

## Case Study

# Tourism and earthquake disaster management to enhance disaster risk reduction: a case study from Nalanda District, Bihar, India

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## Abstract

*In spite of expanded worldwide enthusiasm for the effects of cataclysmic events on tourism, little research has ensued into investigating how these are tended to at the tourist destination level. Making a connection amongst tourism and catastrophe risk diminishment and administration is especially imperative in places that depend intensely on tourism and, in the meantime, are inclined to natural hazards. The Indian tourism has developed as one of the key drivers of development among the services sector in India. For a state like Bihar, tourism is a potential game changer and wondrous industry. Districts like Nalanda is recognized for its prosperous culture acquired from various great personalities and several religions along with rich wildlife, birds and sanctuaries and immense agricultural activity. This district is contributing and assisting the Bihar state to pursue the aggrandizement of tourism both overseas as well as in the domestic market. In spite of the fact that many efforts had been made in gauging risks in Bihar, but historical evidence highlights a need to embrace hazard assessment for the Bihar tourism sector. In spite of the fact that the ordinary guidelines, for the most part, embraced by this industry for harm appraisal might be sufficient in ordinary conditions, this is not achievable for an emergency situation or during multiple debacles. One such illustration is earthquake harm, which is not like another catastrophe such as flood, for which one can get early cautioning. In this manner this study provides an outlook to earthquake catastrophe risk appraisal and administration for the tourism business, concentrating on protection and avoidance. To accomplish the research crevice, this study adopted a tourist relations point of view to concentrate consideration on influences and desires of tourist groups crosswise over the earthquake. Hence author had used mixed method approach. Data gathered during interviews highlight some of the practical issues associated with existing disaster risk reduction and disaster management plans. By outcomes, this article infers that in unique geological condition territories like Nalanda District, existing standard tourism catastrophe arranging with a solitary disciplinary approach is not sufficient to propel information and comprehension. Besides, as noted in the survey, tourists don't know about the nearby states of Nalanda locale and exceedingly depend on tourism administrators to give vital data, which may not be accessible. Research is critically required for the danger and catastrophe data techniques for various visitor gatherings and target markets. Each may require isolating messages and data situated in various sources to guarantee that they are perused and comprehended by these gatherings. It is trusted that this fact finding has made a little commitment to learning in the field of tourism fiasco arranging, which requires advance consideration from both tourism policy makers, scientists and strategic planners. It is trusted that a move far from reaction and recuperation to lessening and status, combined with a post-disciplinary way to deal with a look into, will help the tourism business to manage characteristic dangers and calamities later on more adequately.*

**Keywords:** Tourism, Disaster Management, Disaster risk reduction, Stakeholder Perception, Bihar.

## Introduction

Tourism has been a noteworthy social marvel for all over the world. It is driven by the inclination of each human being for new encounters, experiences and the yearning to the both educated and engaged<sup>1</sup>. Tourism today is a recreation movement of the masses. Individuals today go to national and international destinations to break the customary dreariness of life<sup>2,3</sup>. They are principally pulled in by either the picturesque excellence of its inclination or by captivating relaxation, games and experience exercises offered by the destinations or by the social, political, religious and economic arrangement of the territories<sup>4</sup>.

The sheer volume and multifaceted nature of the tourism have prompted to the advancement of travel and tourism businesses. Thus, tourism has played a more vital part in the monetary advancement of numerous nations like India and their states like Bihar. Bihar is a land purified with a magnificence which brought forth *Buddhism*, *Jainism* and aided in the development of *Sikhism* and *Hinduism*. Historical literature acknowledges that it was the focal point of the first republic on the world at *Vaishali* and the city of *Pataliputra* was biggest and most terrific on the planet at the stature of its wonderfulness. It got its emanation of sacredness with the introduction of *Lord Mahavira*

here. This was likewise the most loved resting spot of Lord Buddha, and he lectured his last sermon here, which was later recognized by a lion capital raised by *King Ashoka*. Apart from its rich history, the state is blessed with huge Gangetic planes, bolstered by a portion of the nation's most vital waterway. The point of fact, it bears the significant weight of history yet bears it with much warmth and mindfulness. In this way, this state has composite culture, i.e. an amicable mix of craftsmanship, religion, and doctrine. Apart from it, this state holds an important position in early India history, as Mahatma Gandhi launched his *Satyagraha movement* in opposition to the British rule<sup>5</sup>. Apart from it, it was in Bihar that Mahatma Gandhi launched his *Satyagraha movement* in opposition to the British rule<sup>5</sup>.

### Tourism Potential of Bihar



**figure-1:** Existing tourist location in Bihar and circuits.

Bihar has the colossal potential for different tourism exercises, as a matter of first importance being religious tourism. The historical backdrop of Bihar shows a rich legacy acquired from a different era and incredible identities. The archaeological and historical significance of this legacy still studded with landmarks of its past magnificence. The untamed life, fowls,

and asylums hold limitless potential for nature-based eco-tourism. The stream Ganga, up and down it's extend offers the potential for water-based sports and riverfront exercises. As tourism industry is fragmented in nature, these sites are not situated within a district or locality thus government is promoting the tourism and tourists to travel to one sacred site is pooled with another sacred site which is variously acknowledged as circuit tourism and multi- destination wise tourism (Figure-1). Major tourist circuits in this state are:

**Buddhist Circuit:** Bodhgaya – Rajgir – Nalanda – Patna – Vaishali – Lauriya Nandangarh –Lauriya Areraj - Kesariya – Vikramsila (Refer Map).

**Jain Circuit:** Vaishali – Patna – Rajgir – Pawapuri – Nathnagar – Mandar Hill – Bisram – Masadh – Champanagar – Nalanda.

**Ramayan Circuit:** Valmikinagar – Pretshila Hill – Ahilya Asthan- Sitamarhi - Kako – Sitakund – Tar – Singheshwar – Chankigarh– Buxar.

**Islamic/Sufi Circuit:** Maner Sharif – Fulwari Sharif – Khankah Emadia – Dargah Sharif – Bihar sharif – Hazrat Jandaha – Hajipur – Serukahi – Kanti – Saran Khas – Hasanpura – Lakri Dargah – Goraul Sharif – Masurhi — Tomb of Pir Shah Nufa – Pir Pahar – Siris – Tomb of Chandan Shahid – Tomb of Hasan Khan Sur.

**Nature and Wildlife Circuit:** Rajgir Sanctuary – Bhimbandh Sanctuary – Vikramsila Sanctuary – Udaipur Sanctuary – Kaimur Sanctuary– Gautam Buddha Sanctuary – Nakti Dam Sanctuary – Gogabill Sanctuary – Valmiki National Park and Sanctuary – Kanwar Jheel Sanctuary.

**Gandhi Circuit:** Motihari – Betia - Bhitharwa – Brindaban – Sadaquat Ashram.

Thus this state is witnessing significant growth and increase of tourists foot falls. As per Ministry of Tourism, 2015 report [(ON367), (ON566) and (17172)], Bihar positioned seventh among top ten states of India in terms of foreign tourist footfall. Hence one out of six visitors in India is heading towards Bihar. As a result, the state has turned into a favorite tourist destination for overseas tourists. As demonstrated by these reports, Bihar is receiving a greater number of voyagers from abroad than Goa which is a hotspot for untouchables on account of its shorelines.

**Objectives of the Study:** This article considers the key elements earthquake disasters and their effects upon tourism destinations of Nalanda District. Hence this article explores the impact of the earthquake on tourism and evaluates how stakeholders observe the aspect of tourism in present and future disaster risk management activities by focusing on the case study of the tourism in Nalanda District. The objective of this article to highlight following activities: i. To understand the repercussion of natural disasters like earthquake on the tourism

industry in terms frequency, past occurrence, scale and damage level, ii. To understand initiatives taken by authorities in lieu to promote safe tourism in Nalanda district and explore existing activities to diminish risk from earthquake events. iii. To explore the relationship between Disaster Management Organizations and the Tourism Organizations strategies about earthquake disaster management within the Nalanda district's tourism industry, and consequently the levels of awareness held by stakeholders?

**Research questions:** This research focused on the key elements of disasters management on tourism destinations of Nalanda District by aiming the following questions. i. What are the past impact of earthquakes on tourist destinations of Nalanda Districts? ii. What are the disaster management plan, vulnerability, policy, resource governance and management practices in Bihar state for tourism hotspot like Nalanda District? iii. What are the awareness level of local authorities, residents, and other stake holders about the earthquake disaster preparedness and adaptation, iv. What is the earthquake risk perceptions, protective behaviors and tourist's sense of responsibility for self-protection held by tourist visited Nalanda District?

After reading this article, it is anticipated that, the reader will have acquired and been able to exhibit a holistic view and systems perspective of the main processes of disaster management, earthquake risk reduction, disaster response and recovery with a dire understanding of different concepts and issues central to the understanding of risk reduction and adaptation in tourism contexts.

