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Strategy to Make Vulnerable Hill Tourist Destinations Disaster Risk Resilient

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ABSTRACT

In India, religious tourism in hilly areas is flourishing. There are some destinations, where millions of people visit every year and get consolation to their mind. On the other hand, some of these stations are prone to earthquakes, heavy rains, landslides, flash floods and disasters of that nature. It is the duty of the administration to ensure that effective steps are initiated to minimize the risk of disasters so that tourists enjoy while spending their time at these destinations. Keeping this in view, the paper focuses on the comprehensive strategy which the management of hill tourist stations must adopt to reduce the risk of disasters and make these more risk resilient. Since, hilly areas are more prone to disasters than the plains. Firstly, understanding threat due to various types of disasters, identification of the exact locations where these disaster can hit and making plans to tackle these with the aim of minimizing its effect.

1. Introduction

Hill stations are very popular all over the world from tourism angle. Everyone wants to spend one's leisure time at these places and relax. Some of the hill stations are famous from religious tourism point of view. Tourists/pilgrims visiting these areas spent quite a bit of money which finally boosts up the economy of these areas, uplifts the standard of living of locals and enhance Gross Domestic Product (GDP) of the region.

In India, religious tourism in hilly areas is flourishing. In some of these destinations millions of people visit every year and get solace to their mind. However, some of these stations are prone to earthquakes, heavy rains, landslides, flash floods and disasters of that nature. It is the duty of the administration to ensure that effective steps are initiated to minimize the risk of disasters so that tourists enjoy while spending their time at these destinations. Generally it is seen that the administration/management of the hill stations do not bother to take any preemptive steps to counter the effect of disasters which results in massive destruction of property and loss of lives during any natural or man-made disaster. Tourists start avoiding those stations thus affecting the economy of the region.

Objective: This paper aims to bring out the comprehensive strategy which the management of hill tourist stations must adopt to reduce the risk of disasters and make these more risk resilient.

2. Disasters in Hill Tourist Stations

Since time immemorial it has been seen that the hilly terrains are prone to heavy rains, landslides rock/boulder felling etc. causing damage to property and human lives. Kedarnath tragedy in Uttrakhand (India), caused due to heavy rains, took a toll of over 10,000 human lives during June 2013 - 5 Jun 2013 [1] where as Kathmandu tragedy in Nepal on 2 Apr 2015 took a toll of 8,000 lives [8]. Heavy snowfall in Amarnath (J&K State) killed around 250 persons in 1996 [2] where as 38 persons died in Darjeeling district of West Bengal on 3 Jul 2015. Fall of Big Boulder due to landslide in Manikarn Sahib (H.P State) on 18 Aug 2015 caused 7 persons to lose their lives whereas the stampede in Naina Devi Temple (H.P State) on 3rd Aug 2008 had a casualty of over 200 personnel.

Hill tourist areas are prone to disasters. So there is need to prepare a comprehensive strategy for all these stations to minimize the effects of disasters so as to make the destination more tension free and enjoyable.

3. Challenges in Tourist Destinations in hills

Like many other countries, India too has a large number of tourist places. But as far as foreigners are concerned, they prefer the hill stations to spend their leisure time. As per the global tourism survey, the mostly visited vacation centers by the foreigners are **hill stations in India**.[3] The tourists generally come to the 'country of landscapes' with their family members for relaxing from their hectic and busy life schedules. This tourist influx is the main source of economic activity in some of the tourist stations. However, hilly areas have their own challenges, common ones are as under:

- Excessive rains, landslides, cloudbursts, shooting stones and felling rocky stones
- Narrow passages and roads leading to congestion and traffic jams[3]
- Accident prone roads
- Unstable slopes leading to landslides and *pasees*
- Less buildable land
- Some of the hill stations are seismically vulnerable and prone to natural disasters

Tourist influx in the very popular hill stations has increased multifold in recent years and in some cases, may be, beyond the capacity which these stations can handle. Like the tourist station Simla (India) is designed for a highest population of

25,000 on a pedestrian scale, but the present population of the Simla town is around 169,758 [4] which is still on the increase. Similarly, the number of tourists/pilgrims visiting Shri Mata Vaishno Devi Shrine located at Trikuta hills of J&K State of India has increased from just 1.3 million in 1986 to over 10 million during 2011-12 [5]. Increase of tourists have put a lot of pressure on land, nature ecology and resources in those areas besides the challenges mentioned above.

