Impact of COVID-19 on tourism sector: a case study of Madhya Pradesh, India

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ABSTRACT: Background: COVID-19 is nothing but SARS-CoV-2 or Severe Acute Respiratory Syndrome, is a virus that causes severe respiratory illness. Is a global pandemic caused by a novel corona virus, firstly reported China (Wuhan City) on Dec, 2019. In India, Kerala is the first state in which the COVID-19 first case has registered which has raised to three cases by 3 Feb, 2020. Purpose: The aim of this research is to map the impact and assessment of the COVID 19 pandemic situation using geospatial technical process in Madhya Pradesh and suggest various measures to control the pandemic situation.
Objectives: (i) Assessing and mapping the affected parts of Madhya Pradesh and evaluating the risk of the pandemic on tourism, and
(ii) Initially tracking and forecasting the cases of COVID-19 in the study area.
Methodology: The methodology consists of FOUR (4) main phases.
 In the **first phase** understanding the risk of the pandemic situation at three primary levels i.e. risk analysis, risk evaluation, risk management after that,
 In the **second phase** is to identify the target risk zones of COVID-19 cases using geospatial technical process based on bulk screening.
In the **third Phase** Assessment and mapping of pandemic risk.
 In the **fourth phase**, treatment of the risk and evaluation of future occurrence possibilities.
 Result: COVID 19 pandemic is the greatest threat globally. Geospatial technical process provides valuable support in assessing and mapping the risk of COVID 19 cases in Madhya Pradesh at the initial level. **Conclusion**: This study shows that the geospatial technical process contributes very significantly in detecting pre and post COVID 19 pandemic conditions and helps in proper decision-making, not only in Madhya Pradesh but also in the entire world.

I.   INTRODUCTION

COVID-19 (Corona virus disease) is a disease caused by a recently discovered corona virus, first case reported in China (Wuhan city). The infection spreads mostly by discharge from the nose or droplets of saliva as an infectious person sneezes or coughs. As on 2022, the WHO as declared the following vaccines for Covid-19 The Pfizer/BioNTech Comirnaty vaccine, The SII/COVISHIELD and AstraZeneca/AZD1222 vaccines, The Janssen/Ad26.COV 2.S vaccine developed by Johnson & Johnson, The Moderna COVID-19 vaccine (mRNA 1273), The Sinopharm COVID-19 vaccine, The Sinovac-CoronaVac vaccine, The Bharat Biotech BBV152 COVAXIN vaccine, The Covovax (NVX-CoV2373) vaccine, The Nuvaxovid (NVX-CoV2373) vaccine and availed by Central Government of India. Most of them are very much effective against COVID-19 disease, but no one make you fully immune against COVID-19. In some countries, it was found that they can mutate in different forms and affect the human body more aggressively. However, many ongoing research and clinical trials are evaluating potential treatments and cure . On the 11th of March 2020, the WHO, World Health Organization has declared this outbreak a Worldwide Pandemic. After that many countries, including India, have shut-down its socio-economic and cultural institutions, except sectors related to essential services. At this time, the COVID-19 pandemic has emerged as an opportunity as well as the biggest challenge for the world and countries individually. From the government's point of view, opportunity in the sense of expanding the medical facilities as well as innovating for the people and society so that during the lockdown and social distancing

protocols how the people utilize their time, money, and efforts in a tough time. For private people, they have to learn how to make the product for the end-user by following governmental guidelines as well as how to sell product at customers doorstep so that both will be safe and benefitted. Schools and Colleges, have to learn how to teach the children's in a digital way so that both of them will be safe. People have to learn how to expand their social relationship without affecting others.

Today's era comes in the digital age, where networking in social media become a major necessity for our day-to-day life. For any information or news, we tend to approach such platforms where the chances are high that we can get exposed to false information. Most likely in the case of the COVID-19 pandemic, all platforms of social media had flooded with many kinds of false information connecting to its origin, spread, cure[1], precautions, vaccines, etc. Some of them were correct, but most of them were fake news, which was creating a panic situation among people.

To ignore such untrue information and keeping the chaos down, geospatial technical process can be used for monitoring based on available data (count of reported cases) in India and around the globe. GIS offers an interactive way to monitor the effects of the virus on a real-time basis. The best example is AAROGYA SETU mobile app the working of app is purely based on geospatial technical process. "AAROGYA SETU is a smart phone application that informs users about their Corona virus infection risk. On April 2, the Indian government introduced the AAROGYA SETU smart phone app to safeguard Indian residents against the widespread spread of corona virus. The software makes use of a GIS location system and a contact tracking technique based on Bluetooth. It keeps track of all the individuals who come into touch with as you go about your daily routine. If any of contacts tests positive, the app will notify you. The Corona Virus pandemic is also covered by the AAROGYA SETU app, which gives relevant and tailored medical warnings."
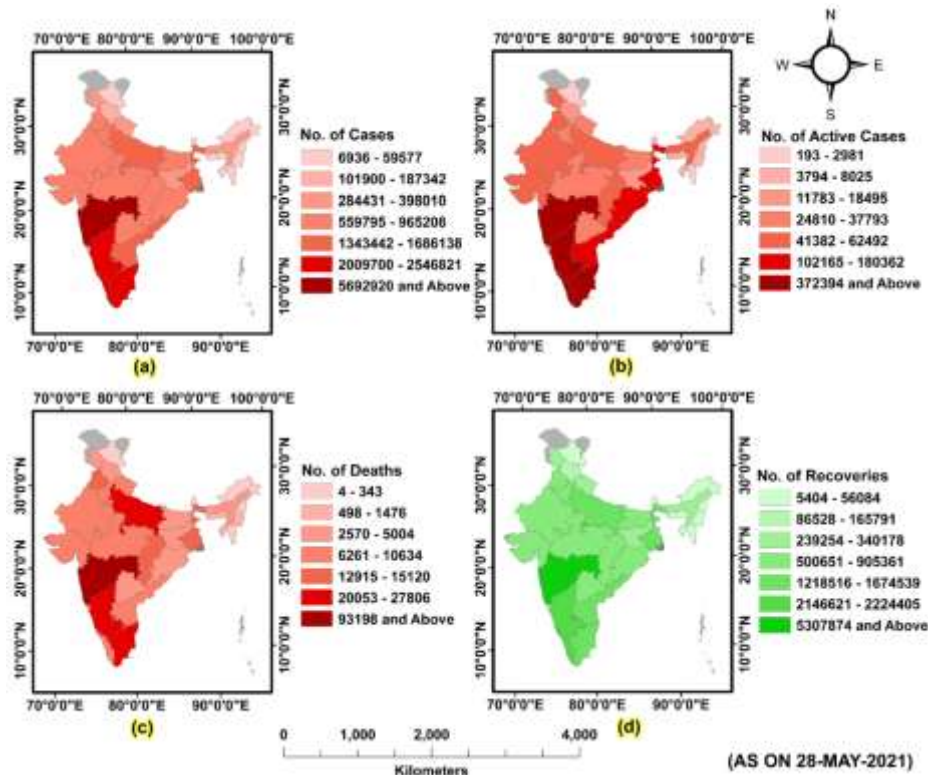