## Methodology

This research follows “Sequential Explanatory” Mixed Methods Design Strategies as described by Creswell, (2003) in which information has been synthesizing on similar or related data to the earthquake disaster management for sustainable tourism<sup>7</sup>. For the conceptual and theoretical development of the research, literature review has constructed the necessary critical reasoning. Data on the history of the earthquake have been collected from different sources, i.e. articles, *Indian Metrological* department reports, USGS Earthquake Hazards Program reports (United States Geological Survey and website. This article is also based on the study, involving compilation and analyses of information and data like tourist footfall, which has been secured from the websites of Ministry of Tourism of India, Tourism Corporations, Bureau of Immigration, Govt. of India, World Tourism Organization (WTO), World Travel and Tourism Council (WTTC) and Annual reports of Tourism EEE Ministry, India. Foreign tourist arrivals (FTAs) and Foreign exchange Earnings (FEEs) data have been taken for the period of 13 years i.e. 2001 to 2014 from the website of World Tourism Organization. Data for the domestic and foreign tourists' visits have been taken from Bureau of Immigration, Govt. of India. The second part of this study is an attempt to

assess the perceptions of tourist and stakeholders on earthquake disaster management issues, and adaptation/coping measures<sup>7</sup>. It identifies indigenous response options for information and knowledge that will help in policy making that may have an optimistic influence on the life of the local and tourist who are directly affected by any such events. This research uses an approach, which seeks to gain insights from the tourists themselves based on *Structured and Close ended questionnaire* survey. The data were collected from 400 tourists, inclusive of domestic and international tourists, who visited Nalanda district, India. We also surveyed the member of various departments of district administration who are important actors in adaptation, as they have experience in dealing with natural hazards. Since, understanding the role of stakeholders in the decision-making process will assist in the implementation of adaptation policies. Therefore the purposes of this survey were twofold - first, to survey awareness level of international and domestic tourists, and of the local tourism industry about the importance of earthquake disaster prevention. The second purpose was to understand local authorities, their role, current policies and government initiatives, and their role in relationship to disaster reduction and next to find how the tourism industry of Nalanda District works together with the segments accountable for to mitigate risks, plan, respond and recover from earthquake events.

## Study area: Nalanda District as a tourist destination:

Nalanda District is one among 38 Districts of Bihar State, India. With a population of 2872523, it is 18th Largest District in the State<sup>9</sup>. It's named Nalanda, after the famous university and the world's oldest university “the Nalanda University” located here, therefore, famous for religious tourism and cultural heritage sites because it is frequently referred in Jain and Buddhist scriptures and hence blessed with rich and glorious history<sup>10,11</sup>. As per the Bihar tourism department, this district is a hotspot for tourism as it comes under “*Buddhist Circuit, Tirthankar Circuit, Islamic/Sufi Circuit and Nature and Wildlife Circuit of tourism*”. Thus this district is deeply rooted with indian culture and history. Founded in the fifth century A.D. Nalanda is known as the old seat of learning. “*Chakravartin Ashoka*” built monasteries, sanctuaries, and *Viharas* here<sup>10,11</sup>. Since *Lord Buddha* visited Nalanda several times, hence this area was a center of Buddhist learning; *Hiuen Tsang* stayed here in the seventh century and had left definite depiction of the fabulousness of education and immaculateness of religious life honed here<sup>11</sup>. As per the *Archeological Survey of India, Rajgir block*, of this district was the antique capital of *Magadhan kingdom* which thrive in the 6th century BC. Its relationship with *Lord Buddha* and *Lord Mahavira* praises this district<sup>12</sup>. The principal Buddhist board instantly after the *Mahaparinirvana of Lord Buddha*, to pen down his lessons, was likewise held at Rajgir. Another block of this district Pawapuri, a righteous and sinless city it is a great pilgrimage center of the Jains. *Lord Mahavira*, the greatest more profound of Jainism had delivered his last sermon took *Mahaparinirvana* and was cremated here<sup>12</sup>. Hence this district is place of “international importance”. The

spread of Buddhism resulted in the establishment of many monasteries in this area. *Vishwa Shanti Stupa*, built in 1969 by the government of Japan is one of the 80 peace pagodas constructed for spreading international peace and non-violence<sup>14</sup>. Recently in 2016, it is declared *World Heritage Site* by *UNESCO*. Apart from its unique topography blessed this district as a place of natural and recreational importance. Located near Rajgir Hills, this small hill town is covered with lush green forests. The Rajgir Hills contains hot springs, which contain some medicinal properties that help in the cure of many skin diseases<sup>14</sup>. The Rajgir Sanctuary is home for many wild animals viz. Wild bear, Leopard, Hyena, Barking Deer, and Nilgai<sup>14</sup>.

**Tourism Importance:** Buddhist Monasteries, as well as Hindu and Jain's temples situated in and around Rajgir, have developed the area as a favorite tourist destination. As Rajgir is the venue for various meals/events and festivals like *Malas Mela* (held every three years), *Buddha Jayanti*, *Mahavir Jayanti*, *Makar Sankranti* and other cultural events like *Rajgir Dance Festival*, a festival of classical and folk dances organized by Bihar State Tourism Department every year in the month of October<sup>15</sup>. Bihar tourism industry is flourishing due to growth in foreign tourist influxes and a greater number of Indians traveling to domestic destinations than before (Figure-2).

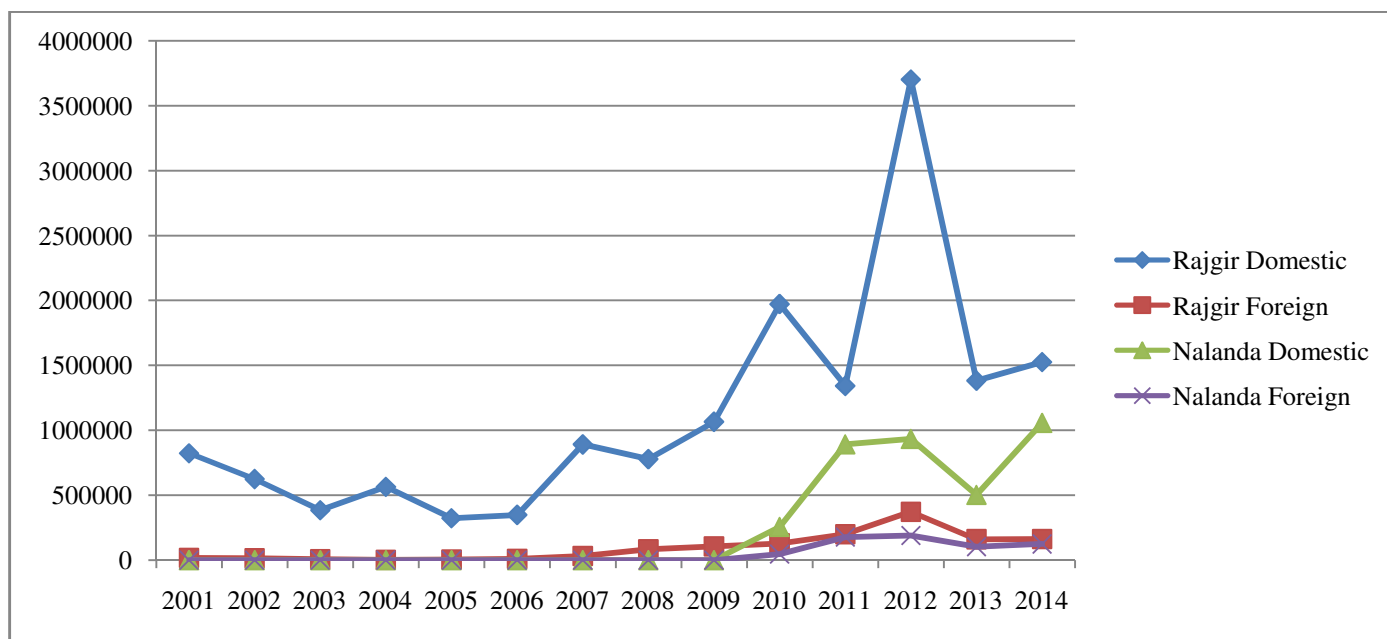


Figure-2: Trends of Domestic and overseas tourist Visit to Nalanda District<sup>16</sup>.