4. Initiatives Taken by UNO, Central and State Governments

Quite concerned over the large number of deaths and loss of property due to disasters, United Nations has accorded due importance to it and created an office (UNISDR) in its Secretariat in 1999. It keeps conducting programmes and educating the world communities on the methods of reducing disaster risk. Last conference viz. 3rd UN World Conference on Disaster Risk Reduction was held at Sendai, Japan where all the countries present adopted a framework for reducing disaster risk in the next 15 years . This framework is called "Sendai Framework for Disaster Risk Reduction 2015-30"[9]

With in India, to tackle disasters at the national level, the Government of India (GOI), on 23 December 2005,enacted the Disaster Management Act, which envisaged the creation of National Disaster Management Authority (NDMA), headed by the Prime Minister and State Disaster Management Authorities (SDMAs) headed by respective Chief Ministers, to spearhead and implement a holistic and integrated approach to Disaster Management in India.[6] It has the vision which reads as "To build a safer and disaster resilient India by a holistic, pro-active, technology driven and sustainable development strategy that involves all stakeholders and fosters a culture of prevention, preparedness and mitigation" [6]

Under this act a National Disaster Response Force (NDRF) has been constituted at national level for the purpose of specialized response to natural and man-made disasters. Accordingly, 10 battalions, each consisting of 1,149 persons have been constituted from within the paramilitary forces under the Ministry of Home Affairs. These battalions are fully equipped and trained to take on the relief work created by the disasters.[7]

At the level of states, State Disaster Response Force (SDRF) have been constituted from within the belt forced personnel of the state to take on the relief and rescue operations within in the state. Besides this there are Home Guards, Civil Defence Force and Fire Fighting and Emergency Departments in the states to supplement the efforts of the SDRF.

These efforts are being done at the governmental level. However, at the non-governmental level, there are not many agencies which undertake this type of disaster management work. In J&K State, however, there is one organization, named Shri Mata Vaishno Devi Shrine Board (SMVDSB) which has taken initiative in this direction and done a lot of work for minimizing the effects of disasters. It has set an example for other NGOs, working in this field, to emulate.

5. Strategy to make the Tourist Destinations Disaster Risk Free

Understanding the damage a disaster can do to human lives and other assets, there is definitely a requirement of taking steps and making a compressive strategy at state, city and district levels to reduce its horrifying effect. Even the non-governmental organizations should come forward and help in this direction.

Hilly areas are more prone to disasters than the plains. There is a requirement of firstly understanding threat due to various types of disasters, identifying the exact locations where these disaster can hit and making plans to tackle these with the aim of minimizing its effect. So the comprehensive strategy would be made in a systematic way as under:-

- Identification of disaster prone areas and the extent of damage it could cause
- Making Plan for the following:

  - Have Early Warning Systems
  - Structural Issues
  - Capacity Building Initiatives
  - Handling Post Disaster situations

- Earmarking resources (financial and physical) to handle disasters
- Final Implementation of the plans and Conduct of Mock Drills periodically to keep the residents aware of the strategy and actions to be taken in its implementation

6. Identification of Disaster Prone Areas and Carry out Vulnerability Assessment

First of all it's very important to know the type of disaster situations a region is likely to face. Disasters could be natural or manmade, common ones of which are as under:

Natural Disaster Situations

- Snow avalanche
- Earthquakes
- Landslides, mudflows and shooting stones
- Heavy rains, flash floods and cloud bursts