Figure 1. (A) Patterns of COVID-19 pandemic in India as on 28 May, 2021, map represents a) Total Cases; b) Active Cases c) Death and d) Recoveries, in India.
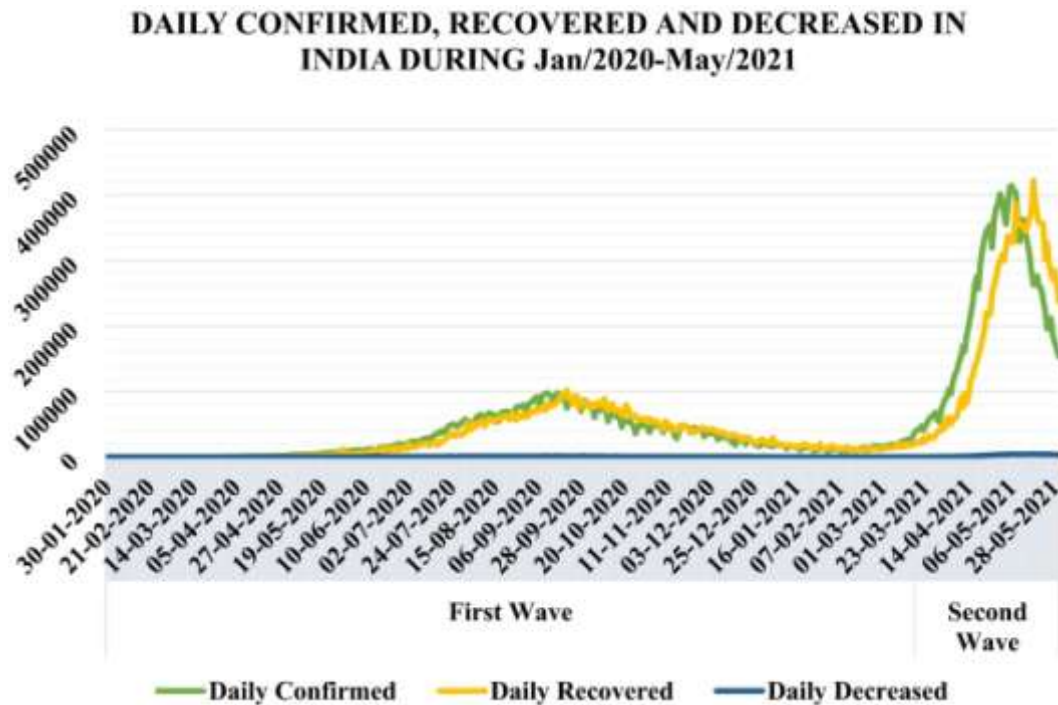
Figure 1. (B) Systematic graphical representation of daily confirmed, recovered and decreased cases in India from Jan, 2020 to May, 2021.

With the geospatial technical process, we are able to map the distribution pattern of COVID-19 cases in India, adding infectious cases, as well as evolving trends among the people and countries [2]. It is believed that geographic accuracy is mandatory while detecting and responding to any infectious disease outbreak and pandemic situations [3]. Geospatial data science plays a vital role to understand, analyses, and visualize the spatial distribution of any phenomenon occurring in various countries. Similarly, Geospatial innovations offer a scope of chances for the improvement of current tourism applications utilizing digital maps [4].

The spread of COVID-19 in India has started in January 2020. On March 24, the Government of India ordered a 21-days nation-wide lockdown to break the chain of the spread of COVID-19 [5,6]. At that point, the total count of cases in India was relatively low, with only 564 confirmed cases all over the country. However, total tests conducted at that point were also low, around 3298 tests till that day [7], because of this it was impossible to know the exact number of true infections, all contaminated zones or **hotspots**. The status of the COVID-19 pandemic in India are shown above Figure 1A and B.

Afterward, during starting of First Wave it

has been found by many research and experts that the decision to impose lockdown in India was taken in the face of deep uncertainty, and it required understanding of the coming consequences to livelihoods against the risk of an uncontained outbreak of the COVID-19 [8,9]. Some researchers and experts told that the Second Wave of COVID-19 was started from the start of May month, 2021 and it was more aggressive than the first one because the COVID-19 virus was mutating very rapidly and affecting the lungs and immune system of human body. Due to this people require ventilators for breathing oxygen. The most affected states were Maharashtra, Delhi, Uttar Pradesh, Karnataka and Tamil Nadu etc. [10].

The Second Wave of COVID-19 was much worse than expected for India; more than four thousand people died every day as per government records and more than 2343152 active cases as of 28 May 2021. After the Second Wave of COVID-19 experts were analyzing that Third Wave of COVID-19 was more severe, in which most likely the chance of low age group children might be affected at large scale. So, the government must focus on this situation either new generation will be affected at large scale. Vaccination is the only solution to beat this epidemic. As of that time, there was no vaccine for lower age group children but

the government was working on it. "Vaccination was the only way fight against COVID-19 pandemic situation." The status of Vaccine up to 01 June 2021, mentioned below in Table 1 and Figure 2.