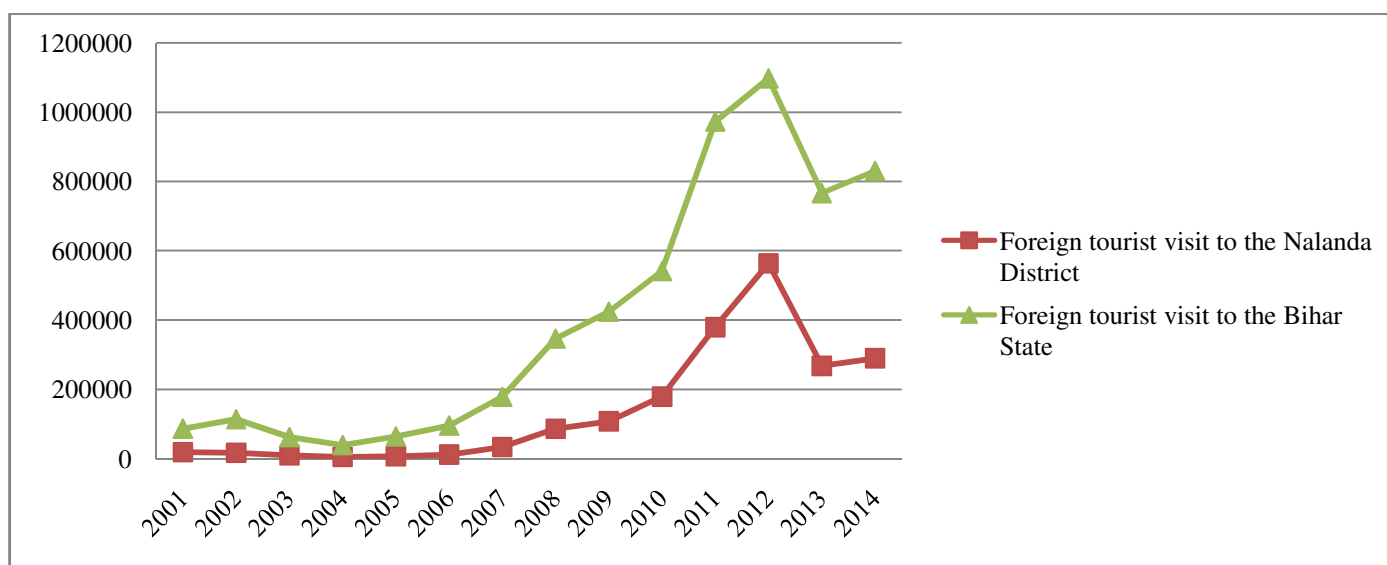


Figure-3: Foreign tourist footfall in Nalanda Vstotal foreign tourist in Bihar<sup>16</sup>.



**Scenario of Earthquakes in Bihar and Nalanda District:** The Bihar situated on the *Gangetic Plain*<sup>18</sup>. This is a fore profound, a down twist of the Himalayan foreland, of variable profundity, changed over into level fields by long-overwhelming sedimentation with the complex structural setting (Figures-3 and 4). This is known as a *geosyncline*, and the Gangetic Plain is the *Indo-Gangetic Geosyncline*. This has indicated extensive measures of flexure and disengagement at the northern end and is limited on the north by the *Himalayan Frontal Thrust*<sup>19,20</sup>.

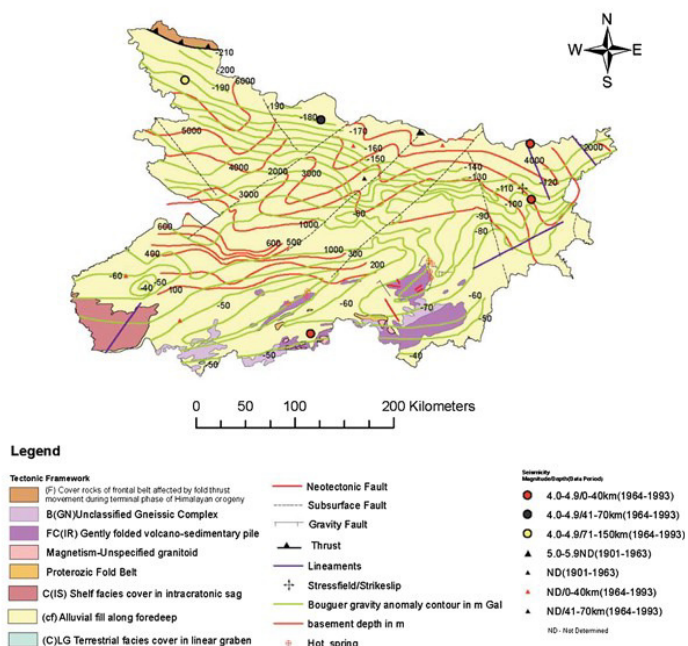


Figure-4: Bihar tectonic framework<sup>17</sup>

The floor of the Gangetic through is not an even surface; it rather indicates folded disparities and covered edges (rack deficiencies). Western Bihar sits on the sub-surface *Faizabad edge* while the eastern segments sit on the *Munger-Saharsa Ridge*. The ranges close to the fringe with West Bengal lie on the *Kosi Graben (Purnea-Kasganj Graben)*. The focal segments of Bihar lie on the *Gandak misery* and East Uttar Pradesh rack. The Himalayan Frontal Thrust does not keep running in Bihar. However, it keeps running over the outskirts of Nepal. A few issues have been distinguished in the district, and a few have demonstrated proofs of development amid the Holocene age. The West Patna Fault keeps running in an NE-SW heading from close Arrah in the south to the Nepalese fringe close *Madhubani* in the north. Running practically parallel to it is the *East Patna Fault* which reaches out from the southeast of Patna in the south to the Nepal fringe toward the east of Madhubani. Another fault (likewise lying parallel to the past two), is the *Munger-Saharsa Ridge Fault* which keeps running from Bihar Sharif (Nalanda) to close Morang in eastern Nepal. Aside from these, there are east-west running tear faults in the district that control the courses of the primary waterways. As the main frontal push between the subducting India plate and the abrogating Eurasia plate toward the north thus, Bihar is among the area where

seismic tremors can happen. It is hard to pick up a refined comprehension of the regional earthquake hazard because there is a fragmented historical record of past. Soon after the 2009 Bhutan tremor, earth researchers attempted to anticipate the likelihood of a staggering quake in the eastern district inside a few years<sup>21</sup>. The 2010 Sikkim quake, which shook significant parts of the nation, demonstrated the forecast was correct<sup>21</sup>. Seismologically the whole locale is perched on a quake bomb. Bihar has a background marked by direct to serious tremor events, and its territory is shrouded in seismic zones IV and V with conceivable most extreme force up to 8.4 on the Richter scale. While the northern piece of the state, nearby Nepal, lies in the most elevated hazard zone and thickly populated Patna with its bordering regions fall in zone IV (high hazard zone). During the past 180 years, Bihar has faced devastating earthquakes in 1833 and 1934, followed by a less damaging earthquake in 1988<sup>22</sup>. The epicenter of 1833 earthquake was in central-east Nepal, which caused widespread damages at Munger, Muzaffarpur and other places in Bihar. An earthquake of magnitude 8.4 had occurred in 1934, having epicenter close to Bihar border in eastern Nepal, which devastated vast areas of North Bihar from East Champaran to Araria; severe damages were reported from *Patna, Barh and Jamalpur* also; Munger was completely ruined<sup>22</sup>. In 1988, Earthquake of magnitude 6.6, epicenter at Uttar Pradesh-Bihar border, affected the districts of *Darbhanga, Madhubani, Saharsa and Munger*<sup>23</sup>.

**Multi-Hazard Profile of Nalanda district and earthquake events:** The topographical composition of Nalanda District, its perimeter, its land, its water bodies, the climate and, most importantly, its position made it most vulnerable and inclined to the greater part of the significant dangers: seismic tremor, surges, tornado, dry spell, and fire. In some cases, two of the real hazards visit this city amid a similar period. Nalanda district constitutes the multi-hazard profile of the district in the genuine feeling of the term. This district is situated in the high seismic zone, Zone -IV and roosted on the edge of the tectonic plate joining the Himalayan tectonic plate close to the Bihar-Nepal Fringe. It had six sub-surface fault lines infiltrating through its Gangetic planes in four directions, Nalanda district is vulnerable to the most noticeably awful sort of debacle caused by the seismic tremor<sup>27</sup>. The lineament wise Earthquake Vulnerability, this district is most vulnerable and super sensitive district in Bihar (Figure-5) and the majority of the houses and buildings in Rajgir have not consolidated working by-laws, and don't have sufficient basic quality to withstand even a mild seismic tremor). After 2015, Nepal's massive earthquake, scientists from the National Geophysical Research Institute of India and Stanford University, United States, analyzed the fault that separates the Asian and Indian continental plates may cause a 'mega earthquake' of this century as the dead fault of Himalayas are getting activated<sup>28</sup>. So the tremor will antagonistically influence an expansive number of house, hotel, cultural heritage and tourism business. It will disturb the economic activity for a significant length, with a genuine effect on business and work.