Man-Made Disasters

- Forest fire
- Onsite fire
- Over-crowding situation and stampedes/congestions
- Lawlessness situations, terror attacks, bomb blasts or radiological emissions

It has been seen that earthquakes sometimes trigger snow avalanche, landslides, mudflows or shooting stones etc. Every year around 500,000 earthquakes take place in the world, however, most of these are of low intensity and hence not noticeable. Somehow, around 100,000 earthquakes of magnitude 4.0 and above on Richter scale cause damage every year. Based on the history of a place, topography/alignment of plates under the earth, an area is categorized in various Seismic Zones from 1 to 5. Seismic

Zone 5 is the area with highest risk with earthquake of intensity of MSK IX (macro seismic intensity scale of earthquakes) or greater and areas under Seismic Zone 1 has the lowest risk factor.

So the hill stations be got surveyed from the Geological Department to know the risk zone of the area. Even micro-zoning is done by the Geological department to pinpoint the locations which are more prone to disasters. These areas be got identified for making plan to address the issues.

7. Preparing Risk Vulnerability Map

Based on all the inputs, Risk Vulnerability Map is required to be prepared which must indicate as to who and what all are at risk within the hill station. All the plans to tackle disaster and minimize damage to life and property are to be made based on this risk vulnerability map.

Making Plans to make the region risk free

Plans must be made firstly to predict location and occurrence of disasters like avalanche and take steps for these not to happen. Secondly, the disaster prone sides of the hills must be strengthened to avoid effect of earthquakes, rock/stone felling etc. Even buildings and other structures could be made with sufficient strength and techniques to be safe enough during disasters. Thirdly, to minimize the impact of disasters, the capacity must be build up within the resources of the hill station for immediate rescue and relief operation by way of training manpower, positioning of stores and practicing SOPs (Standard Operating Procedures) as part of the periodic drill. Suitable early warning systems be put place and various control centers, response centers be also established for getting inputs and taking action based on accordingly

a. Plans to tackle Avalanches: If the area is prone to avalanche, then preemptive action needs to be taken accordingly to minimize its effect. Avalanches generally occur when new snow or rain falls leading to already accumulated snow to dislodge and cascade down the side of a hill. It can also be caused by earthquakes or artificially get triggered by snowmobiles, skiers, gunshots and explosives. It is also known that most avalanches occur on slopes between 35 & 45 degrees because slopes less than 30 degrees rarely produce avalanches, and slopes greater than about 50 degrees tend to slide off the snow often. [12] and [13]

Knowing the above facts, it is easy to predict the occurrence of avalanche and prevent it to cause any damage. So an Avalanche Forecast Cell (AFC) could be established with the task of looking out for avalanches whenever over a foot of fresh snow falls. To avoid accumulation of snow and formation of avalanche later on, explosives could be used to trigger smaller avalanches that don't pose a danger to persons or property. This way bigger build up of snow is avoided thus preventing avalanche to occur.

b. Plans to Strength Structures (hills slopes and buildings)

Based on the knowledge of the Seismic Zone in which the hill station is located, the vulnerable spots identified by the Geological Survey Departments could be strengthened/reinforced. Following actions are required to be taken:

- Firstly, those slopes of hills which are vulnerable, weak and source of landslides, stone felling, mud flow etc. must be identified. Then these must be strengthened and stabilized by fixing single or double linked chain by removal and repairing the potential unstable blocks or to make the roads and paths underneath safe. [11]

- Secondly, for all the future buildings and structures, bye laws be framed by the Local Bodies like Municipal Corporations, Municipal Committees etc. to take on construction of buildings with sufficient strength commensurate to the Seismic Zone in accordance with the international/national standards. For construction of RCC structures, the standard ASI-318 (American Concrete Institution Code) is internationally acceptable where as for construction of earthquake resistant bridges, the standard AASHTO-2007 (American Association of State Highways and Transport Office) is generally used [14]. In India, Bureau of Indian Standards has laid down IS 1893:1984 which spells out the criteria for *earthquake* resistant d*esign* of s*tructures for all type of buildings, elevated structures bridges etc. is preferred [10].*

- Thirdly, the existing buildings and structures which do not conform to Indian Standard IS 1893:1984 or any other standard must be identified, declared unsafe and either demolished or retrofitted/reinforced to meet the norms of structural strength commensurate to the Seismic Zone requirements.