Table 1. Available COVID-19 vaccine in India as on (01/June/2021).

| S/N	Name	Mfr./developer	Research name	Vaccine type:	Admin. Method	Source
1.	Covishield	AstraZeneca, Serum Institute	AZD1222 (ChAdOx1)	Non-Replicating	Intramuscular injection	mohfw.gov.in
2.	Covaxin	of India Bharat Biotech	BBV152	Viral Vector Inactivated	Intramuscular injection	who.int
3.	Sputnik V	Gamaleya Research Institute	Gam-COVID-Vac	Non-Replicating Viral Vector	Intramuscular injection	who.int
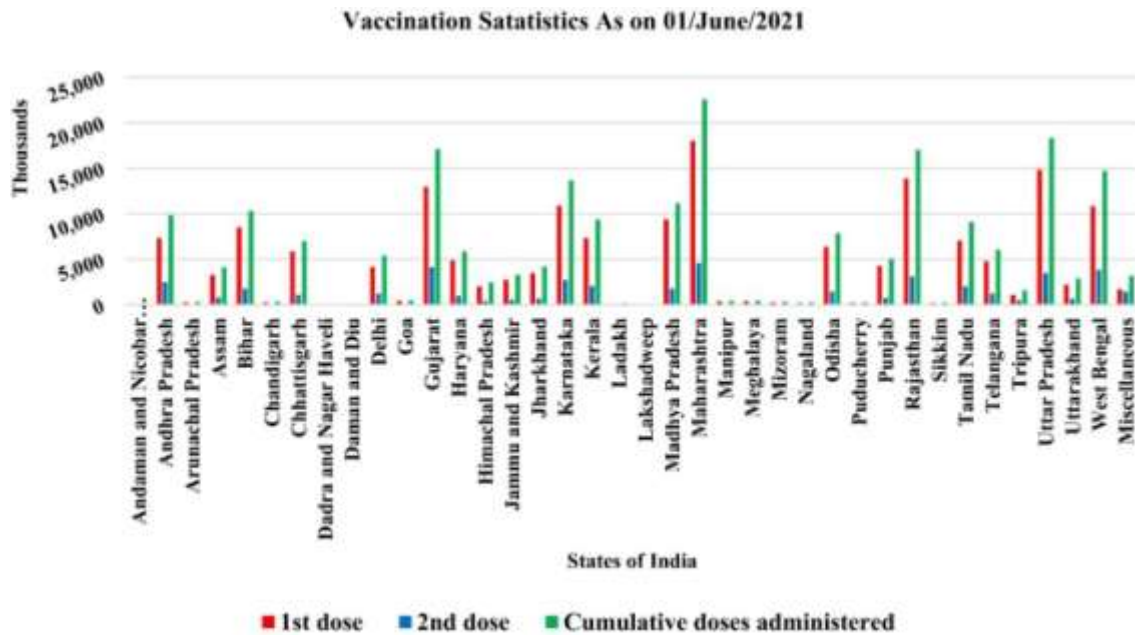
Figure 2. Systematic graphical representation state wise Vaccination Statistics up to 01/June/2021. * Note: Supporting table mentioned at the end of the paper (Table 3).

II. IMPACT OF COVID-19 ON TOURISM SECTOR

As a consequence of the COVID-19 pandemic (Empyrean, Unrestricted, catholic, ecumenical ,stellar, pandemia) , the globe is facing an unparalleled global health, social, and economic crises. Travel and tourism are among the worst-affected industries, with worldwide demand plummeting as a result of worldwide travel restrictions, including the closure of several borders to control the infection. International tourist arrivals (overnight visitors) fell by 72 percent in January-December 2020 compared to the same period 2021, according to the UNWTO(United Nation World Tourism Organization) World Tourism Barometer, and continue to decline, hampered by slow virus containment, low traveler confidence, and significant travel restrictions still in place due to the COVID-19 pandemic. In comparison to the same period last year, there were 900 million fewer international tourist arrivals in the first ten months of this year, resulting in a loss of US$ 935 billion in international tourism export revenues, more than ten times the loss experienced in 2009 as a result of the global economic crisis. Between January and December 2020, arrivals in Asia and the Pacific fell by 82 percent. This ten-month period showed a 73 percent dip in the

Middle East and a 69 percent dip in Africa. International arrivals fell by 68 percent in both Europe and the Americas. According to current patterns, foreign arrivals are expected to fall by 70% to 75% for the whole year of 2020. Figure 3. This would mean that international tourism could have returned to levels of 30 years ago. In 2020, the predicted drop in international tourism will equate to a loss of nearly 1 billion visitors and US$ 1.1 trillion in tourist revenue. This drop in foreign tourism might result in a worldwide economic loss of more than US$ 2 trillion in 2019, accounting for more than 2% of global GDP. In the future, it is believed that the announcement and implementation of a vaccination would gradually boost consumer trust and help to reduce travel restrictions. International tourism is expected to return in the second half of 2021, according to UNWTO's expanded scenarios for 2021–2024. In terms of foreign immigration, however, a restoration to 2019 levels might take 2½ to 4 years. In Indian context the tourism sector has been badly affected due to COVID-19. If we compare two-year trends (2019–2020) the difference is visible as per Table 2. The tourism sector is most revenue generating sector but due pandemic effect it goes in negative figures. As off now the Indian government requires fund to fight against COVID-19 Pandemic. For that purpose, they have very limited resources for earning. Among all the resources tourism is one of them, so this study it is important to analyze the sector at a vast scale to understand how the COVID-19 situation affecting tourism sector for that Madhya Pradesh is chosen as a study area, because Madhya Pradesh is most preferred destination for tourism activity.

Figure 3. Representation of World tourism loss during COVID-19 Pandemic. Source: World Tourism Organization (UNWTO), December 2020.

Table 2. Comparison of Tourism Loss During April–December (2019–2020).

Month	2019	2020	Difference	Percentage Loss
April	774651	470	774181	99.94
May	615136	1329	613807	99.78
June	726446	4480	721966	99.38
July	818125	6503	811622	99.21
August	800837	11619	789218	98.55
September	751513	18469	733044	97.54
October	945017	30917	914100	96.73
November	1092440	60156	1032284	94.49
December	1226398	79910	1146488	93.48

In the long term, it has also impacted on the sustainable development and climate change

agenda (s) of the nation as well as for the Madhya Pradesh as a state. In current scenario India suspended all its tourist activities as the majority of the confirmed cases were linked to the other countries.

III.   COVID-19 IN MADHYA PRADESH

In Jabalpur, the city of Madhya Pradesh, the 1st case of corona virus was found on the 2nd of March 2020 [11]. In fact, on 19th March 2020, Madhya Pradesh imposed a statewide lockdown. Madhya Pradesh was the one of the state to imposed such kind of massive lockdown due to the heavy flow of COVID 19 cases [12]. Among them Indore city was highly affected by COVID-19 due to that there was an essential need to impose more constrictive lockdown in the city Figure 4. At that time the administration had decided more restrictive curfew to disrupt the spread of the virus, which has a major economic effect on the state.

