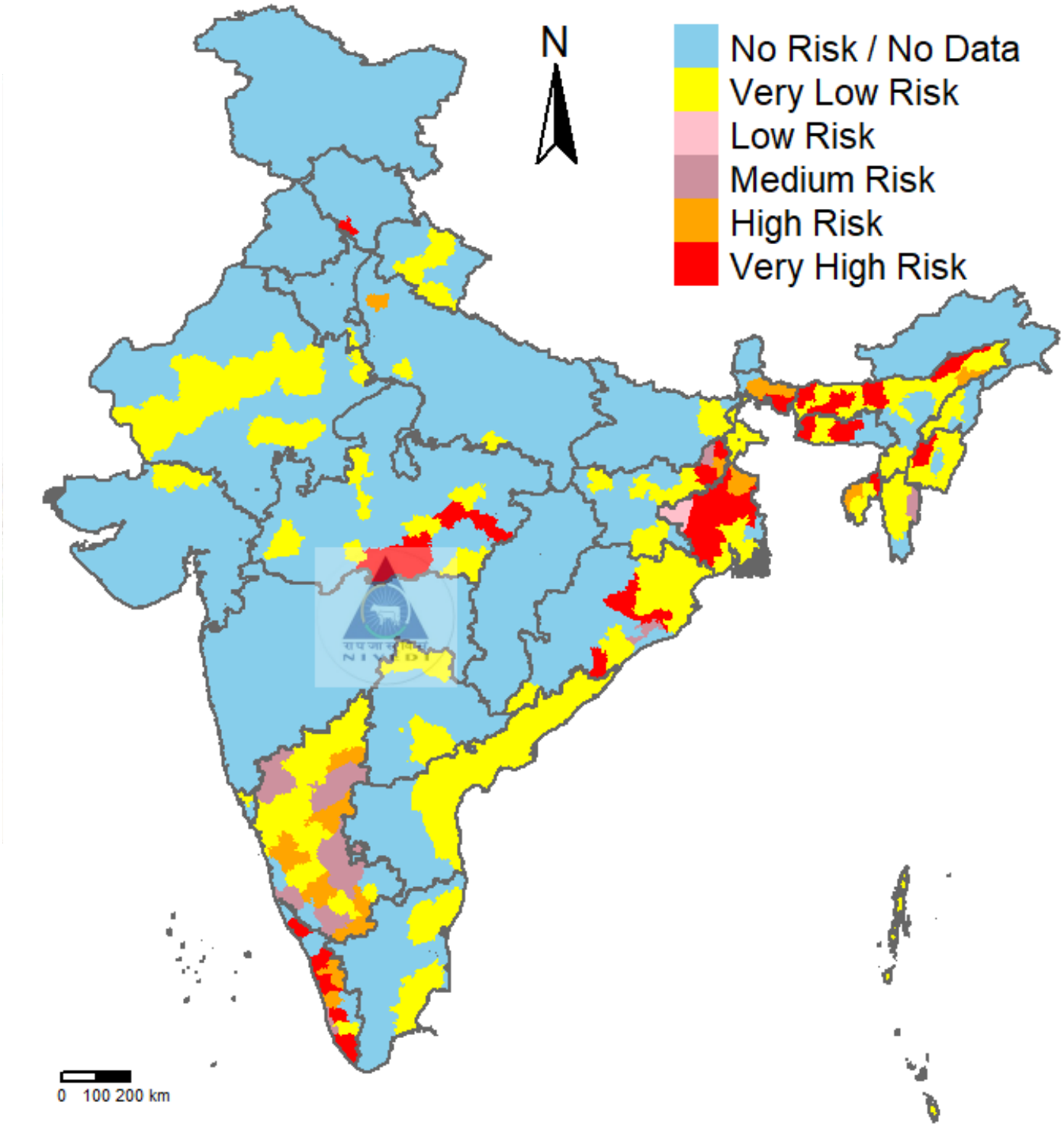
Risk Prediction of Fascioliasis for the month of June 2021



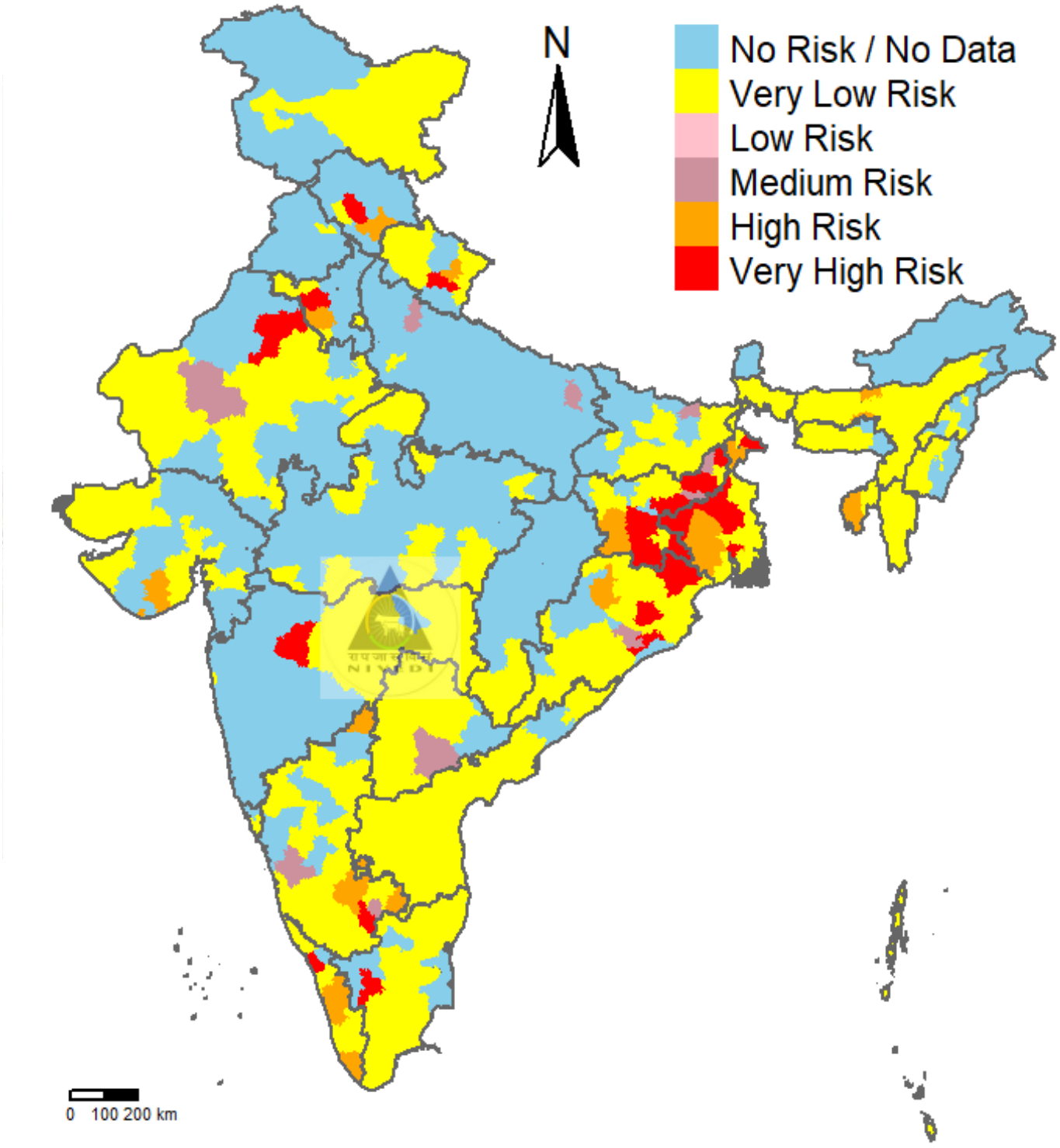
Risk Prediction of Foot and mouth disease for the month of June 2021