- Lastly, alternate routes all eventualities like for congestion or overcrowding etc must be created.

c. Capacity Building Initiatives

An in-house Disaster Management Force needs to be prepared which comes in action within a few minutes and conducts relief and rescue operations immediately, manages the disaster in the first few hours before arrival of the expert teams and help from different near and far locations. These become successful only and only if there are already sufficient resources available and procedures known to the concerned authorities. So detailed plans and SOPs (Standard Operating Procedures) need to be worked out for the same which may include establishment of the following organizations:

- Organizations at ground level
- Organizations at apex level
- Adhoc organization to be created immediately on occurrence of disaster.

8. Organizations at Ground level

1. Disaster Management Task Force (DMTF): It will be created from within the existing manpower resources of the hill station. It will comprise of 30-100 persons depending upon the size of disaster threat, population of the hill station and the

number of tourists visiting it. It will have a leader with other persons divided into teams. This force will be trained by expert agencies periodically. A few persons will become master trainers who will conduct periodic training for all the personnel of DMTF. This force is a standing body which is responsible for the following:-

- Spreading awareness about the risk vulnerability among the residents of the station. Preparing Dos and Don'ts for general public during disasters
- Liaising with the neighbouring and state/national disaster management agencies for coordination, ascertaining availability of disaster management resources with them, taking help from them for training and joint practices annually.
- Conducting specialized training on various aspects like search and rescue techniques, first-aid medical help, mob control techniques, fire fighting techniques etc.

2. Quick Response Team: This will be the smallest team in the organization which will have all the requisite resources required immediately to reach the disaster location and take control of area, start carrying out the rescue operation. It will inform the DMTF Leader the details of the disaster to get all help and communicate all details to them till the central agencies take control of the area for managing disaster. This team will provide the immediate leadership for taking on responsibility for managing the incident operations and persons will be trained in the following areas:

- Search and Rescue
- First-aid Medical help
- Arranging logistics required immediately like food, transportation of injured/affected ones to the nearest safe location etc.
- Fire fighting in case disaster leads to burning of buildings
- Crowd Control
- Emergency lighting systems in case of failure of electricity
- Emergency communication systems in case of disruption of communication towers/installations and failure of mobile/landline communication
- Record keeping and link up with higher authorities for help, media control during initial stages etc.

Team will have its small disaster management stores where requisite equipments will be kept and maintained. A sample inventory in the store for disasters like earthquakes and landslides is enclosed at Annexure A.

9. Organization at Apex Level : Steering Committee

At the apex level in a hill station, a Steering Committee for Disaster Management will be created which will act as a nodal agency with adequate manpower. It lays down policies, SOPs for various organizations like DMTF, QRT etc. It also coordinates at the central level with members from all the services to manage the disaster in totality with the help of external agencies too. Composition of its organization will be as under:-

- Chief Executing Officer of the Hill Station: Chairman
- Senior officer of Police Department : Member
- Senior officer from Health Department : Member
- Senior officer from Communication Department: Member
- Senior officer from Fire and Emergency Services: Member
- Senior officer from Engineering Department : Member

Besides the list given above, senior officers from other services could also be co-opted as deemed fit for the station. This committee will meet once in six months or a year to lay down policies, carryout amendments, if required, take stock of the requirement of stores for disaster management stores, monitor the training programmes undertaken during the period for the DMTF and QRT personnel. Need for any specialized training for them etc. will be ascertained. It must ensure that the awareness programmes are being followed as per the schedule.

It must create a database of all the relief material which is available in the neighbouring towns and cities which could be used for in case of disasters and disseminate this information to all the stake holders.