Due to falling state revenues, the government will be forced to slash big spending on basic necessities, which is necessary to revive the state's economy [13,14]. The state officials are already restructuring the budget for new financial year, which promised a modest but important boost to   the state's economy. Some specific departments may have to minimize their daily expenses up to   25 percent which ultimately results enough amount of revenue to tackle the current situation. The problems in Madhya Pradesh

give a snapshot into what awaits the rest of the nation as new cases of COVID-19 begin to escalate and the lockdown that started on the night of March 24 to May 3,   2020 [12,15]. It further stresses the importance of offering financial aid to state governments whose budgets have failed due to a number of causes. The economy of Madhya Pradesh, like most of the world, was tussling much before the epidemic. Because of the lockdown, the slowdown of the economy spreading very fast which results in the closure of many states industries and establishments which are likely to get decreased the income of the state by Rs 17,500 crores during 2019–2020, a 12.5 percent downfall compared to the past year, as per recent report submitted by DOIT Madhya Pradesh [16].

In the last quarter of March alone, it is reported that corona virus-related restrictions cost approx. Rs 3,500 crores, a 50 percent downfall compared to the past year. Another prediction exercise by the finance department of the state government estimates April revenues to decrease approx. Rs 1500 crores, a 60 percent downfall year-by-year, owing to the lockdown extension until May 3, 2020 [17].

Although Bhopal state officials worry about their numbers, according to experts, the countryside is braced for acute hunger and unemployment, and cautioned that the closing of local businesses and factories has adversely affects the livelihoods of the neediest citizens of district [18].
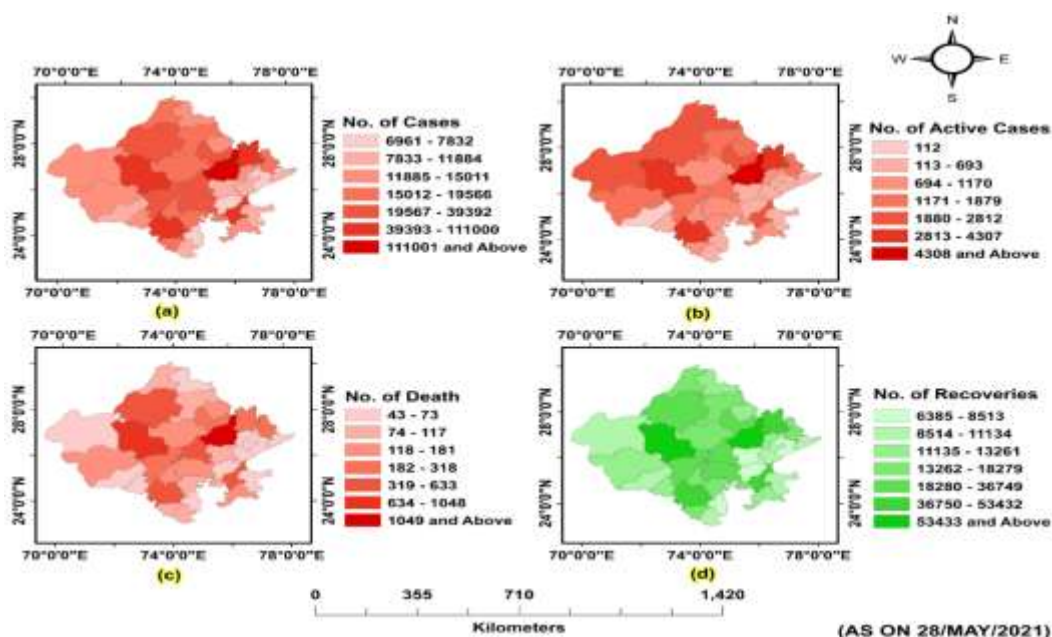

Figure 4. Patterns of COVID-19 pandemic in Madhya Pradesh as on 28-May-2021, the map represents a) Total Cases; b) Active Cases; c) Death and (d) Recoveries, in Madhya pradesh.

In 2018, travel and tourism have contributed about 9 percent share of GDP in India. As a result, it's evident that the country's growth is being significantly [19,20] helped by the tourism industry [21]. Protecting this sector will also be a significant investment in potential economic opportunities for nations. Therefore, if we are to reflect on India's potential growth through the tourism business, we need to secure all the service providers in the tourism industry.

IV. OBJECTIVES OF THE STUDY

The main objectives of this paper are as follows: a) Assessing and mapping the affected parts of Madhya Pradesh at initial days and evaluating the risk of the pandemic on tourism, and b) Initially tracking and forecasting the cases of COVID-19 in the study area.
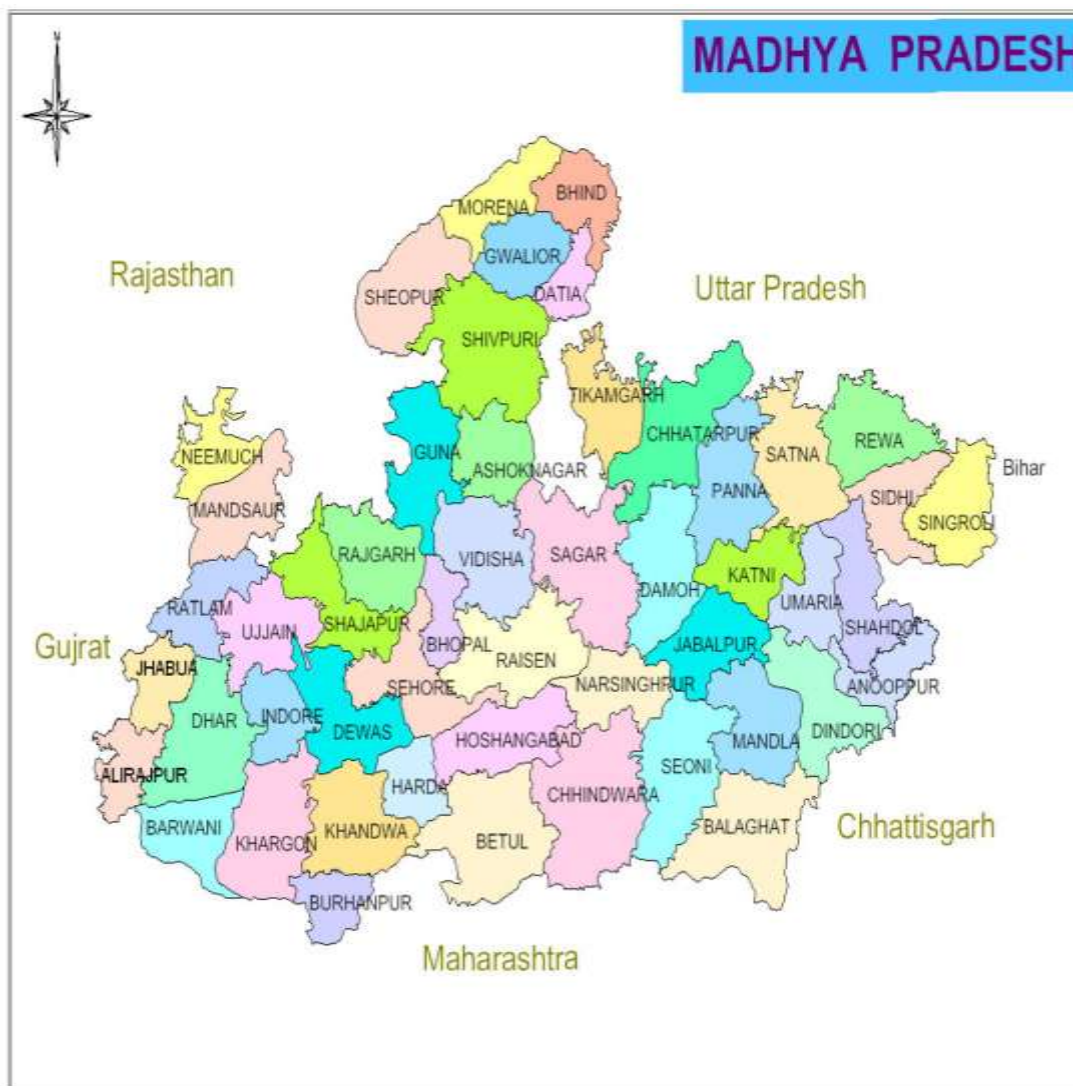
V. STUDY AREA DESCRIPTION