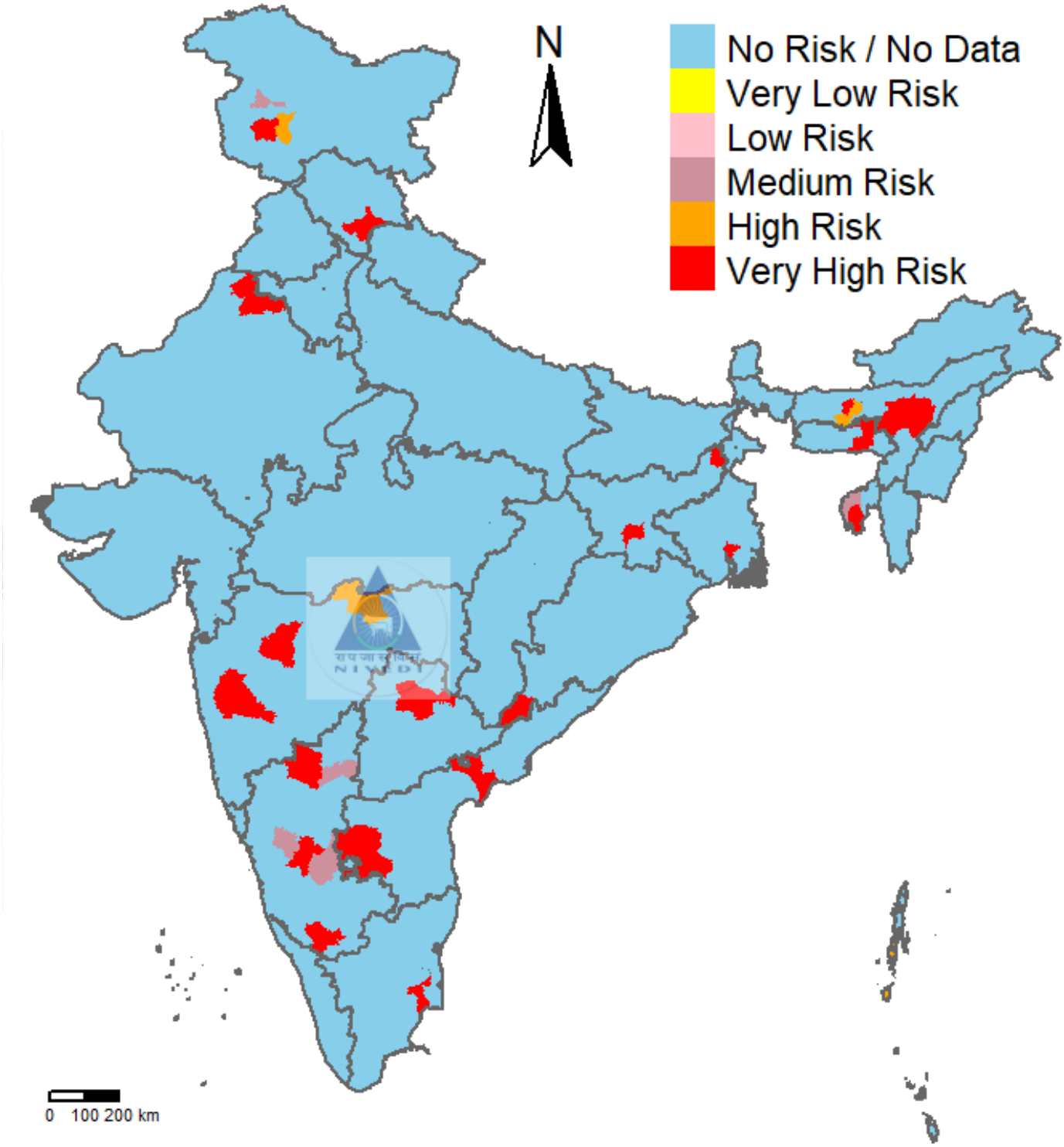
Risk Prediction of Haemorrhagic septicaemia for the month of June 2021



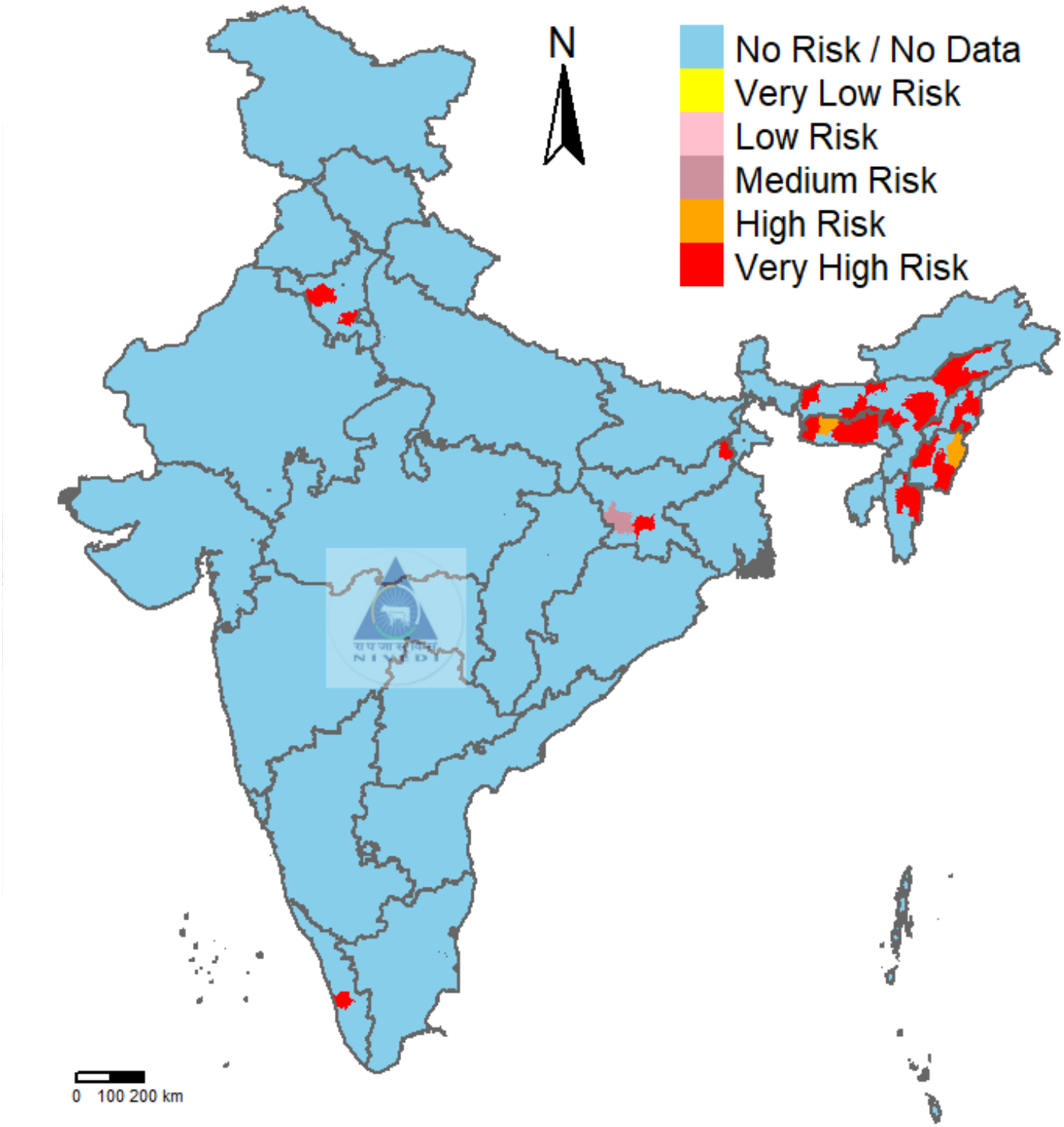
Risk Prediction of Peste des petits ruminants for the month of June 2021



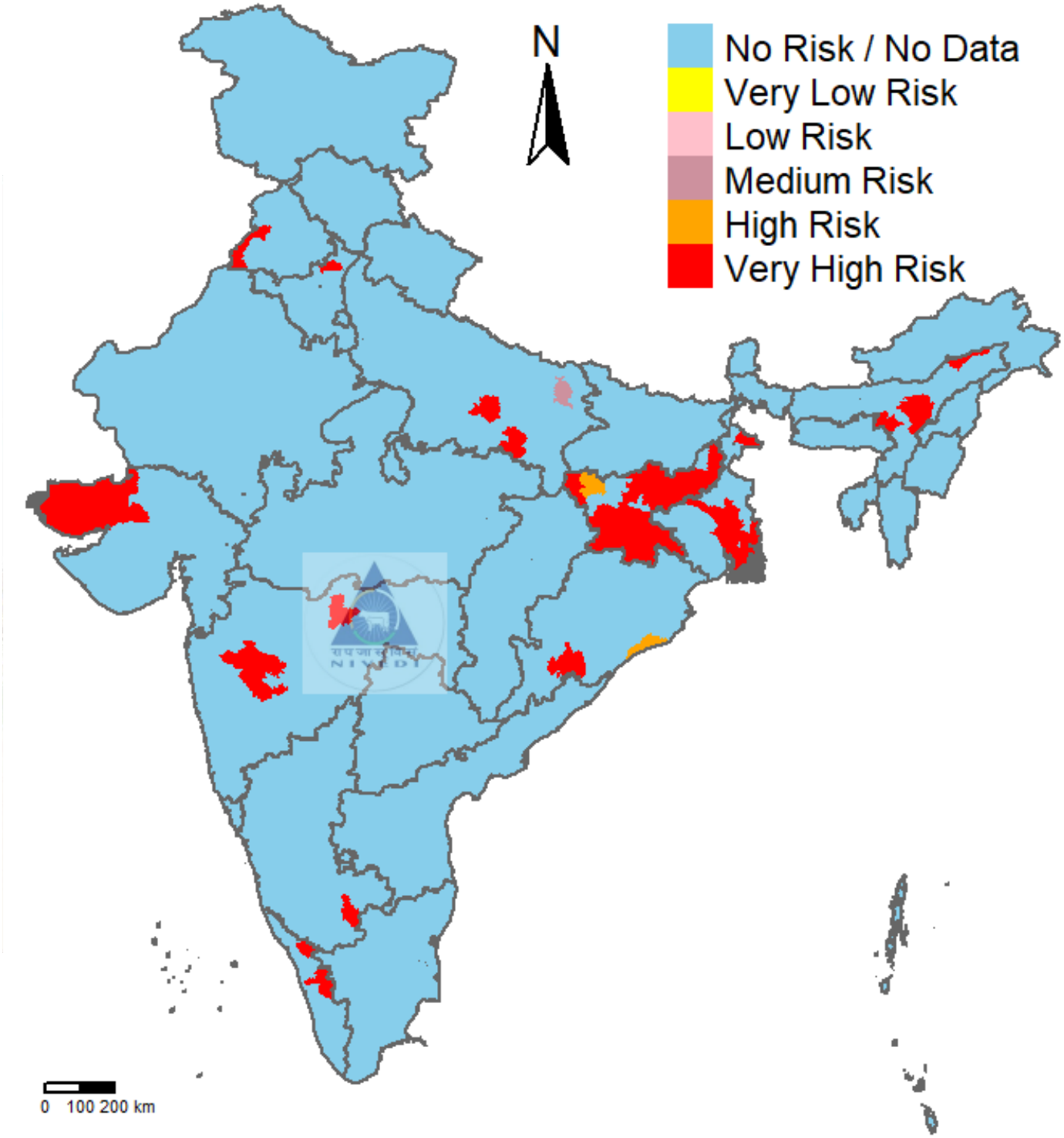
Risk Prediction of Sheep and Goat pox for the month of June 2021