Because of its unexampled geographical land condition, the Nalanda has many, fluctuated, one of a kind and excellent sorts of the landscape, and additionally an alterable atmosphere, which indicates a shocking abundance of characteristic touring assets in a moderately little range. In any case, this unique geographic condition implies that this zone is subjected to visit cataclysmic events also. As of late, the under the "Bihar Tourism Policy-2009, for Accelerated Tourism Growth of the State" Bihar government has advanced many initiatives for empowering nearby improvement of the tourism industry.

To fully exploit our natural resources, most tourism operators naturally want to build tourist facilities at or close to those areas with the most wonderful view, frequently neighboring the Rajgir slopes. The issue is that it is these areas described by

high calamity hazard and absence of assets for open debacle help work. Instructions to join tourism and monetary advancement with fiasco avoidance and alleviation work, safeguard open security has turned into a basic issue for the administration. Of the different sorts of regular risks, tremors are a standout amongst the most genuine and unpreventable<sup>31</sup>. Simply take a gander at the event of seismic tremors along the Pacific Rim, in Japan, Taiwan, Nepal, in the course of the most recent decade<sup>32,33</sup>. They obviously show the calamitous effect of seismic tremors on tourism. Following the event of a tragic seismic tremor, traveler related associations and goals are put in an especially troublesome position, confronted with the difficulties of declining quantities of guests and falling revenues

**Table-1:** Major Epicenter around Nalanda District<sup>24-26</sup>.

Date	Magnitude	Epicenter
26 August 1833	7.9	Eastern Nepal
21 May 1842	7	Banka-Dhuraia area, Bihar
11 November 1842	8.9	Bihar-Bengal area
7th October 1920	7	Jahanabad-Sasaram area, Bihar.
15th January 1934	8.4	Bihar-Nepal border
5march 1935	6	Bihar-Nepal border
11 February 1936	5.6	Bihar-Nepal border
December 23, 1983	4.3	Narenpur Bihar
February 17, 1985	4.7	Kodarmā, Jharkhand, India
May 02, 1988	3.8	Rāmnagar, Bihar, India
15 February 1993	4.9	Qasba-Purnea area
May 16, 1993	4.6	Bānkura, West Bengal, India
May 16, 1998	6.6	Uttar Pradesh-Bihar border region,
October 20, 2003	4.3	Puruliya, West Bengal, India
May 27 2005	3.5`	Manchanda Bihar
June 06, 2008	3.8	Bodhgaya
November 08, 2008	4.1	Durgāpur, West Bengal, India
March 26, 2009	4.1	Chāībāsa, Jharkhand, India
March 27, 2012	5.0	Kishanganj, Bihar Bengal border
December 15, 2015	4.5	Chās, Jharkhand, India
15 December 2015	4.2	Devghar Jharkhand

## Findings and results: Assessment of Tourist Awareness and other Stakeholders

**Damage due to past earthquake:** Being most vulnerable and super sensitive district in Bihar, this district also was shaken by an earthquake. The entire past earthquake events had significantly impacted the tourism sites and cultural and heritage properties of this district. Since till 1976, Nalanda District was a rural area under the administrative division of Patna. Thus most of the damage in this area was unreported. The famous **Sun temple** in Badgaon which is very close to world heritage site, Old Nalanda University Ruins and having high religious value

due to Bihar famous the “Chath Puja”, was collapsed during the 1934 earthquake and reconstructed by the villagers at a new site in 1935 (Figure-6). Similarly, 1934 earthquake destroyed some part of Sone Bhandar, Rajgir and part of Manyar Math is buried down due to liquefaction caused due to this earthquake<sup>33</sup> (Figures-7 and 8). The Annual Report of an Archaeological Survey of India (1936-37), also confirms that many conservation activities and restoration works, which includes the restoration of Cyclopean walls and other Maths, were uncompleted in Rajgir area due to lack of fund.

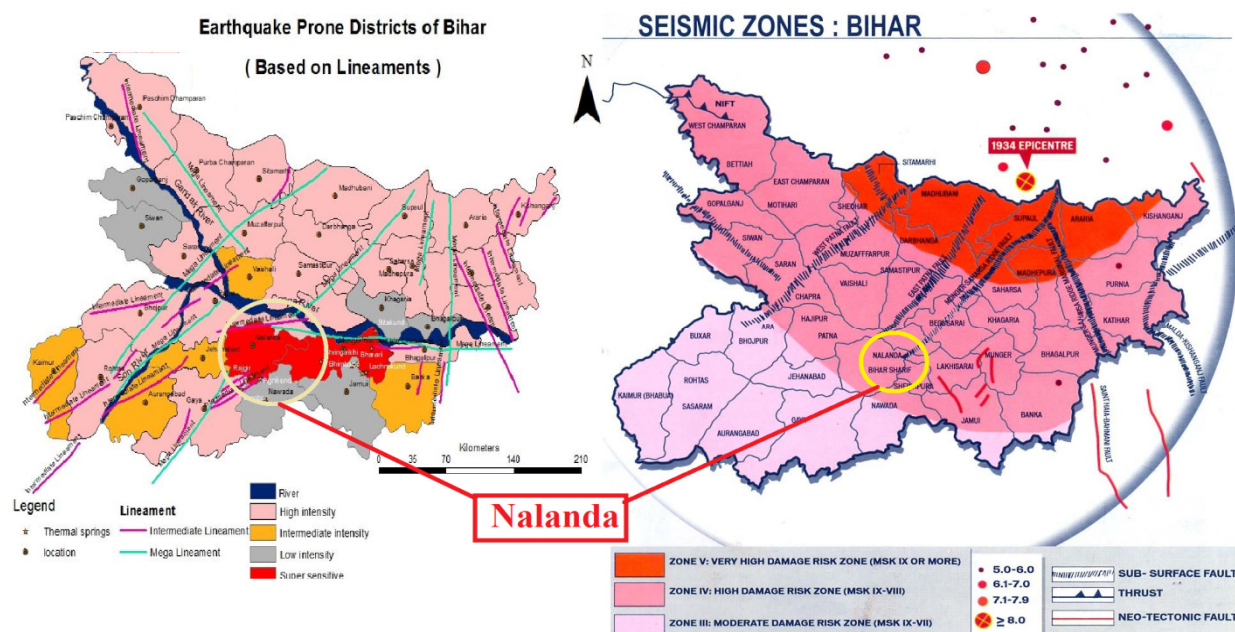


Figure-5: Nalanda District as earthquake prone district<sup>30</sup>



Figure-6: Sun temple in Badgaon, Nalanda after 1934 Earthquake





**Figure-7:** Damage cause by 1934 Earthquake on Sone Bhandar, Rajgir.



**Figure-8:** Damage caused by 1934 Earthquake to Maniyar Math.

**The result of tourist opinion survey:** Nobody can assure earthquake safety unless everybody in the community is aware of earthquake consequences and gets prepared. Being prepared alone will not always work for others. Risk perceptions are essential in looking at how individuals comprehend dangers and secure against them. The required data and information were collected from a direct field study from four major tourist destinations namely, *Manyar math, Vishwa Shanti Stupa, Griddhakuta Peak, Venu Vana Kalandakanivapa* and at *Nalanda University Ruins*. Since as per Bihar tourism reports these places were receiving the satisfactory numbers of tourist arrivals, hence they are selected. The sample size was selected by using convenience and snowball sampling techniques. Each prospective tourist was initially approached and invited to participate, and a total of 400 tourists participated in the study. The survey work was undertaken from January 2017 to March 2017, which is peak season from a tourism point of view, as per the Bihar Tourism department. A total of 400 questionnaires

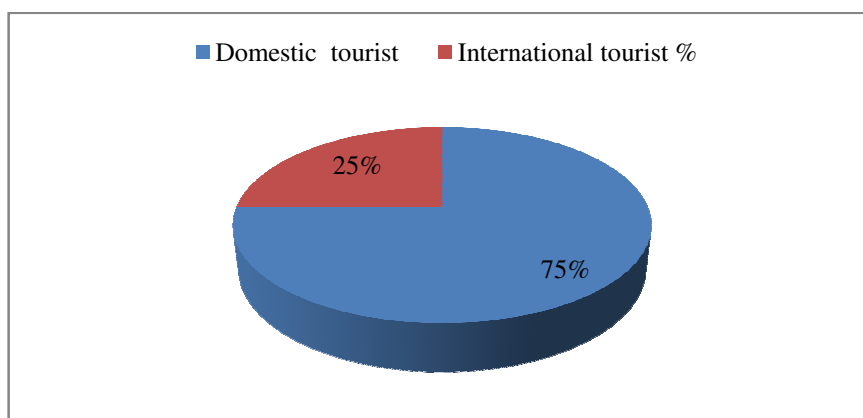
were administered from all the five tourist destinations, and only tourists that were willing to be administered questionnaires were selected. The crucial reason for this decision is to pay attention to those who were more interested and concerned by the incidence of the earthquake. Approximately 15 to 20 min was spent to complete one questionnaire. The questionnaires for administrators have filled a group of three volunteers. The volunteers met the respondents explaining the study and the purpose of the questionnaire. The questionnaire could be answered through the volunteer or personally filled only once. This questionnaire comprised of 22 questions, mostly multiple-choice, but also some open questions. Also, 15 officials from Central and State administrative service and policy makers answered to the questionnaire; Responses were collected and stored by in a PC. Open questions were coded by a simple and subjective coding system.