Figure 5. Location Map of Madhya Pradesh (Source: Author [1]).

From a tourism point of view, Madhya Pradesh has always been a crucial part of India. It covers an area of 308245 square kilometers in total, makin [22]. Geographical state boundaries are linked to 5 states that are Chhattisgarh, Gujarat, Maharastra, and Uttar Pradesh (UP) Figure 5, Madhya Pradesh is already one of the famous and most favored tourist destinations among national and foreign visitors. All the destinations have a very high flow of visitors throughout the year.

Ancient temples, fortresses, and cave works reflect the rich history of Madhya Pradesh. In the foothills of the Vindhya Range, prehistoric paintings dating from roughly 10,000 BCE adorn the walls of the Bhimbetka rock shelters (designated a UNESCO World Heritage site in 2003). In west-central Madhya Pradesh, one of the state's oldest historical monuments is the stupa (Buddhist mound forming a memorial shrine) at Sanchi, near Vidisha. Originally constructed by Ashoka, emperor of India from about 265 to 238 BCE, the stupa was expanded by the Shunga kings, who ruled the area during the 2nd and 1st centuries BCE. Madhya Pradesh, a large state in central India, retains landmarks from eras throughout Indian history. Begun in the 10th century, its Hindu and Jain temples at Khajuraho are renowned for their carvings of erotic scenes, most prominently Kandariya Mahadeva, a temple with more than 800 sculptures. The eastern Bandhavgarh and Kanha national parks, noted Bengal tiger sanctuaries, offer guided safaris.

In terms of natural wealth, cultural history, historical and archaeological treasures and unique wildlife, the state is renowned for its richness. For visitors visiting Madhya Pradesh, the palaces and forts, heritage hotels, vibrant festivals and fairs, local handicraft, etc., have become a ultimate selling enthusiasm. This draws a large number of tourists, particularly international visitors [23]. In the past, the tourism sector in Madhya Pradesh has been affected at various levels from time to time, but in the year 2020, it has been disturbed and destructed drastically.COVID-19 pandemic has become one of the major concerns for the tourism sector. It has affected tourism on a very large scale. Hence, there is a need to rejuvenate the tourism sector by developing a proper monitoring system of COVID-19 cases, so that people feel safe while traveling and the government can control the heavy spread of the virus among the people.
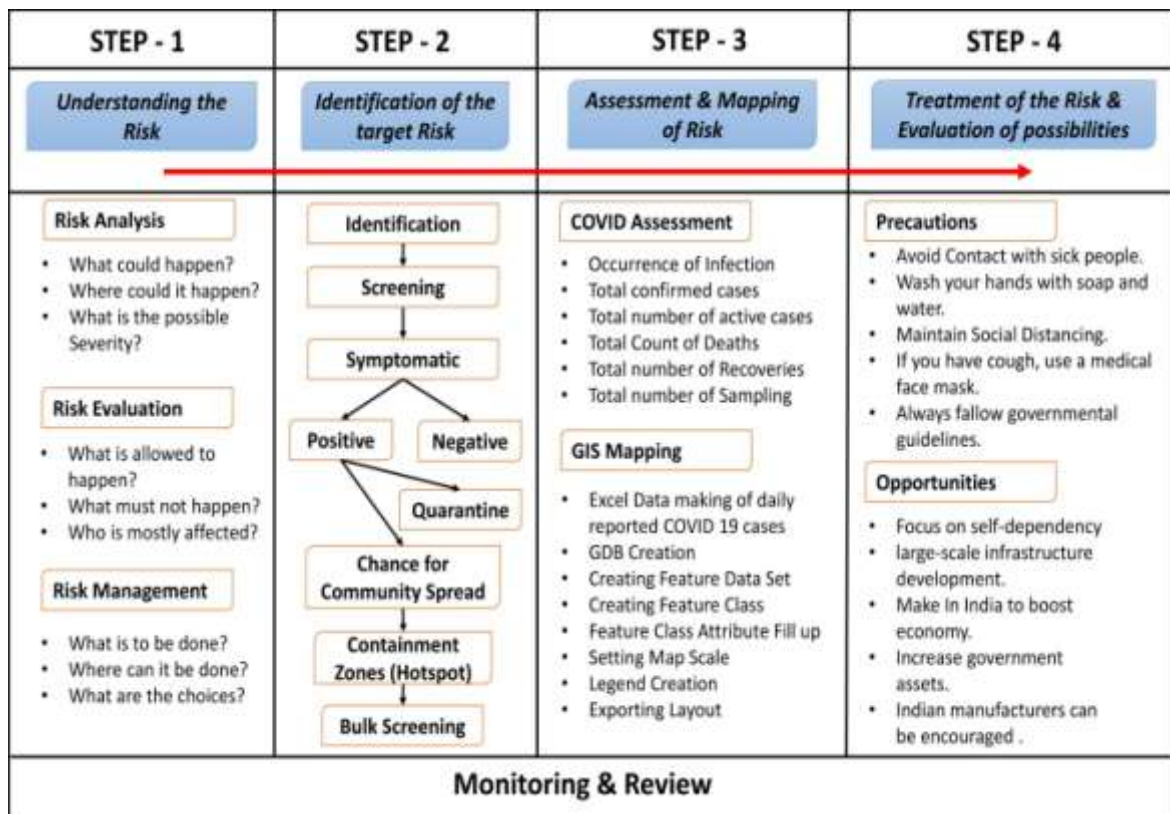
VI. RESEARCH FRAMEWORK

Figure 6. Methodology Adopted (Source: Author [1]).