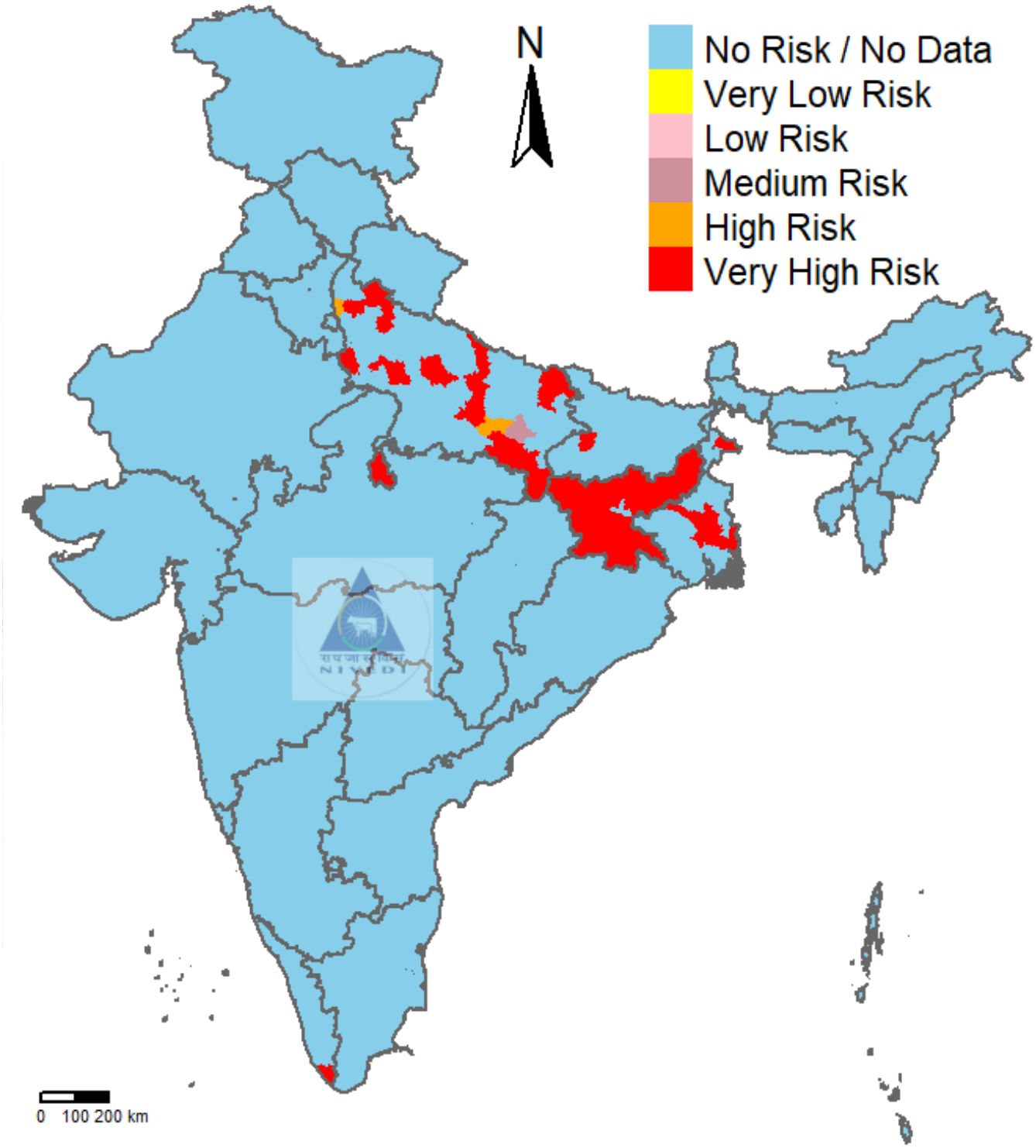
Risk Prediction of Swine fever for the month of June 2021



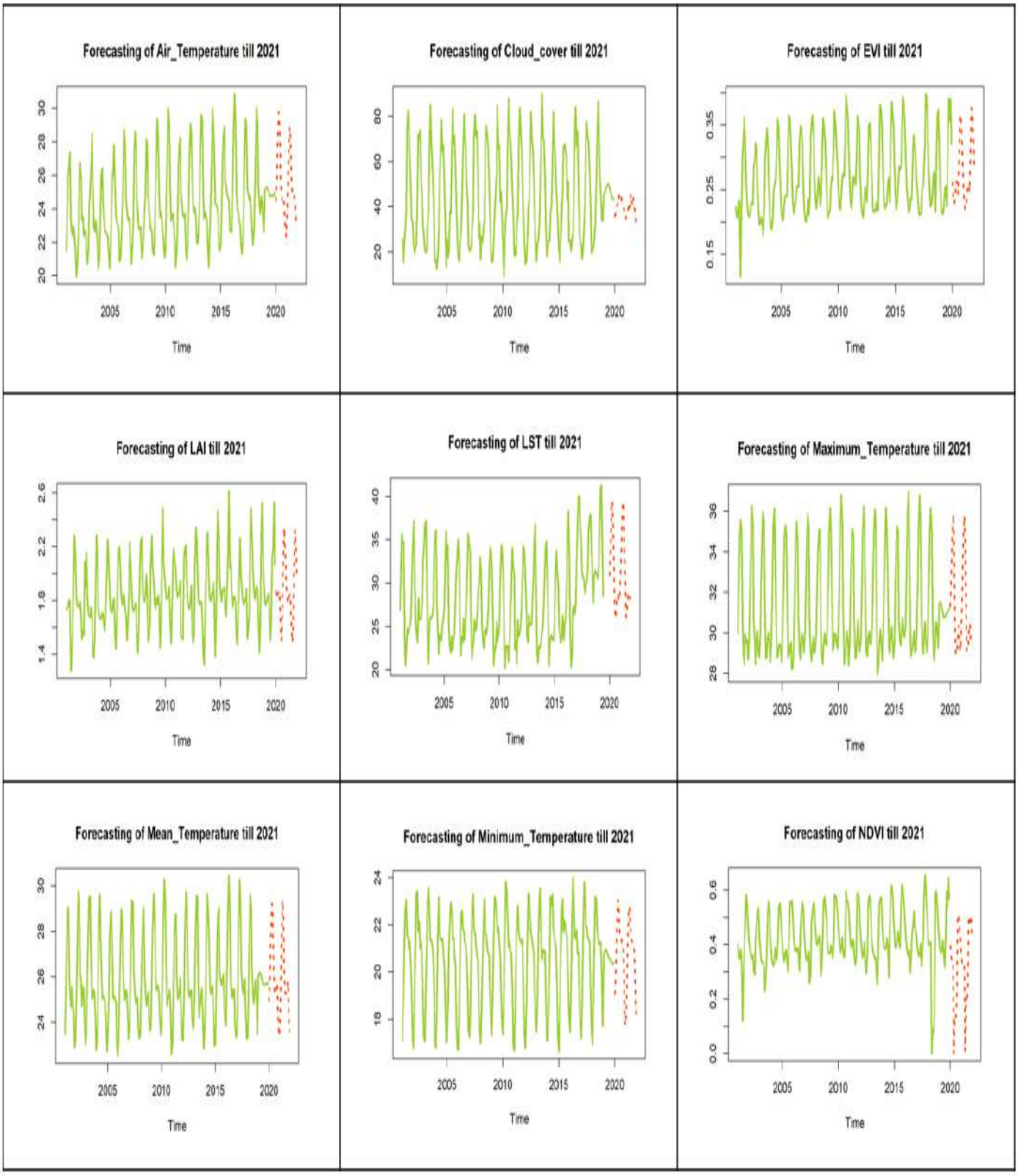
Risk Prediction of Theileriosis for the month of June 2021