**Results Highlights:** i. Out of 400 tourists surveyed in this survey were, 75%, i.e. 304 are domestic tourists while

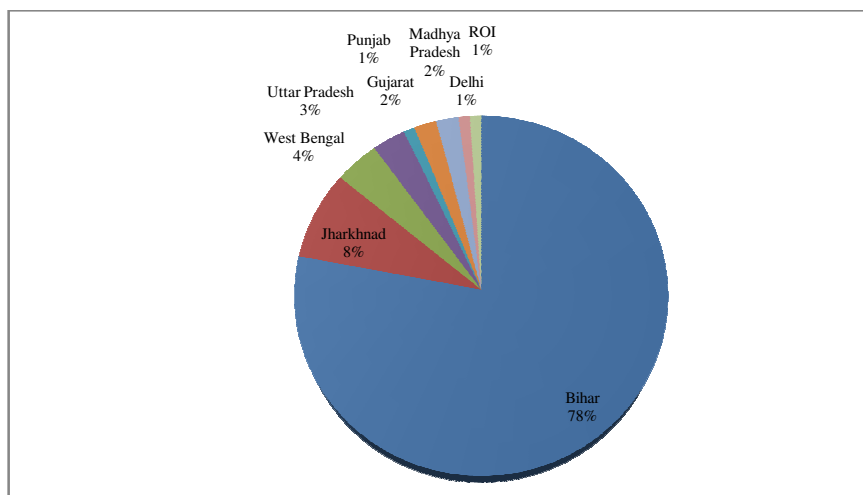


remaining 25 % i.e. 96 were international tourists. ii. Among the domestic tourists, 78 % tourists were from Bihar itself, and 8% were from the neighboring states of Jharkhand and 4 % from West Bengal. iii. Approx 81 % of international tourist belongs from Buddhist Nations, Major of them from Japan, Nepal, Thailand etc. iv. Most of the domestic tourists were less than 45 years of age, while foreign tourists were slightly older than domestic ones; 13% of them were more than 60 years of age. v. Majority of foreign tourist was traveling Nalanda district with objectives of religious tourism while Visiting of friends/relatives, sightseeing and recreation/ leisure were the primary goal of domestic tourists. vi. The international tourist seems much aware of Disaster risk reductions while domestic tourists were not clear about disaster risk reduction. vii. 55% of domestic as well as 45% of International tourist affirms that they had witness earthquake in past which causes significant damage to roads and other infrastructure property. viii. Both domestic (93%) and international (90%), first time listen that Nalanda district is most vulnerable to natural disasters like earthquake. The majority of them affirm that they came across this fact during the survey. Similarly, most of them did not

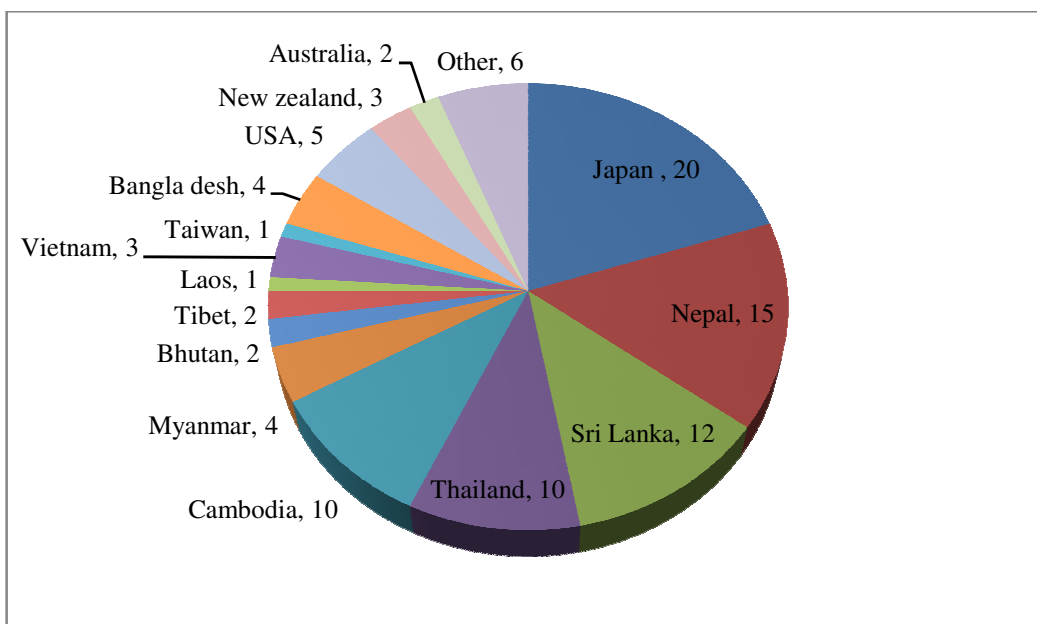
check the Weather information of this area. ix. Since 95% of tourist comes under different tour packages offered by tour operators, thus they do not check the star rating of hotels. however all of them seems aware about the safety of their documents like passport, etc. x. The majority of international tourist confirms that in the case of emergency they will rely on Tourist operators. While domestic tourist confirms that they will contact the police and their family members. xi. The majority of tourist wants to get informed about the potential natural hazards and civil protection measures through electronic messages like SMS services. Some tourists from the USA and Australia confirm that they receive mail from their embassy about the tourist area and potential risk and hazard information. xii. Similar they express their concern that there is very limited information accessible from authorized sources about the potential hazards and about the ways to get prepared for them. A government website should and must have it. xiii. Both domestic and international tourists express their concerns that Encroachments and lack of Sign/Safety boards will make the situation more worse.



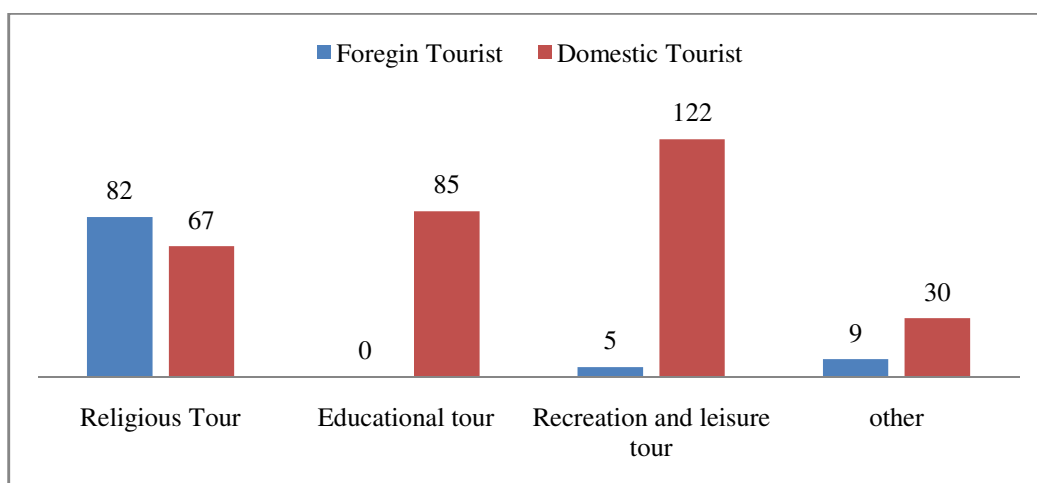
**Figure-9:** Classifications of Tourist Questionnaires.



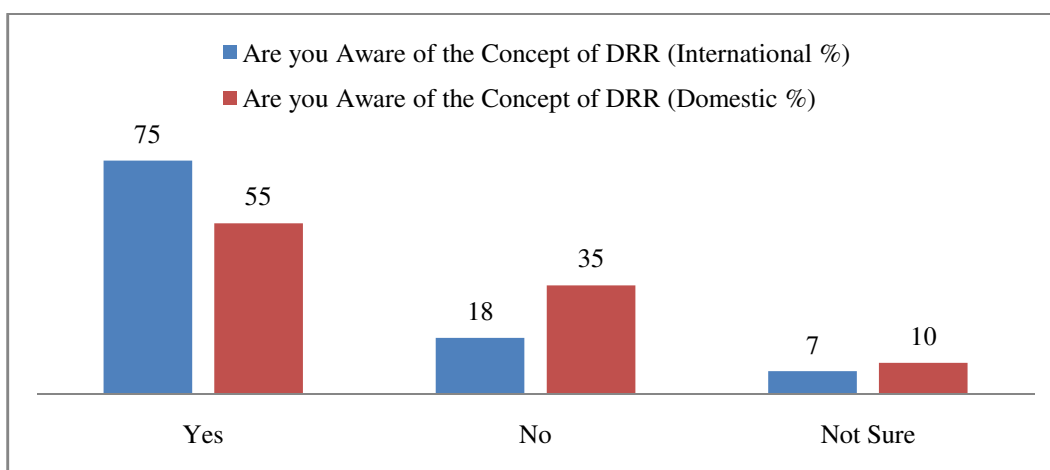
**Figure-10:** Profile of Domestic Tourists.