The research paper is purely focused on the COVID-19 pandemic in Madhya pradesh, India, and how the geospatial technical process can help to identify logical possibilities of the current and future situation during the pandemic Figure 6. The research is following the current trend of COVID-19 cases and the analysis which can help to project future trends. So that proper monetization and effective control measures can be implemented by the government. In India, Madhya pradesh plays a crucial part in the tourism sector at national as well as international level and the spread of COVID-19 has been seen increasing due to tourism [24]. Example: Haridwar Kumbh, Pilgrimage tourism one of the largest and biggest tourism event organized by government is the best place for corona virus to spread among the people. More than 2000 positive cases was found during Kumbh mela [25]. This force me to do this research for my country, for fulfilling this I have selected Madhya Pradesh as a study area. The methodology consists of four main phases. In the first phase understanding the risk of the pandemic situation at three primary levels after that identification of target risk using geospatial technical process comes under the second phase. Assessment and mapping of pandemic risk is the third phase. In the fourth phase, treatment of the risk and evaluation of future occurrence possibilities.

Tourist Arrival In Madhya Pradesh
Tourist arrivals in the state have increased from 15,60,400 in 1984-85 to 38,86,548 in 1990-91 and to 51,80,444 in 2000-2001. Of this, the share of domestic tourist has been very high to the order of 98%. Foreign and Domestic Tourist arrivals in the state of Madhya Pradesh .

VII. RESULT

Tourism has always been a major contributor to job growth and a major source of foreign income for the country. This sector not only supports urban workers but also offers livelihoods for people through social strata in rural areas. It is a mediator of the aviation sector, automobile sector, hospitality, commercial, etc. It is one of the primary drivers to generate revenue for Madhya Pradesh. Due to COVID-19, Tourism has become the most adversely affected sector. It has been found that the national and international arrival trends are highly affected at large scale, it can be seen from the flow chart Figure 7, which is not good for the Tourism industry. The closure of hotels, dharamshala, resorts etc., and airport flights have been halted after the start and spread of the COVID-19 pandemic has already resulted in a projected revenue loss of 1.25 trillion rupees for the Indian tourism industry by 2020. A CARE ratings agency research says that the amount corresponds to a 40 percent downfall in total revenue over the fiscal year 2019. The study predicts the impact of the epidemic on tourism between January and February 2020 which shows downfall of 50 percent, and it may be getting stronger by 70 percent downfall in March alone, since the termination of numerous global flights. In April–June, the Indian tourism sector is forecast to make a projected loss of revenue approx. Rs. 69,400 crosses, describing a y-o-y (year-on-year) downfall of 30 percent.

Figure 8. A. Day wise pattern of COVID-19 patient in 52 districts of Madhya pradesh (April 2020 to May, 2021).

COVID-19 pandemic in Madhya Pradesh				
District	Total cases	Recoveries	Deaths	Active cases
BETUL	12,890	12,590	277	32
BHOPAL	1,23,325	1,22,121	972	227
DHAR	12,532	12,388	130	14
GWALIOR	53,090	52,427	633	31
HOSHANGABAD	10,680	10,570	99	11
INDORE	1,53,000	1,51,410	1,391	202
JABALPUR	50,640	49,896	670	74
KHARGONE	13,960	13,716	239	10

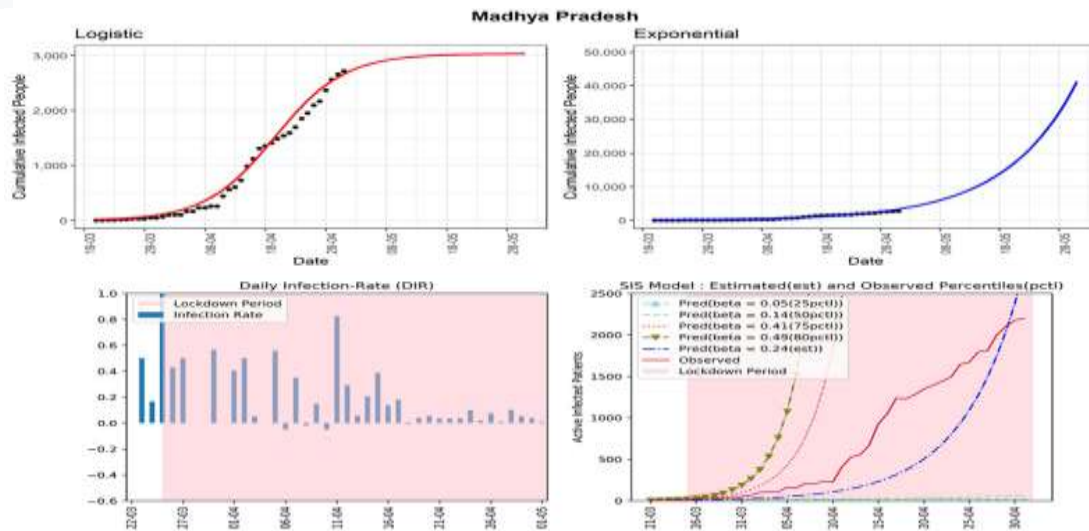| NARSINGPUR	11,200	11,115	81	4
RATLAM	17,853	17,438	385	30
REWA	16,431	16,270	155	6
SAGAR	16,591	16,154	390	47
SATNA	11,965	11,829	133	3
SEHORE	10,136	10,057	73	6
SHAHDOL	10,080	9,958	118	4
SHIVPURI	12,393	12,261	125	7
UJJAIN	18,896	18,720	172	4
VIDISHA	11,918	11,677	237	4

Figure 8 B Day wise pattern of COVID-19 patient in 52 districts of Madhya pradesh (April 2020 to May, 2021).

In Madhya Pradesh, daily new cases are coming in all the 52 Districts Figure 8. So, collecting all the data and multi-scale mapping it using Geospatial Technical process makes it more understandable to the government agencies for future prediction and establishing hotspots/containment zones play a crucial role in minimizing the cases. Assessment and mapping in geospatial technical process also allow up gradation of the data and the information for the epidemic with time.