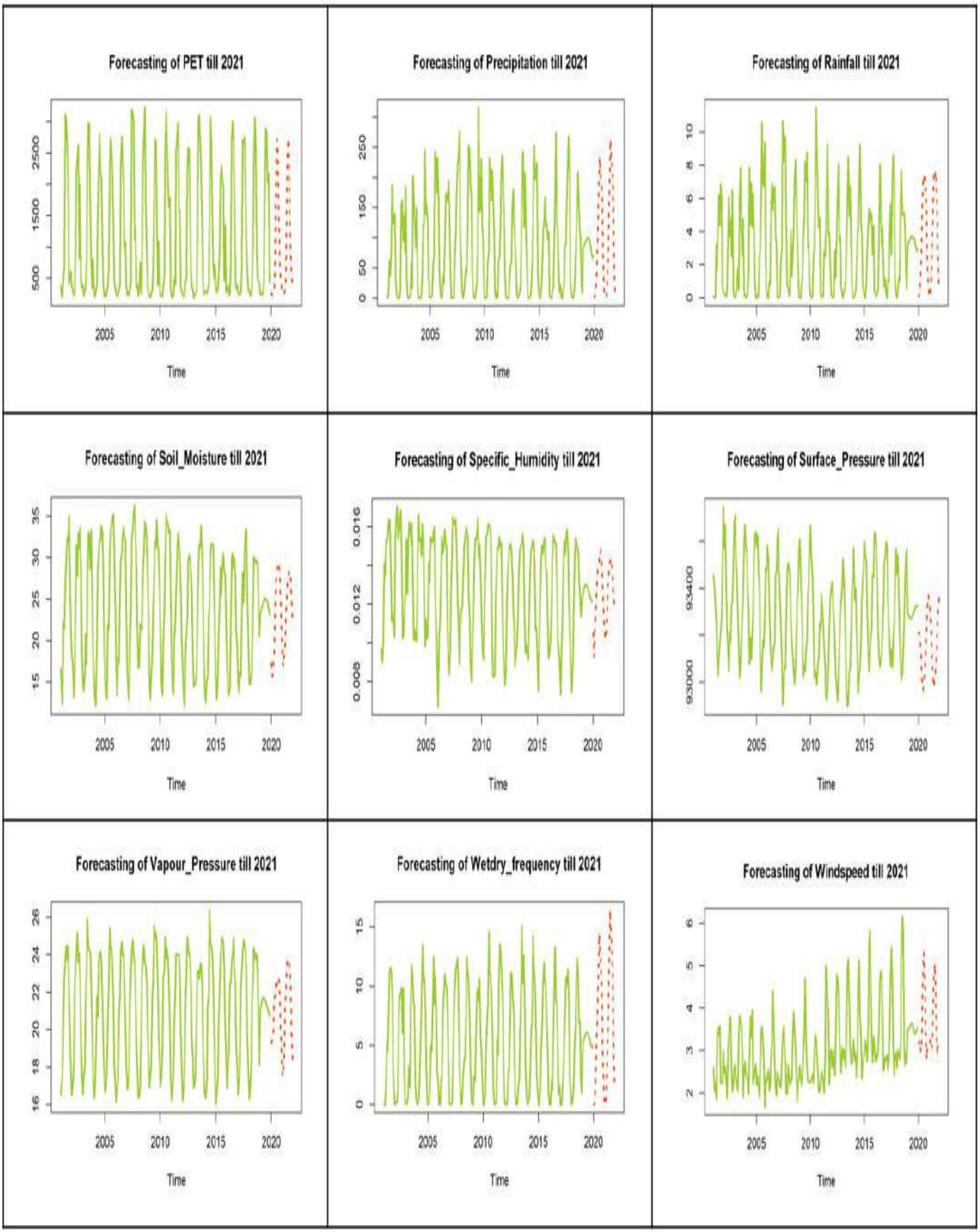


Risk Prediction of Trypanosomiasis for the month of June 2021



V. Forecasting of remote sensing and meteorological parameters till December 2021 (Ex. Karnataka)




Forecasting of PET till 2021
Time
Forecasting of Precipitation till 2021
Time
Forecasting of Rainfall till 2021
Time
Forecasting of Soil_Moisture till 2021
Time
Forecasting of Specific_Humidity till 2021
Time
Forecasting of Surface_Pressure till 2021
Time
Forecasting of Vapour_Pressure till 2021
Time
Forecasting of Wetdry_frequency till 2021
Time
Forecasting of Windspeed 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
Trypanosomiasis	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

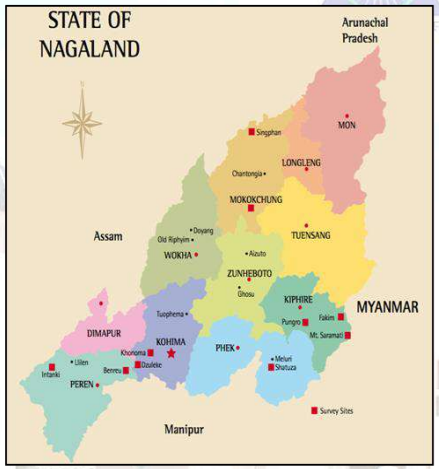
Following reports of a good number of buffaloes dying in a recent outbreak of suspected Haemorrhagic septicaemia (HS), a team from Animal Husbandry and Veterinary Services (AH&VS) department visited the affected areas under Medziphema on April 12. (Haemorrhagic septicaemia is a contagious bacterial disease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

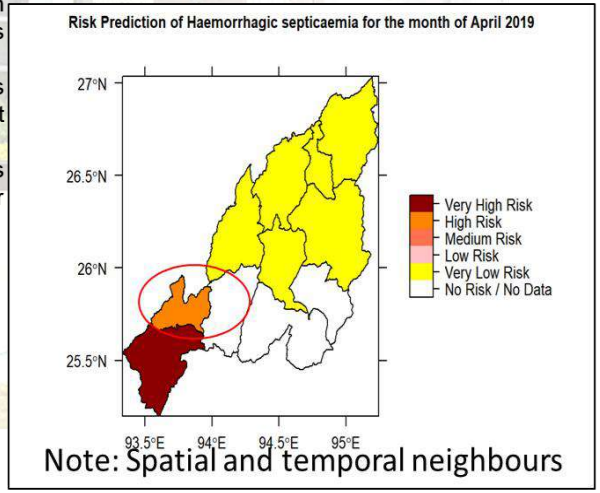
AH&VS, deputy director & principal investigator, AICRP-ADMAS, Dr S. Amenla Walling, in a press release reported that the team consisted of the department's director, Dr Temsumeren, along with additional director, Dr. Budhi Lama, and other officials from the department. The press release added that the 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

ANDAMAN AND NICOBAR REPORTJUNE-2020

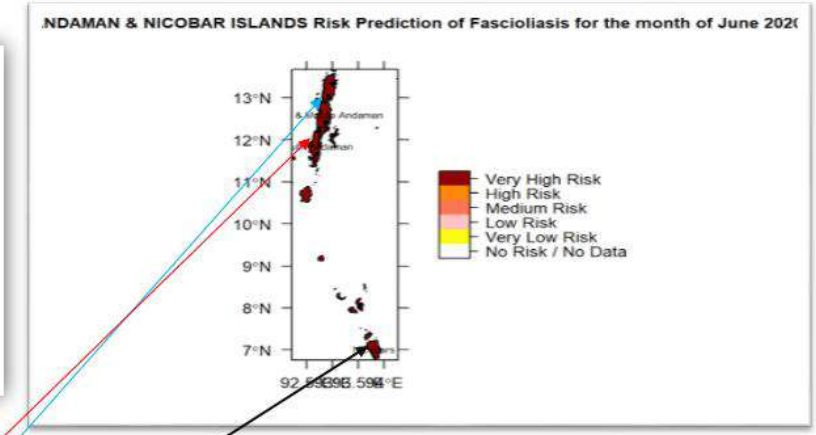
NIVEDI Prediction

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

1 message

Jai Sunder <jaisunder@rediffmail.com> Wed, Jul 8, 2020 at 10:53 PM

to: Rahman Hibabur <pcadmas@gmail.com>, Director NIVEDI <director.nivedi@icar.gov.in>

Cc: sharan patil <sharanspin123@rediffmail.com>, Divakar Hemadri <divakar.hemadri@gmail.com>

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
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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 JULY-2020