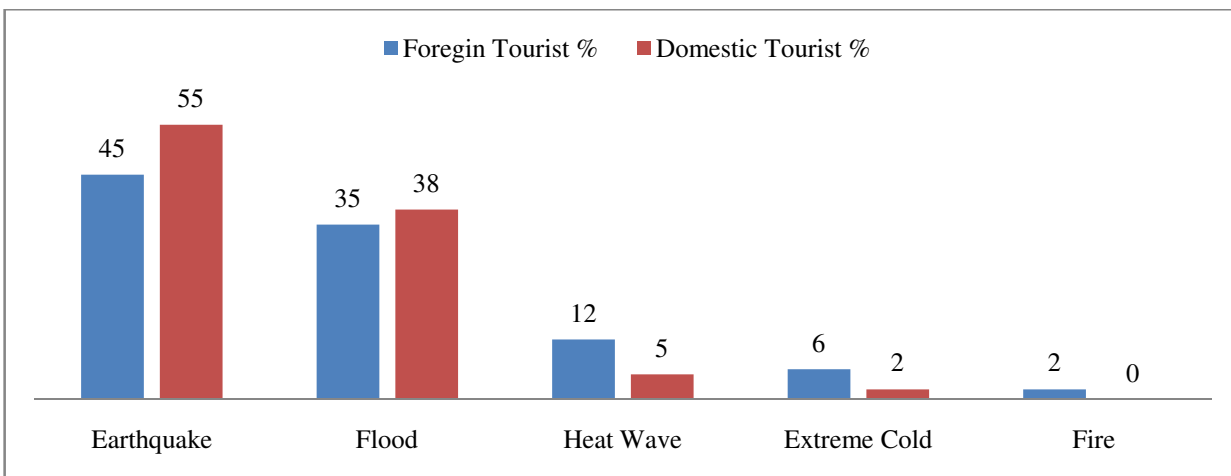
**Figure-11:** Profile of International Tourists.



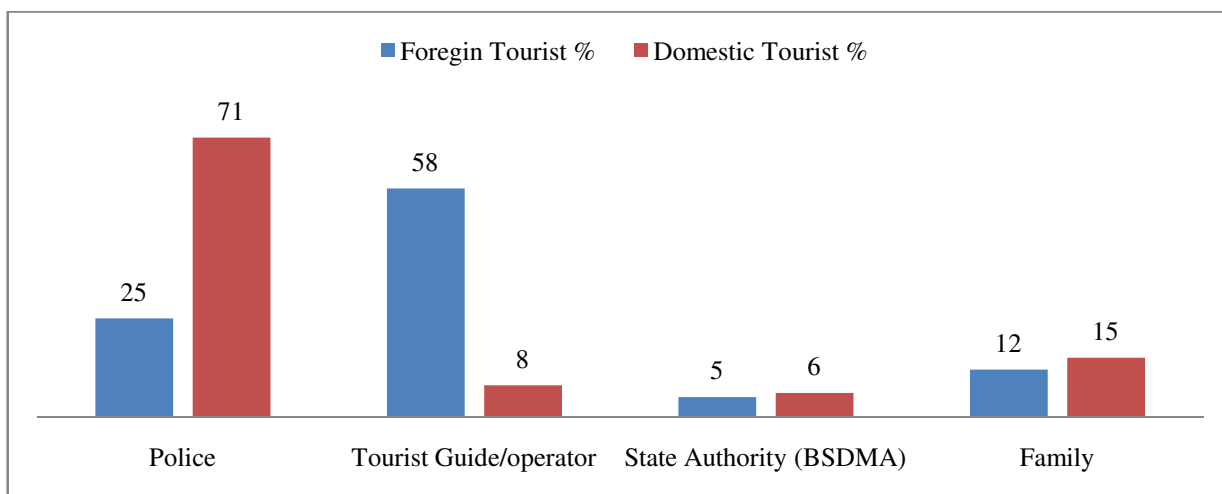
**Figure-12:** Reason for Travelling.



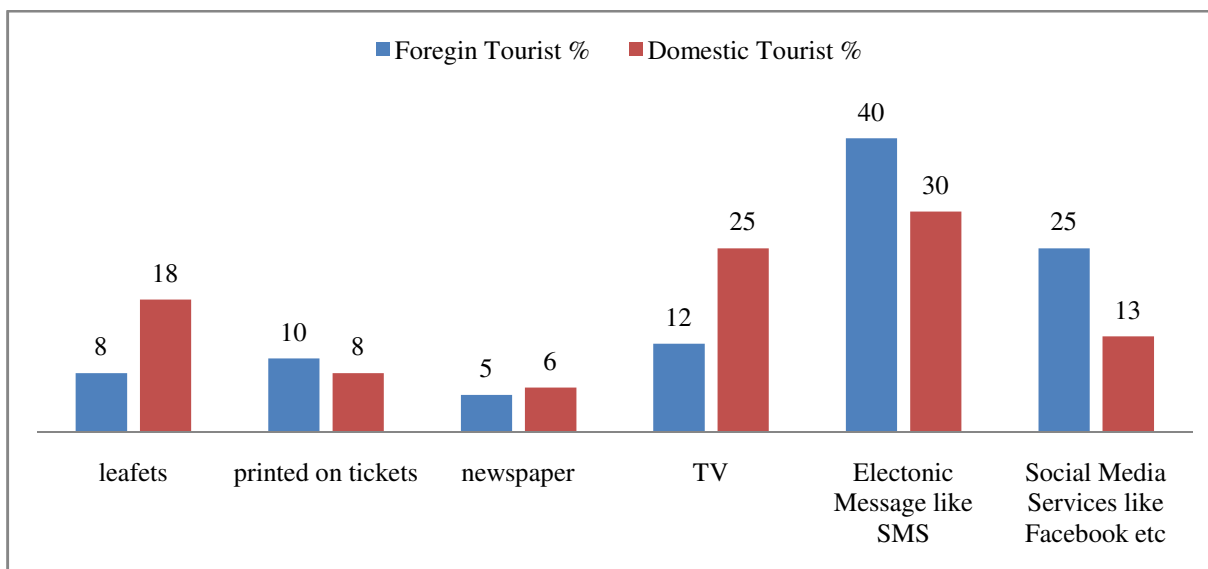
**Figure-13:** Tourist Awareness level regarding DRR.



**Figure-14:** Past Disaster Experience.

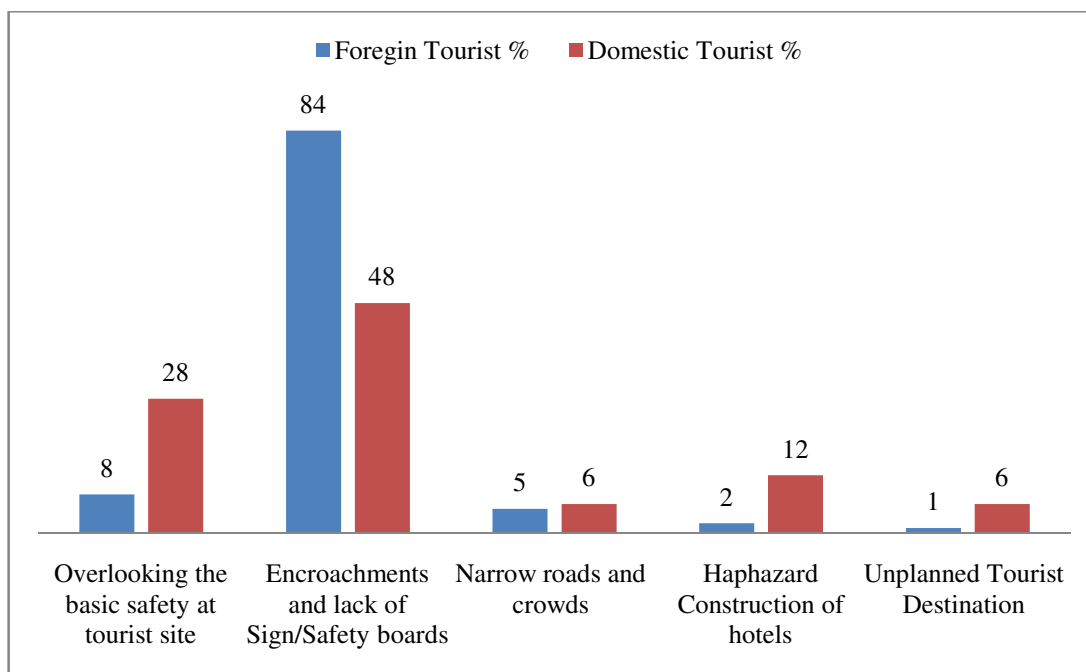


**Figure-15:** Tourist choices to contact in case of any disaster.



**Figure-16:** Tourist preferential mode of communication to be informed about the potential natural hazards and civil protection measures.