India's government agency, the Ministry of Health and Family Welfare (MoHFW), has proposed a district wise categorization to tackle COVID-19 pandemic in the form of different hotspots naming red zone, yellow zone and green zone representing (high, medium and low) based on recorded cases using Geospatial Technical process. Districts with no found cases are categorized as green zone. As per the government, if there is no new case is found for 28 days, a hotspot district will be transferred to the green zone. In India, based on the doubling rate of reported COVID-19 cases, states are directed to recognize hotspots. According to the Ministry, this detection and tracking of hotspots will be performed regularly. In the red hotspot zones, strict containment strategies need to be enforced. Demarcation of Madhya pradesh district is done by government agencies which are shown above.

VIII.   DISCUSSION

Combined with the context of large-scale population flow, the uncertain dissemination of COVID-19 has contributed to the immediate need for science and technical assistance to monitor and prevent the spread of the disease. Geospatial technologies may play an important role in the battle against this pandemic, in the prediction of the spatial spread of the disease, in the spatial avoidance and management of the epidemic, in the

spatial distribution of money, and in the spatial detection of social opinion.

In the current scenario of COVID-19 in India, Geospatial Technical process can help in the (a) Rapid collection of a large number of data and information systems for the epidemic. (b) Processing, acquisition, and integration of problem-oriented data. (c) Rapid multi-scale mapping for the epidemic, and up gradation with time. (d) Comparative study of spatio-temporal tracking and analyzing the containment zones. (e) Managing the demand and supply for medical amenities. (f) Evaluation of the risks of commodity procurement and shipping. (g) Estimation of the population flow and epidemic spread. (h) Monitoring social activities at a time of the epidemic, etc.

Through all the data provided by the Madhya Pradesh Government, early and fast detection of possible danger areas of infection with COVID-19 is increasingly crucial for mega-states adopting targeted infection prevention and control initiatives, which would be a first step towards improving the tourism sector in Madhya Pradesh. In this analysis, communities with confirmed cases from 1 March to 19 June were obtained and considered to be unique disease data for Madhya Pradesh. Evaluation of spatio-temporal variations in epidemics prior to the use of Ecological Niche Models (ENM) to compile disease data and socio-economic variables to classify most possible danger zones of this infection in Madhya Pradesh Figure 8. It is very important to take a risk zone for the analysis of the infected areas. Based on size of population of Madhya Pradesh different buffer zones has been created from outside the city's urban boundary at (20, 40, 60, 80, 100 m) by this we can clearly map the chances of high infection in the community which can be mapped with

Red. The community with high risk is mapped as orange which can clear that the community is going to infected soon or have a high risk of infection. And the community with medium risk is mapped as yellow which clears that community has medium risk which is going to be infected later stage. A community with a low risk of infection is mapped as light green and dark green is mentioned as no risk of infection. It is essential to know the risk factors in the community if we analyze the pattern of COVID-19 cases.

Risk zone analysis shows that the approach can be used as an early forecasting technique to classify possible risk areas for contamination with COVID-19 on a fine scale. This paper recommends that local health authorities should keep an eye on the disease in each area and ensure that their measures in the zones are properly applied and adapted. In this study, we analyzed the spatial and temporal dynamics of newly issued communities with reported cases of COVID-19 before exploring feasibility and early detection of possible risk areas for infection in Madhya Pradesh. Several notable findings that have been achieved and would provide a valuable guidance for regions with increasingly local dissemination and focused containment measures to tackle the outbreak of this disease. Even as the Corona virus pandemic sparks an unparalleled global attack on life and livelihoods, pushing the planet into a slowdown that, in terms of size, may well be reminiscent of the Great Depression, India seems to be the odd one in dealing with the crisis. The leadership of every major economy, including those that have been singing waves of globalization, is undergoing some form of government interference and expansionary fiscal policy.
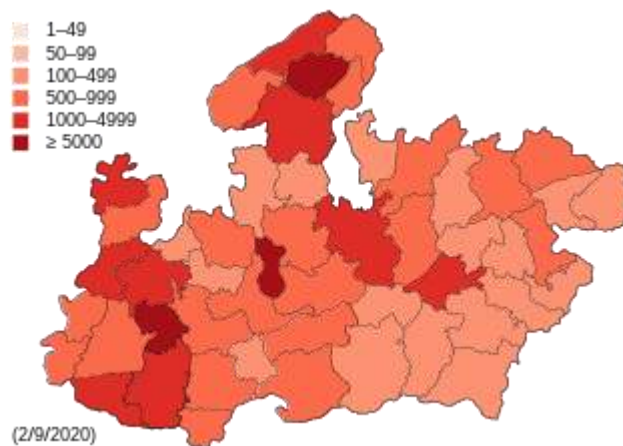
Map of District with Confirmed Cases
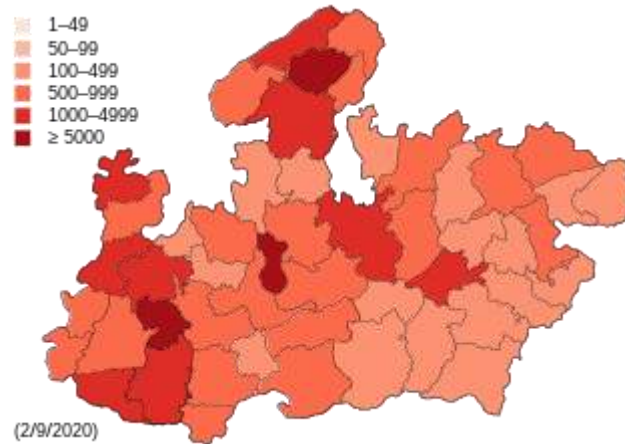
Map of Covid-19 Deaths
Figure 9. Cases and Death in COVID-19 in Madhya Pradesh**.**

Public health

Medical professionals in Madhya Pradesh were sent to national training on COVID-19 preparedness. Preparation of hospitals for the treatment of COVID-19 including postponing elective surgeries to ensure adequate supply of PPE. To grant certain rights to establish effective control over outbreak-affected areas and take swift actions, Section 71 of the Madhya Pradesh Public Health Act, 1949 was invoked. This section of the act provides all Chief Medical and Health Officers, Civil Surgeons, and Chief Hospital Superintendents rights set out therein.

Economic impact

The state government is carrying out a more targeted demolition of the existing labour laws. These new rules are aimed at significantly reducing the regulatory processes a business has to undertake. In addition to that, the state government has let companies hire contract workers for a longer duration, allowed them not to recognize trade unions for collective bargaining in a number of sectors such as textiles, cement and auto, and does not provide any mechanism for raising industrial disputes for new firms.