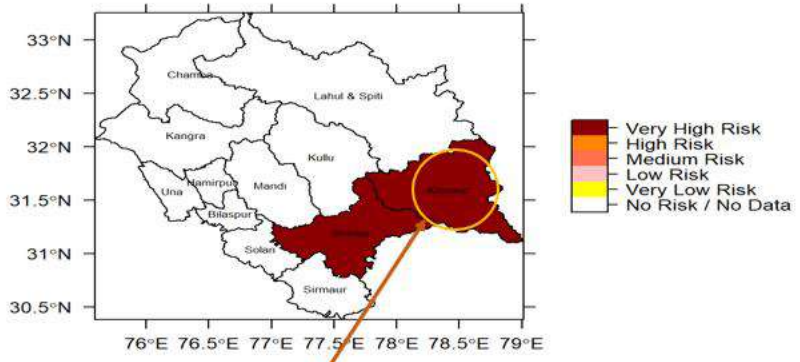
NIVEDI Prediction

District wise Livestock Disease forewarning for July 2020: Himachal Pradesh

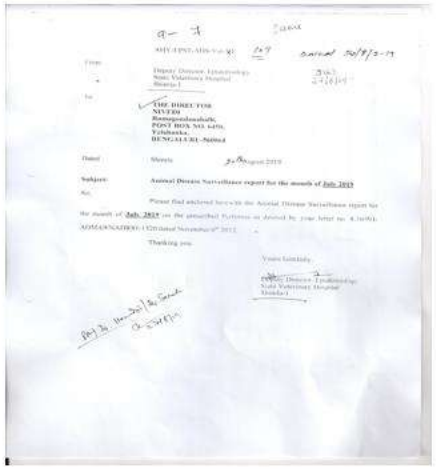
Districts of Himachal pradesh	Livestock Diseases												
	Anthrax	Babesiosis	BQ	BT	ET	Fasciolosis	FMD	HS	PPR	S&G Pox	SF	Theileriosis	Trypanosomiasis
Bilaspur	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Chamba	NR	NR	NR	NR	NR	NR	VLR	NR	NR	NR	NR	NR	NR
Hamirpur	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Kangra	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.

HIMACHAL PRADESH Risk Prediction of Sheep and Goat pox for the month of July 2020



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; grecichitender@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
Jurej	30.6458° N 77.4766° E	171002	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 mention it.
* Kindly specify the species i.e., cattle, buffalo and nor bovines and similarly write individually for goats and sheep.

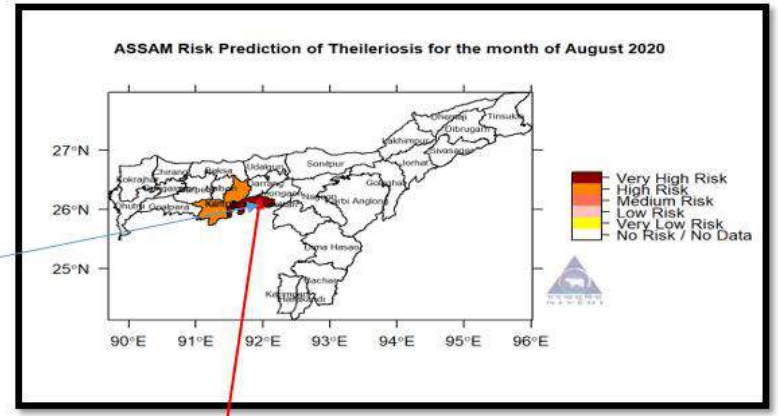
Co-PI-AICRP-ADMAS of NIVEDI
PI-AICRP-ADMAS of NIVEDI

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>
To: pcadmas@gmail.com

Mon, Oct 5, 2020 at 4:27 PM

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/0000-0002-5829-7929
Scopus Author ID: 57203809722
Web of Science ResearcherID: AAE-4450-2020

3 attachments

Monthly report_August2020_ICAR-ADMAS.doc
517K

Monthly report_June2020_ICAR-ADMAS.doc
517BK

Monthly report_July 2020_ICAR-ADMAS.doc
517BK

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

99/761(83)/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-Dalongghar	26°71N 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

(O P Bora)

KARNATAKA REPORT SEPTEMBER-2020

NIVEDI PREDICTION SEPTEMBER TABLE

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

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

KARNATAKA REPORT SEPTEMBER-2020

GOVERNMENT OF KARNATAKA
DEPARTMENT OF ANIMAL HUSBANDRY AND VETERINARY SERVICES

No:DD(ADSS):MPR:2020-21

Office of the Commissioner
1st Floor, Pashupalana Bhavana,
Bellary Road, Hebbal,
Bangalore-560024.
Date: -10-2020

To
Joint Commissioner(LH),
GOI, Ministry of Agriculture,
Dept.of Animal Husbandry & Dairying,
Krishi Bhavan, New Delhi-110 001

Sir,

Sub: Animal Health information reports on outbreak of contagious diseases & vaccinations in Karnataka State for the month SEPTEMBER-2020

Please find enclosed herewith the statement showing particulars of incidence of the contagious diseases in Karnataka State for the month of SEPTEMBER 2020

Yours faithfully,
Sd/-
DIRECTOR

Copy Submitted for kind information :

1) Commissioner, DAHDF, Krishi Bhavan, New Delhi-110 001.
2) The Assistant Commissioner(LH), GOI, Ministry of Agriculture, Dept.of Animal Husbandry & Dairying, Krishi Bhavan, New Delhi-110 001.
3) The Commissioner / Director, Department of AH & VS, Andhra pradesh / Telangana / Maharashtra / Tamilnadu / Kerala/ Goa.

Copy for information :

1) The Director, Institute of Animal Health & veterinary Biologicals, Hebbal Bangalore-24.
2) The Managing Director, KSWDCL, Hebbal Bangalore for information and necessary action.
3) The Managing Director, KMF, Bangalore for information and necessary action
4) The Project Director, NIVEDI, ICAR Campus, Ramagondanahalli, Yelahanka Doddaballapur Main Road, Bangalore-64 / KLDA, Animal Husbandry & Veterinary Services, Bangalore-01
5) The Additional Director (LH) / Joint Director (Epidemiology), Animal Husbandry & Veterinary Services, Bangalore.
6) The Joint Director, SRDDL, IAH&VB, Hebbal, Bangalore-24.
7) The Deputy Director, PDDL / SCLD, Dept of AH & VS, Hebbal, Bangalore-560024
8) Office Copy.

Director,
Animal Husbandry & Veterinary Services

Status of Specified Livestock and Poultry Diseases in Karnataka During the Month : September Year : 20

Disease	District	Out Break	Attacks								Deaths							
			Cattle	Buffalo	Sheep	Goat	Pig	Dog	Poultry	Others	Total	Cattle	Buffalo	Sheep	Goat	Pig	Dog	Poultry	Others	Total
Anthrax	KOPPALA	1			6						6			6						6
	Total	1			6						6			6						6
Black Quarter	BALLARY	1	1								1	1								1
	MYSURU	1	1								1									
	Total	2	2								2	1								1
Others	BELAGAVI	1	40								40									
CLSD	BIDAR	1	1411	60							1471									
	DAVANGERE	1	4								4									
	HAVERI	1	2369								2369									
	KALABURGI	1	3386	6							3392									
	RICHURU	1	865								865									
	UDUPI	1	137								137									
	UTTARA KANNADA	1	2604	140							2744									
	YADGIRI	1	509	21							530									
	Total	9	11325	227							11552									
Sheep Pox	BALLARY	1			9						9									
	DAVANGERE	1			22						22			5						5
	Total	2			31						31			5						5

JOINT DIRECTOR(LH)

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.