**Figure-17:** Reasons that will worsen the situation in case of disaster.

**Administrative Survey and government initiatives:** During Administration survey, which was based on face to face consultation based, all policy makers seem to aware about disaster and disaster management plan for the city. They affirm that there is “Mandatory provision of DM Plan Under Section 31 of DM Act -2005”. Most of them seem well aware about the District Plan. During this administrator survey, policy makers and an officer from district administration also updated about the existing infrastructure like weather monitoring stations and seismic study center in Bihar. As per the authority, Indian Metrological Department (IMD) had installed weather forecast center at Gaya, Patna, Rajgir, and Nalanda, (Bihar Sharif Block in the case of Nalanda) following at following locations these infrastructures are already setup, and only Valmikinagar is having the seismic study center in Bihar. Apart from it, they update the surveyors about tourist friendly policing under the scheme of “Paryatan Mitra”, which will be in the role of a guide not only for tourists but also to take care of their safety on the basis of 'Atithi Devo Bhava' so that tourists coming from abroad should not have any problem. The people of this team have been deputed for special constancy, 04 Constable, and 01 Police Officers. Also the members of this team will be given training later in the information of other foreign languages. The car will be equipped with black cat commandos equipped with state-of-the-art resources, wireless systems, and weapons. Not only this, by dialing \* 100 \*, it will be connected directly to the Police Control Room, which will inform the tourist friend vehicle as per the requirement so that tourists can get immediate help. It will also be equipped with a medical kit. According to them, this vehicle will now be patrolling at important places in Rajgir and Nalanda. Similarly, the Bihar government recently launched an app “Humara Rajgir”. The aim of this app is to

stand as a guide for visitors visiting Rajgir. This App is present in three languages English, Hindi, and Japanese. However, during this administrator survey, policy makers and administrator often cite challenges related to organization setting, technical planning basis, cooperation and similar issue. Following challenges were found in institutional approaches for current urban planning practices. i. Lack of specific funding/budget lines for disaster risk reduction, ii. Lack of staff ownership of risk reduction and their mainstreaming due to for instance fear of increased workload, lack of institutional leadership, no participatory decision taking and lack of skills and insufficient human resources in general and in particular with expertise in risk reduction and adaptation. iii. Unclear borders between individual and institutional responsibilities to take necessary measures on the ground, iv. Poor enforcements schemes resulting in noncompliance of building and planning codes, v. Lack of political support and financing, vi. Lack of data deficient data for hazards, impacts, and vulnerabilities. vii. Absence of awareness among different stakeholders about the seismic hazard; viii. insufficient scrutiny and authorization of quake safe construction laws and town arranging bye-laws; ix. the absence of seismic tremor safe components in non-built development in rural and provincial and heritage ranges; x. the absence of formal preparing among experts in quake safe development rehearses; and xi. the absence of satisfactory enthusiasm and reaction limit among different stakeholders.

**Discussions, future risks and way forward:** With the findings, it is evident that tourism industry is liable to a catastrophic event. No doubt many research has been carried to evaluate the impacts of cataclysmic event on tourism, but limited efforts have been made to evaluate the comprehension of travelers s to

give suggestion to the hazard administration of tourism industry. With the available data, facts, and results it is evident that Nalanda district legacy and tourist industry is being held prisoner by cataclysmic events. The danger is tangible and requires prompt intercession as hazard risk reduction and a diagram for fiasco administration. Surprisingly, the BIHAR TOURISM POLICY- 2009 which is drafted with the aim for accelerated tourism growth in Bihar, states that<sup>34</sup>:

*The State Government shall recruit security personnel to provide security services to the tourists to instill in them a sense of security while visiting any particular tourist spot and also to offer a helping hand to co-operate with them. For this purpose, competent and skilled force shall be identified or through outsourcing qualified, and smart security personnel from the private sector will be posted at different important identified tourist spots.*

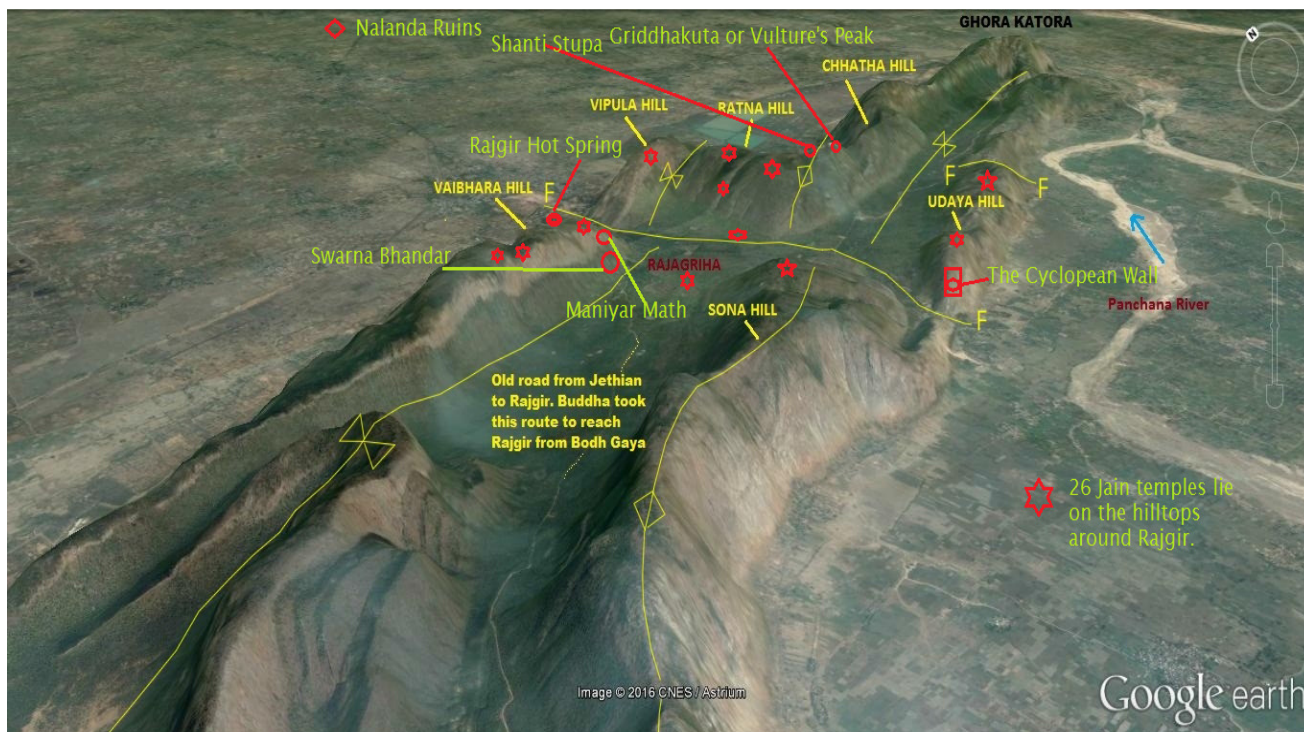
However, currently, Bihar tourism industry has been shaken by big blown, as the Bihar government cut down the tourism budget plan for 2017-18 at Rs 109.87 crore - around 84% against a distribution of Rs 672.49 crore in 2016-17<sup>35</sup>. This notwithstanding the way that tourism has been distinguished among ten need areas of the legislature under its "Industrial Investment Promotion Policy, 2016"<sup>36</sup>. Curiously, "Bihar's Economic Survey 2016-17" had said more than half increment in domestic visitors in the vicinity of 2011 and 2015 and recommended a five-year guide to tapping religious, provable and archeological potential, other than creating 12 traveler circuits<sup>36,37</sup>.

Similarly, Nalanda District which is a legacy district and gets lakhs of travelers consistently, yet it doesn't have a proper district disaster management plan. The existing District disaster plan is not as per the guideline of disaster management act and merely contains the official letters and contact number rather than having concrete plans and guideline. The outcomes of the study exhibit that this district is not prepared to appropriately react to a catastrophe, which is helpless against different risks due to its topographical idiosyncrasies and populace density. The entire disaster management plan seems to proceed with a "relief driven approach" in a fiasco administration exercises instead of a "pro activeaction, relief, and preparedness approach" as conceived in the "Disaster Management Act (DMA)."