There has been a major change in the use of industrial oxygen. The government has restricted the use of industrial oxygen and established rules to have the oxygen convert from industrial use to medical use This has had a positive impact,

resulting in a surplus of about 20 metric tons of oxygen.

IX.   CONCLUSIONS

The COVID-19 pandemic is the biggest threat to any nation has ever faced, as international and domestic travel has severely impacted by up to 45 percent in 2020, which is equal to a four-month travel loss. Geospatial Technical process is one of the important tools which helps in understanding the current tourism-related activities as well as the pandemic situation in a very efficient and effective way. Geographic Information System (GIS) technical process provides a way through mapping and interpreting the spread of COVID-19 concerning tourism in space and time so that the decisions can be taken about strategies and measures to monitor the spread of the pandemic the best example is AROGYA SETU Android App which utilizes Bluetooth based contact tracing technical process to help the community. Evaluation of maps offer a common research framework that incorporates all forms of related data, both primary and secondary. Maps can aid a better way in terms of visualization, interpretation and reaction planning for policy makers in a constantly shifting world. Site intelligence offers gathering of real-time information about the effects of COVID-19 pandemic on the workforce, businesses and facilities Figure 9.

Table 3. Representing Vaccination Statistic of Indian States as on (01/June/2021).

S/N	State/Union territory	Population (2011 census)	1st dose	2nd dose	Cumulative doses administered	1st dose %	2nd dose %
1	Andaman and	3,80,581	1,09,084	15,181	1,24,265	28.66%	3.99%

	Nicobar Islands						
2	Andhra Pradesh	4,95,77,103	73,50,968	25,12,379	98,63,347	14.83%	5.07%
3	Arunachal Pradesh	13,83,727	2,55,589	78,329	3,33,918	18.47%	5.66%
4	Assam	3,12,05,576	33,04,145	8,33,156	41,37,301	10.59%	2.67%
5	Bihar	10,40,99,452	85,14,462	17,91,507	1,03,05,969	8.18%	1.72%
6	Chandigarh	10,55,450	2,74,422	74,901	3,49,323	26.00%	7.10%
7	Chhattisgarh	2,55,45,198	58,92,189	11,05,870	69,98,059	23.07%	4.33%
8	Dadra and Nagar Haveli	3,43,709	78,964	11,941	90,905	22.97%	3.47%
9	Daman and Diu	2,43,247	91,091	14,033	1,05,124	37.45%	5.77%
10	Delhi	1,67,87,941	41,85,072	12,24,334	54,09,406	24.93%	7.29%
11	Goa	14,58,545	4,33,834	95,100	5,28,934	29.97%	6.52%
12	Gujarat	6,04,39,692	1,29,58,838	41,44,949	1,71,03,787	21.44%	6.86%
13	Haryana	2,53,51,462	48,91,726	9,95,845	58,87,571	19.30%	3.93%
14	Himachal Pradesh	68,64,602	20,22,506	4,33,621	24,56,127	29.46%	6.32%
15	Jammu and Kashmir	1,22,67,032	27,54,337	5,46,074	33,00,411	22.45%	4.45%
16	Jharkhand	3,29,88,134	34,83,409	7,10,024	41,93,433	10.56%	2.15%
17	Karnataka	6,10,95,297	1,09,24,013	27,53,565	1,36,77,578	17.88%	4.51%
18	Kerala	3,34,06,061	73,34,216	20,68,520	94,02,736	21.95%	6.19%
19	Ladakh	2,74,000	1,22,247	37,290	1,59,537	44.62%	13.61%
20	Lakshadweep	64,473	26,727	6,946	33,673	41.45%	10.77%
21	Madhya Pradesh	7,26,26,809	93,75,056	17,92,248	1,11,67,304	12.91%	2.47%
22	Maharashtra	11,23,74,333	1,80,05,790	45,69,691	2,25,75,481	16.02%	4.07%
23	Manipur	25,70,390	3,87,473	70,445	4,57,918	15.07%	2.74%
24	Meghalaya	29,66,889	3,91,357	74,340	4,65,697	13.19%	2.51%
25	Mizoram	10,97,206	2,64,123	51,117	3,15,240	24.07%	4.66%
26	Nagaland	19,78,502	2,16,970	51,942	2,68,912	10.97%	2.63%
27	Odisha	4,19,74,219	63,78,928	14,77,093	78,56,021	15.20%	3.52%
28	Puducherry	12,47,953	2,17,963	51,214	2,69,177	17.47%	4.10%
29	Punjab	2,77,43,338	42,74,207	7,70,462	50,44,669	15.41%	2.78%
30	Madhya pradesh	6,85,48,437	1,38,97,166	31,16,184	1,70,13,350	20.27%	4.55%
31	Sikkim	6,10,577	1,79,263	59,661	2,38,924	29.36%	9.77%
32	Tamil Nadu	7,21,47,030	70,61,570	20,32,685	90,94,255	9.79%	2.82%
33	Telangana	3,50,03,674	47,96,912	12,61,921	60,58,833	13.70%	3.61%
34	Tripura	36,73,917	11,03,052	5,07,671	16,10,723	30.02%	13.82%

35	Uttar Pradesh	19,98,12,341	1,48,51,890	34,80,426	1,83,32,316	7.43%	1.74%
36	Uttarakhand	1,00,86,292	22,34,626	6,83,922	29,18,548	22.16%	6.78%
37	West Bengal	9,12,76,115	1,08,34,957	38,79,574	1,47,14,531	11.87%	4.25%

It also helps many policy and decision-makers to estimate the valuable resources required to keep organizations running. GIS offers a location-based solution to tracking community-based activity of virus in predefined area. Leverage maps will help to explain new issues and introduce a framework that incorporates essential data, events and services. The first and second wave of COVID-19 has almost gone, now the government must focus on third wave. The experts and researchers suggest that it is going to be very tough situations for the kids because virus is mutating very fast and affecting the population on a large scale in a very mean time. So, there is only one solution left, vaccinate each and every one. Government is already started vaccination to major age groups, but the children-based vaccine is on trial phase. Now there is an immense need to accelerate the trials and come up with proper vaccine. This will help in constraining the COVID-19 cases and accordingly, the government can take effective measures. When COVID-19 cases will stop spreading; people will start feeling safe, the economy will boost, commercial activities; hotels and hospitality sectors, Tourist destinations will get back to its stage; in this way, Tourism Industry will revive itself.

Conflict of interest
The authors declare no conflict of interest.

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