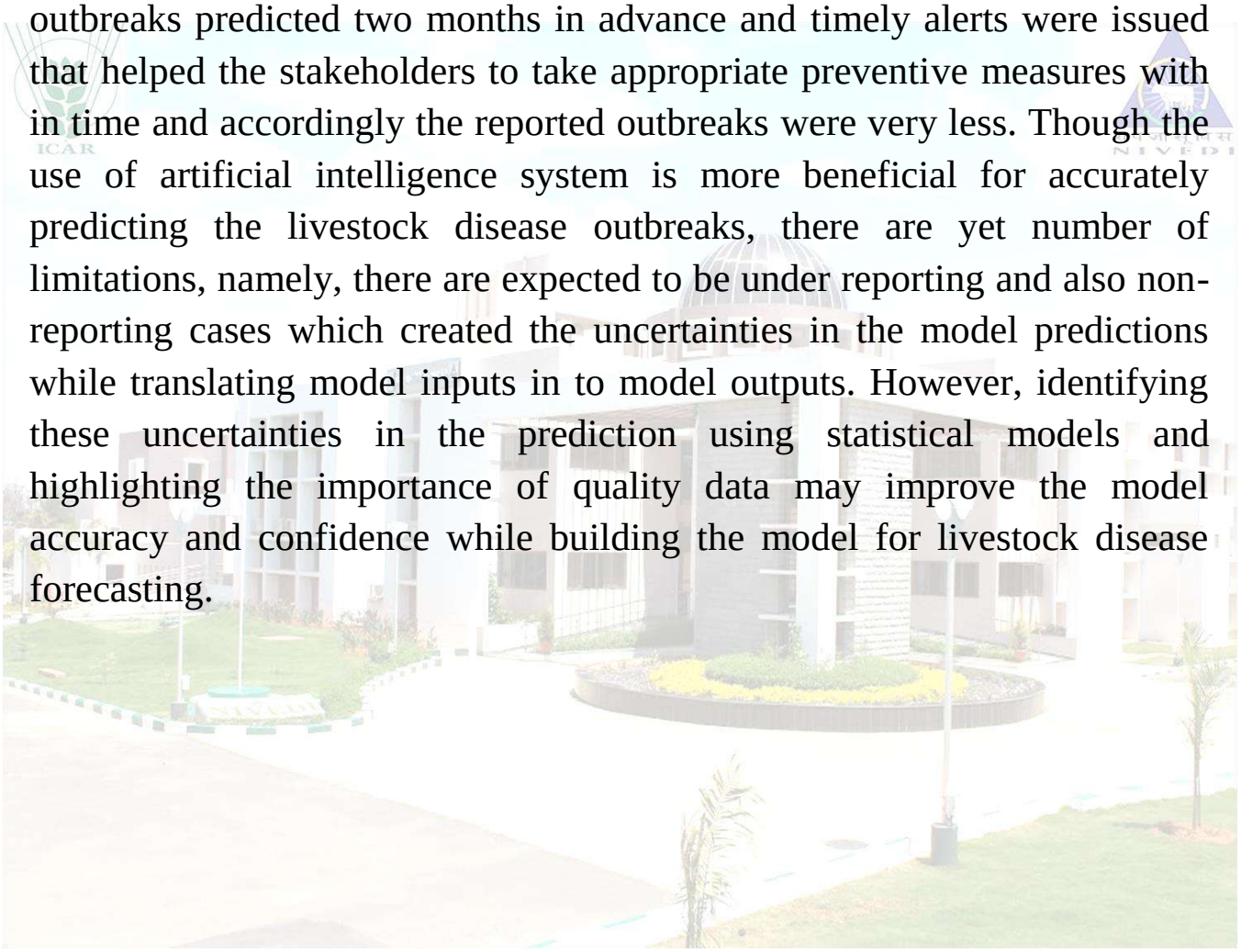


Table 9.1: Number of districts predicted for livestock diseases and reported

Livestock diseases	March-2020		April-2020	
	No of Districts predicted for the disease	No of districts reported the disease	No of Districts predicted for the disease	No of districts reported the disease
Anthrax	20	1	31	1
Babesiosis	39	20	45	19
Black quarter	43	NA	47	5
Bluetongue	NA	NA	NA	2
Enterotoxaemia	17	3	21	4
Fascioliasis	58	NA	46	15
Foot and mouth disease	71	3	48	31
Haemorrhagic septicaemia	47	2	43	5
Peste des petits ruminants	58	7	65	11
Sheep & Goat pox	44	2	32	7
Swine fever	40	4	41	12
Theileriosis	29	19	45	23
Trypanosomiasis	33	8	31	31

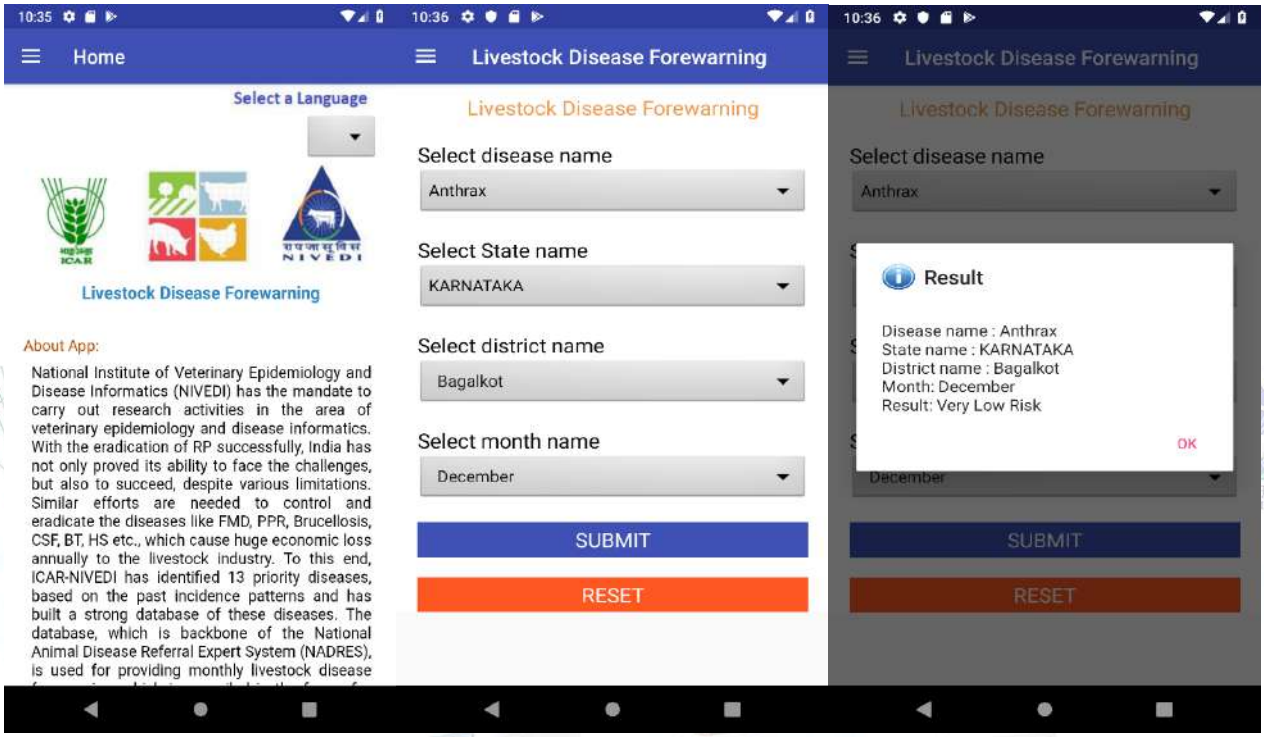
*which takes in to account of action taken for prediction and non-reporting of cases

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 store linkalso 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. 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.

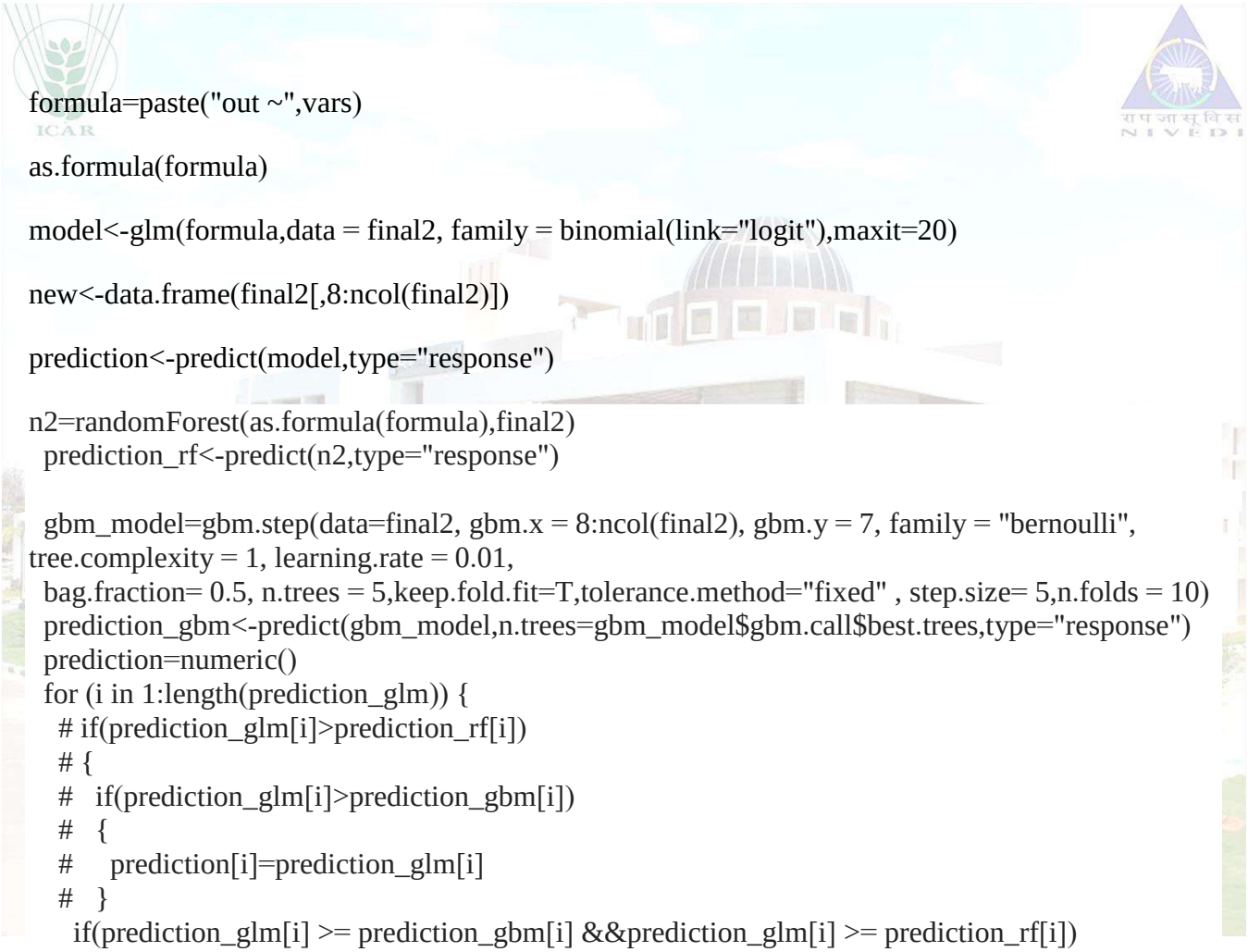
11. Appendix

a) R Code

```
#pars month_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$disease_id,final1$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];
```