The administrative survey reflects that *District Disaster Management (DM)* authorities are a failure on the ground to develop vital communication arrangement which may make "dissemination of proper information impossible to lower levels such as taluks, villages and thereby to vulnerable communities during a disaster. At present, the Bihar state has just a single seismic tremor observing station at Valmikinagar in West Champaran, which is dead<sup>38</sup>. After 2015, Nepal earthquake the Bihar State Government decided to setup 13 new seismic tremor examinations stations within one year, which would improve the

shake inclined state prepared to gather data about tremors<sup>39</sup>. Even after two years, nothing happens on the ground, and it is a burning truth that in spite of being situated in a high seismic zone, the conditions as to tremor checking in Nalanda district as well as Bihar have stayed lacking. In line with such consideration, this study has attempted to investigate awareness level of tourists. The study reveals that the Nalanda district is highly susceptible to the earthquake and any earthquake more than eight on Richter Scale in Indo-Nepal Border may devastate the tourism industry of Bihar. The survey also reveals that since the majority of foreign tourist visiting this district, are not good in English, thus the notice board and information center should have another language like Thai. Furthermore, the influence of different factors, including demographic background, past travel experience, trip purpose, and image perception on tourists' response behavior is clarified. Significant differences are revealed between travelers from different countries and between domestic and foreign tourist as well. There are many tourist facilities located in regions that are also subject to earthquakes disasters. This has already become a significant risk for the tourism industry. It is certain that tourist destinations can cope with such challenges if they have guidelines for appropriate actions in place.

**Future Risks and impacts:** Nalanda District is, and its major tourist destinations are situated in a green valley and surrounded by hillocks (Figure-9). Thus this hill station is an important destination for Jains and Buddhists. These hills are part of Munger-Rajgir metasedimentary belt, and the Munger-Saharsa Ridge Fault runs from it to near Morang in eastern Nepal. As lineaments point of view, this district is most vulnerable to earthquakes, and it is aerially 450 km away from Nepal. Mount Everest and different mountains along the length of the Himalayan mountain range were shaped by wedges of shake pushed on top of other shake layers. This stacking, or thickening, happens amid occasional, however pulverizing seismic tremors<sup>40</sup>. The reason behind it is millions of years ago, the collision of the Indian subcontinent and Asia. Due to which rock layers about 40 kilometers (25 miles) thick from Asia are being shoved on top of crustal rocks, which are about 40 kilometers (25 miles) thick, of the Indian subcontinent. The shoving, or thrusting, involves several parallel fault planes that slip centimeters or meters during infrequent earthquakes. That implies the anxieties, brought about by the India-Asia plate pushing, develop over decades or hundreds of years before they are sufficiently vast to incite a major tremor along with a segment of at least one sections of the blame frameworks. According to *US Geological Survey*, seismic action examination in the Nepal has demonstrated that this zone is a hotbed of accumulated energy. Thus it is predicted that an earthquake 32 times what hit Nepal on April 25 is coming in coming future<sup>40</sup>. Thus tourist destinations in Nalanda district need to be better able cope with such challenges if they had guidelines for appropriate action in place before anything untoward had happened. Disaster planning and response thus appear to be significant for the tourism industry.



**Figure-18:** The Rajgir Hills and its tourist destinations (Created through Google Earth by Author).

**Way forward:** No doubt, the tourist sites, heritage properties are imperative for national and community pride and for social attachment<sup>41</sup>. Catastrophes do happen. Consequently, it is best to be set up to deal with these unavoidable occasions. In times of catastrophe, a successful DRM plan can bolster helpless groups by safeguarding their legacy. In line with such consideration, this study has attempted to investigate awareness level of tourists. The study reveals that the Nalanda district is highly susceptible to the earthquake and any earthquake more than eight on Richter scale in Indo-Nepal Border may devastate the tourism industry of Bihar. The survey also reveals that since the majority of foreign tourist visiting this district, are not good in English, thus the notice board and information center should have another language like Thai. Furthermore, the influence of different factors, including demographic background, past travel experience, trip purpose, and image perception on tourists' response behavior is clarified. Significant differences are revealed between travelers from different countries and between domestic and foreign tourist as well. There are many tourist facilities located in regions that are also subject to earthquakes disasters. This has already become a significant risk for the tourism industry. It is certain that tourist destinations can cope with such challenges if they have guidelines for appropriate actions in place. This article uncovers the importance of understanding disasters risk reduction for the tourism industry because the industry is highly susceptible to change and crises/disasters. It is hoped that the that more academic researchers will put effort into tourism-related research and help to construct a more comprehensive catastrophe risk assessment model designed to decrease catastrophe-related risks to the

tourism industry. The above findings have important practical implications for Disaster risk reduction planning and resilience. Also, the analysis of tourists' response behavior to the earthquake can help the government to predict the changes in tourism market that would occur due to the disaster. A better understanding of the impacts of the natural disaster on tourist behavior can benefit the Nalanda tourism industry in better planning for future risk management and explore effective policy to support the sustainable development of tourism industry.

## Conclusion

Since hazards have no respect for the political boundaries of countries, it is essential for DRM policies to be developed with a strong regional perspective, leading to close patterns of regional cooperation<sup>42-44</sup>. No doubt, the enactment of 73rd and 74<sup>th</sup> Amendments to the Constitution and emergence of local self- government, both rural and urban, emphasize the role of local authorities as "vital". Even though much has been done by "National Disaster Management Authority (NDMA)" and "Bihar State Disaster Management Authority (BSDMA)" it is evident from results and conditions that, still not enough has been done and that there is a long way to go. When trying to understand and set up action in context for such blessed geographical regions like Nalanda District, it seems that there is a huge gap in the application of new approach and technologies for adaptation, mitigation, and prevention of disasters. Also, the existing policy seems to relief centric rather than having "prevention-centric"<sup>45</sup>. Being situated in such tectonically active



zone, what we know for certain is that the disaster like the earthquake in Bihar will never come to an end. The state, its people and its industries must plan, adapt and prepare for the next one strike.

No doubt, the tourist sites, heritage properties are imperative for the nation, community pride and social attachment<sup>46,47</sup>. Catastrophes do happen, consequently, it is best to be set up to deal with these unavoidable occasions<sup>48</sup>. In times of catastrophe, a successful DRM plan can bolster helpless groups by safeguarding their legacy<sup>49</sup>. There are strong linkages amongst DRR and Climate Change, as the number of fiascos is climate related<sup>50</sup>. Thus collaboration amongst DRR, Climate Change, and environmental risk assessment are much essential for sustainable development of tourism sites of Bihar. In line with such consideration, this study has attempted to investigate awareness level of tourists and reveals that the Nalanda district is highly susceptible to the earthquake and any earthquake more than eight on Richter Scale in Indo-Nepal Border may devastate the tourism industry of Bihar. The majority of these tourist facilities are not earthquake-resistant and are potentially vulnerable to collapse in the event of a low-intensity earthquake. Seismic retrofitting is need of the hour for them. It is certain that tourist destinations can cope with such challenges if they have guidelines for appropriate actions in place<sup>39,41</sup>. This article uncovers the significance of disasters risk reduction for the tourism industry because this industry is highly susceptible to change and crises/disasters. It is anticipated that more scholastic specialists will place exertion into tourism-related research for Bihar and help to build a more extensive disaster hazard evaluation to diminish related dangers to the Bihar's tourism business. The above findings have critical pragmatic ramifications for Disaster risk reduction arrangement. A better comprehension of the influence of debacle on tourist conduct can help the Nalanda tourism industry in better anticipating future hazard administration and explore sustainable way for growth of tourism industry.

**Recommendations:** Based on outcome of the study, following recommendations are suggested: i. Creating and undertaking seismic fortifying and retrofitting models for existing tourist structures. ii. Expanding the familiarity with seismic hazard reduction measures to different partners through workshops, classes, and open public awareness campaigns. iii. Creating inventory and documentation on lessons from past seismic tremors and guaranteeing their wide dissemination along with earthquake safety research and development in professional technical institutions realizing the trans-boundary nature of earthquake. iv. Installation of stand alone solar lights in all tourist hot spot of Nalanda district as earthquake caused widespread power outages throughout the area and majority of tourist destinations are located in Rajgir Hills. v. Conduct demonstration projects to disseminate earthquake-resistant techniques and public awareness campaigns, mock drills, on seismic safety and risk reduction and sensitizing all stakeholders to earthquake mitigation in public participation events like

*Heritage walk, Rajgir Mahotsav or Similar Others.* vi. Developing an appropriate mechanism for certification of professionals like tourist guides, tour operators, hotel industry Managers as “Aapda Mitra” in earthquake risk reduction instruments by collaborating with professional bodies.

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