10. Organization on Occurrence of Disaster : Incidence Response Control Room

This control room is the nodal centre in terms of disaster management, collecting and transmitting information to appropriate agencies/persons, giving early warning in time to people, monitoring preparedness, relief and rescue besides allied tasks. It is a single nodal point where complete information about the disaster in the the hill tourist station would be available. It is formed during emergency and crisis situation and is dissolved as the situation becomes normal and till that time if functions 24 hrs a day till emergency persists. Main functions envisaged at this control room are:-

- Establish communication with the disaster site elements, DMTF, QRTs and other agencies operating in the affected area.
- Gather correct information about the site situation, type of damage occurred or likely to be occurred and the type of resources required on spot to be moved by fastest communication means. These resources could be DM stores, communication systems, medical requirements, fire fighting equipments, lighting equipments, tentage/temporary shelters for the effected persons, food articles, clothing, blankets etc.
- Requirement of JCBs and other earth moving machinery to clear the debris, prepare alternate temporary routes/tracks for evacuation.
- Casualties and requirement of air effort to lift them to suitable hospital.
- Passing on information to state/national govt agencies and other agencies with a requisition for the requirement of items as above.
- Getting the resources from outside agencies and transporting these to the nodal centers at the site

locations/DMTF headquarters for further distribution to the needy.

11. Earmarking Financial and Physical Resources

As all the citizens possess some sort of life insurance/health insurance/ vehicle insurance policies to ensure that at the time of need the insurance agencies look after their interest and for this, they pay nominal premium to these agencies periodically. In the same way, to ensure better risk free hill tourist resort, it is mandatory to earmark some budget, create the resources so that at the time of disaster, all the residents and the tourists could be looked after with minimum damage to life and property. So suitable budget should be kept aside for the following activities:-

- Making/reinforcing the existing building and structures disaster resilient based on the seismic zone the hill station is located.
- Procuring DM stores, earmarking space to house these and periodic maintenance of the stores
- Creation of various committees, their periodic meetings of members
- For conducting training programmes for the personnel of DMTF and QRT and mock drill to test the effectiveness of these programmes.
- Notional budget for recovery, rehabilitation and reconstruction phase after the occurrence of disaster is to be catered for

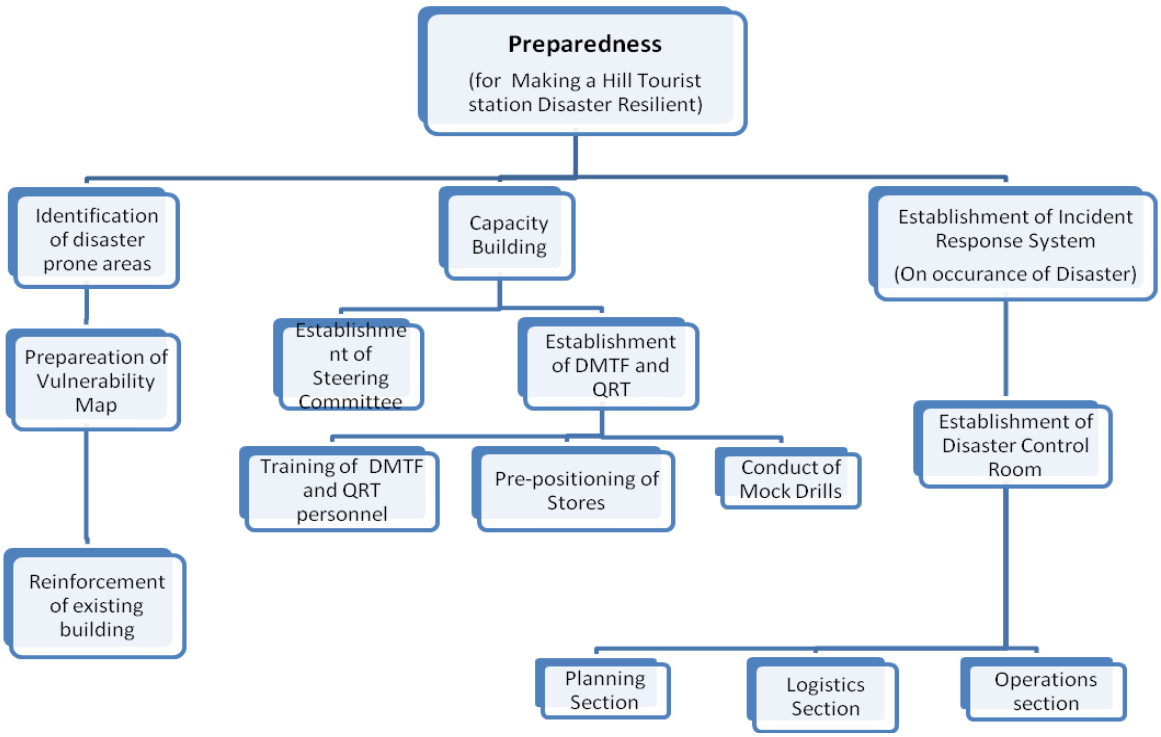
The budget is to be arranged by the govt. or the local administrative body in collaboration with the public-private parternership. The budgetary figures could be reviewed annually based on the additional inputs gathered during the year.