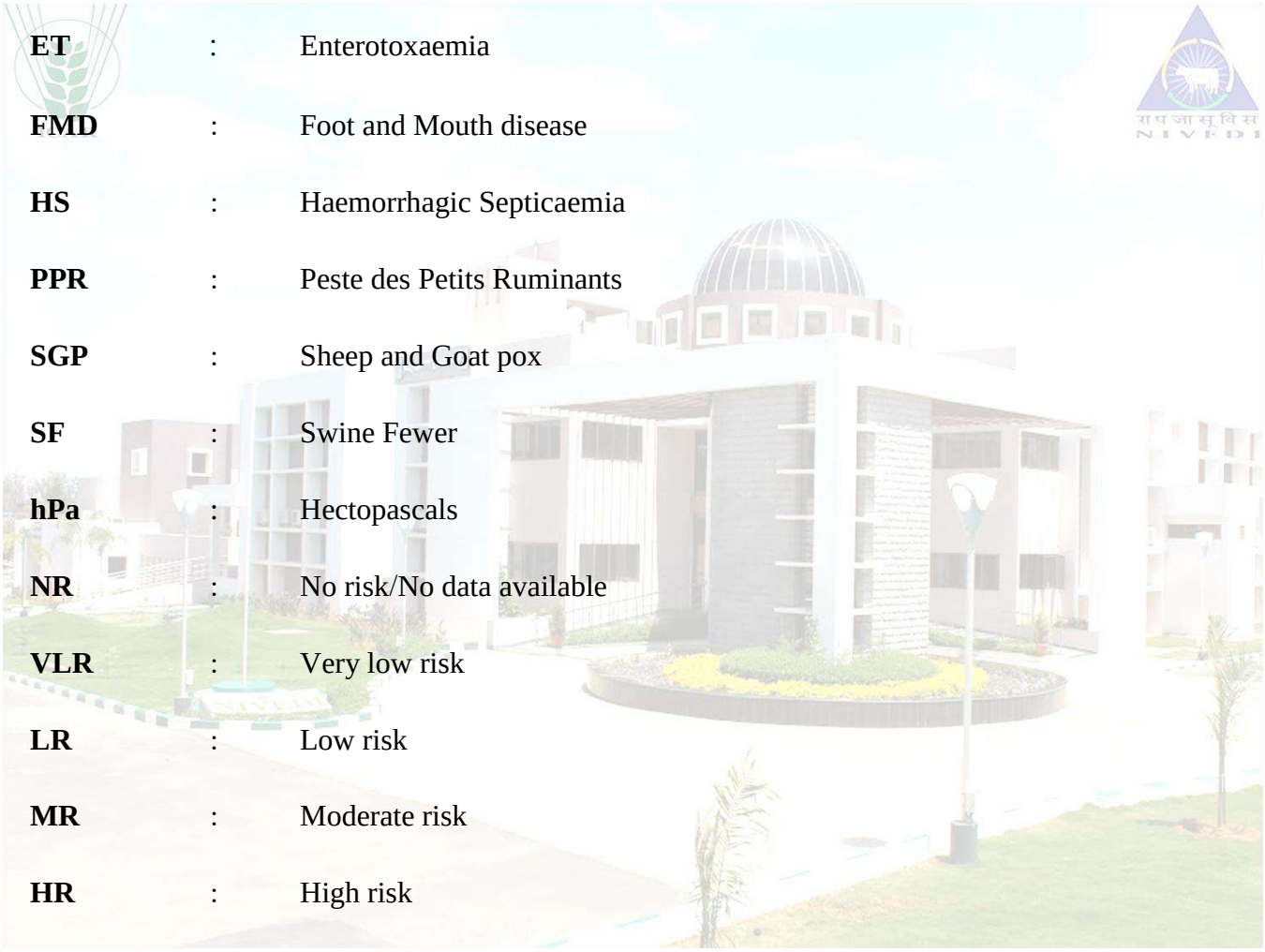
```
    }

    }
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_CD"),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



12. Questions and Answers on the 2019 Coronavirus Disease (COVID-19)

What causes COVID-19?

Coronaviruses (CoV) are a family of RNA (ribonucleic acid) viruses. They are called coronaviruses because the virus particle exhibits a characteristic 'corona' (crown) of spike proteins around its lipid envelope. CoV infections are common in animals and humans. Some strains of CoV are zoonotic, meaning they can be transmitted between animals and humans, but many strains are not zoonotic.

In humans, CoV can cause illness ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (caused by MERS-CoV), and Severe Acute Respiratory Syndrome (caused by SARS-CoV). Detailed investigations have demonstrated that SARS-CoV was transmitted from civets to humans, and MERS-CoV from dromedary camels to humans.

In February 2019, human cases of pneumonia of unknown origin were reported in Wuhan City, Hubei Province of China (People's Rep. of). A new CoV was identified as the causative agent by Chinese Authorities. Since then, human cases have been reported by almost all countries around the world and the COVID-19 event has been declared by the World Health Organization (WHO) to be a pandemic. For up to date information please consult the WHO website.

The CoV which causes COVID-19 has been named as SARS-CoV-2 by the International Committee on Taxonomy of Viruses (ICTV); this is the scientific name. The virus may also be referred to as "the COVID-19 virus" or "the virus responsible for COVID-19". COVID19 refers to the disease caused by the virus.

- **Are animals responsible for COVID-19 in people?**

The predominant route of transmission of COVID-19 is from human to human.

Current evidence suggests that the COVID-19 virus emerged from an animal source. Genetic sequence data reveals that the COVID-19 virus is a close relative of other CoV found circulating in *Rhinolophus* bat (Horseshoe Bat) populations. However, to date, there is not enough scientific evidence to identify the source of the COVID-19 virus or to explain the original route of transmission to humans (which may have involved an intermediate host).

Investigations are needed to find the source, to determine how the virus entered the human population, and establish the potential role of an animal reservoir in this disease.

Priorities for research to investigate the animal source were discussed by the OIE informal advisory group on COVID-19, now the OIE *ad hoc* Group on COVID-19 and the human-animal Interface, and were presented at the WHO Global Research and Innovation Forum (11-12 February 2020) by the President of the OIE Wildlife Working Group. For more information on the OIE *ad hoc* Group on COVID-19 and the human-animal Interface and the WHOR and D roadmap please see the links under 'more information' at the bottom of this page.

Can animals be infected with COVID-19 virus?

Now that COVID-19 virus infections are widely distributed in the human population there is a possibility for some animals to become infected through close contact with infected humans. Infection of animals with COVID-19 virus may have implications for animal health and welfare, and for wildlife conservation.

Several dogs and cats (domestic cats and a tiger) have tested positive to COVID-19 virus following close contact with infected humans. Further information reported to the OIE can be found below in the 'more information' section.

Studies are underway to better understand the susceptibility of different animal species to the COVID-19 virus and to assess infection dynamics in susceptible animal species.

Preliminary findings from laboratory studies suggest that, of the animal species investigated so far, cats are the most susceptible species for COVID-19, and cats can be affected with clinical disease. In the laboratory setting cats were able to transmit infection to other cats. Ferrets also appear to be susceptible to infection but less so to disease. In the laboratory setting ferrets were also able to transmit infection to other ferrets. Dogs appear to be susceptible to infection but appear to be less affected than ferrets or cats. Egyptian fruit bats were also infected in the laboratory setting but did not show signs of disease or the ability to transmit infection efficiently to other bats.

To date, preliminary findings from studies suggest that poultry and pigs, are not susceptible to SARS-CoV-2 infection. Currently, there is no evidence to suggest that animals infected by humans are playing a role in the spread of COVID-19. Human outbreaks are driven by person to person contact.

- **What do we know about COVID-19 virus and companion animals?**

  The current spread of COVID-19 is a result of human to human transmission. To date, there is no evidence that companion animals play a significant role in spreading the disease. Therefore, there is no justification in taking measures against companion animals which may compromise their welfare.

  Some examples of animal infections have been reported to the OIE. Further details on these events can be found in the 'more information' section. So far, these appear to be isolated cases, and there is no evidence that companion animals are playing a role in the spread of human disease.

  Preliminary findings from laboratory studies suggest that, of the animal species investigated so far, cats are the most susceptible species for COVID-19, and cats can be affected by clinical disease. In the laboratory setting cats were able to transmit infection to other cats. Ferrets also appear to be susceptible to infection but less so to disease. In the laboratory setting ferrets were able to transmit infection to other ferrets. Dogs appear to be susceptible to infection but appear to be less affected than ferrets or cats. To date, preliminary findings from studies suggest that poultry and pigs, are not susceptible to SARS-CoV-2 infection.

- **What precautionary measures should be taken when companion or other animals have close contact with human's sick or suspected with COVID-19?**

  Currently, there is no evidence that companion animals are playing a significant epidemiological role in this human disease. However, because animals and people can sometimes share diseases (known as zoonotic diseases), it is still recommended that people who are sick with COVID-19) limit contact with companion and other animals.

  When handling and caring for animals, basic hygiene measures should always be implemented. This includes hand washing before and after being around or handling animals, their food, or supplies, as well as avoiding kissing, licking or sharing food.

  When possible, people who are sick with COVID-19 should avoid close contact with their pets and have another member of their household care for their animals. If they must look after their pet, they should maintain good hygiene practices and wear a face mask if possible. Animals belonging to owners infected with COVID-19 should be kept indoors as much as possible and contact with those pets should be avoided as much as possible.

- **What can National Veterinary Services do with regards to companion animals?**

  Public Health and Veterinary Services should work together using a One Health approach to share information and conduct a risk assessment when a person with COVID-19 reports being in contact with companion or other animals.

  If a decision is made as a result of a risk assessment to test a companion animal which has had close contact with a person/owner infected with COVID-19, it is recommended that RT-PCR be used to test oral, nasal and fecal/rectal samples. Care should be taken to avoid contamination of specimens from the environment or by humans. Animals that test positive for COVID-19 should be kept away from unexposed animals and contact with those animals should be avoided as much as possible.

- **Are there any precautions to take with live animals or animal products?**

  Although there is uncertainty about the origin of the COVID-19 virus, in accordance with advice offered by the WHO, as a general precaution, when visiting live animal markets, wet markets or animal product markets, general hygiene measures should be applied. These include regular hand washing with soap and potable water after touching animals and animal products, as well as avoiding touching eyes, nose or mouth, and avoiding contact with sick animals or spoiled animal products. Any contact with other animals possibly living in the market (e.g., stray cats and dogs, rodents, birds, bats) should be avoided. Precaution should be taken to avoid contact with animal waste or fluids on the soil or surfaces of shops and market facilities.

  Standard recommendations issued by WHO to prevent infection spread include regular hand washing, covering mouth and nose with the elbow when coughing and sneezing and avoiding close contact with anyone showing symptoms of respiratory illness such as coughing and sneezing. As per general good food safety practices, raw meat, milk or animal organs should be handled with care, to avoid potential cross-contamination with uncooked foods. Meat from healthy livestock that is prepared and served in accordance with good hygiene and food safety principles remains safe to eat. Further recommendations from WHO can be consulted.

The Codex Alimentarius Commission has adopted several practical guidelines on how to apply and implement best practices to ensure food hygiene (Codex General Principles of Food Hygiene, CXC 1- 1969), handle meats (Codex Code of Hygienic Practice for Meat, CXC 58 – 2005), and control viruses in foods (Guidelines for the Application of General Principles of Food Hygiene to the Control of Viruses in Food (CAC/GL 79-2012) and others which can be consulted on the Codex website.

Based on currently available information, there is no scientific evidence to justify introduction of additional sanitary measures for the international trade of animals or animal products for countries reporting cases of COVID-19 in humans. Similarly, precautions for packaging materials are unnecessary over and above the observation of basic hygiene, such as ensuring it is clean and free of visible contamination.

- **What are the Veterinary Authority's international responsibilities in this event?**

The infection of animals with COVID-19 virus meets the criteria of an emerging disease. Therefore, any (case of) infection of animals with the COVID-19 virus in (including information about the species, diagnostic tests, and relevant epidemiological information) should be reported to the OIE in accordance with the OIE *Terrestrial Animal Health Code*.

It is important for Veterinary Authorities to remain informed and maintain close liaison with public health authorities and those responsible for wildlife, to ensure coherent and appropriate risk communication messages and risk management.

It is important that COVID-19 does not lead to inappropriate measures being taken against domestic or wild animals which might compromise their welfare and health or have a negative impact on biodiversity.

In some countries, National Veterinary Services are supporting core functions of the public health response, such as screening and testing of surveillance and diagnostic samples from humans. Veterinary clinics in some countries are also supporting the public health response by donating essential materials such as personal protective equipment and ventilators.

Guidance on Veterinary Laboratory Support to the Public Health Response for COVID-19 is available at the bottom of this document.

https://www.oie.int/scientific-expertise/specific-information-and-recommendations/questions-and-answers-on-2019novel-coronavirus/

DAILY INCIDENCE OF COVID-19 PERIODIC REGRESSION.

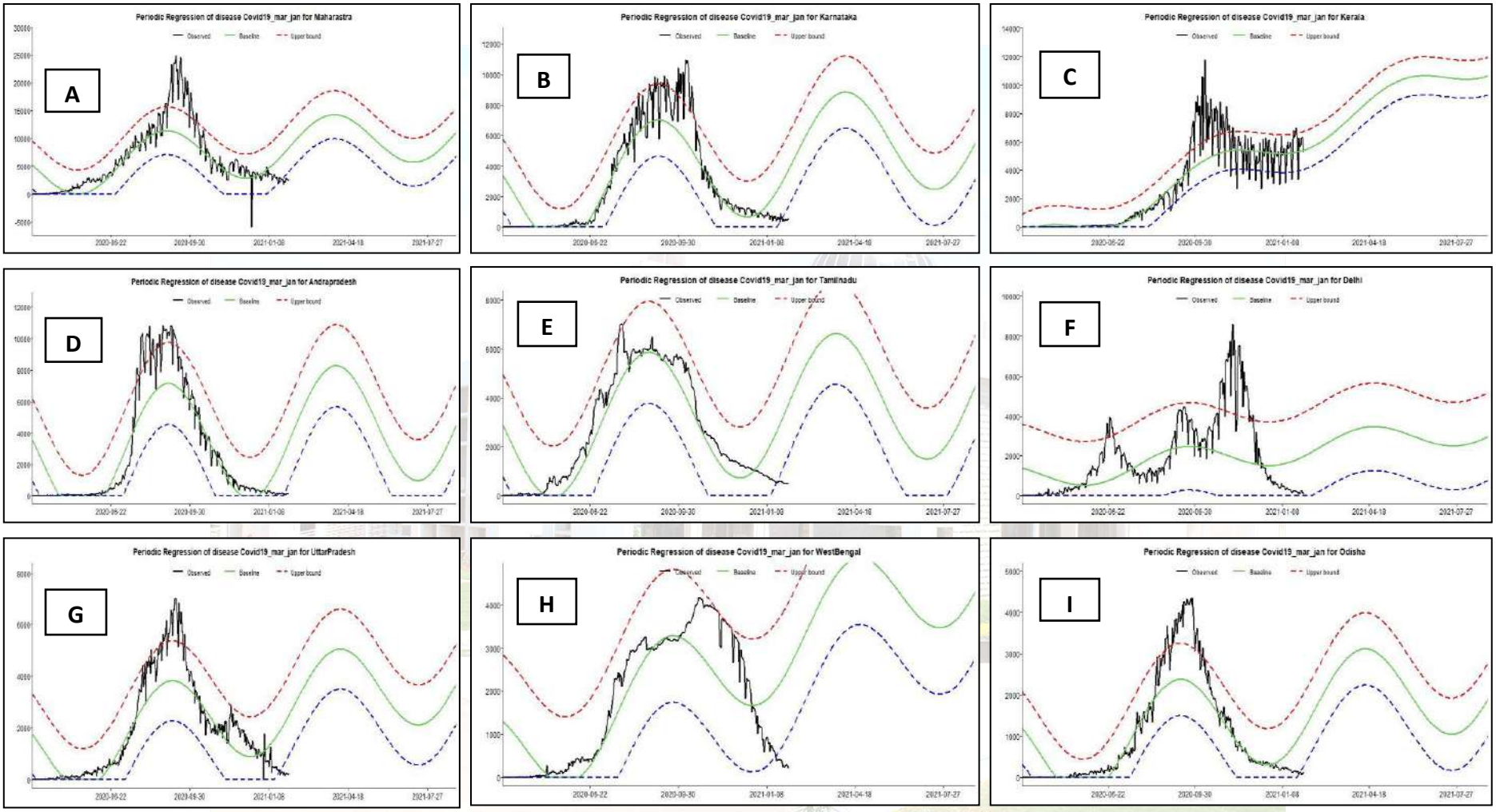


Figure 12.1: Periodic regression analysis of COVID-19 outbreaks in the top 10 highly infected states in India-Maharashtra (A), Karnataka (B), Kerala (C), Andhra Pradesh (D), Tamil Nadu (E), Delhi (F), Uttar Pradesh (G), West Bengal (H) and Odisha (I)

ICAR - National Institute of Veterinary Epidemiology and Disease Informatics

Customer/Client Feedback Form

Feedback for the Livestock Diseases forewarning bulletin of April 2021, Volume 9 and Issue 4

(Please return this duly fill in after receiving the outbreak report ofJune -2021)

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

Sl. No	Diseases Name	No of districts outbreak occurred but not alerted**	Measure 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.	Trypanosomiasis			

**Details may be written here.

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

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

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