12. Implementation of Plan and Conduct of Periodic Mock Drills

After creating of all the committees, task force and earmarking budget for the various activities, it is desirable to lay down an implementation plan clubbed with the methodology for its monitoring. An annual calendar needs to be prepared and followed for effective monitoring. So Implementation Plan and Calendar could include:-

- Formation of committees
- Formation of DMTF, QRT
- Training of personnel of DMTF and QRT
- Procurement of DM stores and positioning these at appropriate locations
- Annual Calandar to include dates for
  - Dates of meeting of committees
  - Training programme for the DMTF and QRT with dates
  - Maintenance schedules including calibration checks of the equipment/stores
- Conducting mock drills of all the procedures periodically for ensuring fitness and serviceability of all the resources all the times. Any lacuna or shortcomings in the procedures or stores, noticed during the mock drills, be used to update the procedures and upgrade the equipments/stores.

13. Flowchart of Actions for Preparing Strategy



14. Conclusion

India in the recent years have made significant development in the area of disaster management. A new culture of preparedness, quick response, strategic thinking and prevention is being ushered. The administrative framework is being streamlined to deal with the various disasters. Effort are also being made to make disaster management a community movement wherein where is greater participation of the people. The database of all the relief material which is available in the neighboring towns and cities which could be used for in case of disasters and disseminate this information to all the stake holders.

Besides, to ensure better risk free hill tourist resort, it is mandatory to earmark some budget, create the resources so that at the time of disaster, all the residents and the tourists could be looked after with minimum damage to life and property. However, a lot more need to be done to make disaster management a mass movement in near future.

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Annexure A

Sample Inventory for Earthquake and Landslide Prone Hill Stations

S.No.	Item	Numbers Required
1.	Pick Axe	15
2.	Shovel	15
3.	Rain coat	25
4.	Umbrella	15
5.	Helmet	25
6.	Gum boots	25 pairs
7.	Rubber glove	25
8.	Iron Buckets	25
9.	First Aid Box	25
10.	Folding Stretchers	15
11.	Splints	5
12.	Generator with light	2
13.	Spot light	15
14.	Hand held search light with cells	5
15.	Torch 4-cell type	25
16.	Mega Phone	2
17.	Whistle	10
18.	Rock climbing pulley	2
19.	Rock climbing lenex, 150 Mt	500 m
20.	Rope rappelling lenex, 150 Mt	500 m
21.	Simple rope	100 m
22.	Rucksack	5
23.	Rock hammer	5
24.	Rock piton	10
25.	Rappelling piton	15 pairs
26.	Harness seat	10
27.	Jumper	10
28.	Harness combination	20
29.	Carabineer combination set	20

