



STRATEGIC PLAN FOR RISK REDUCTION

Increasing resilience through effective

RESPONSE, RECOVERY, MITIGATION, & PREPAREDNESS

TOURISM RISK HOTSPOT

MUSSOORIE CITY

STATE LEVEL ENDORSEMENT

“The magnitude of hazards and frequency of extreme weather events in Uttarakhand has increased due to climate change. The traditional methods of disaster management need to be overhauled, earlier the traditional methods used to be relief, response and rehabilitation, but now the whole scenario has changed. We really have to upgrade our capacities and strengthen our people.”

Mr. Amit Singh Negi

Disaster Management Secretary, Govt. of Uttarakhand

(State Workshop on “Strengthening Resilience to Climate Change Related Disaster Risks” held in Dehradun on 21st July 2017)

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1 INTRODUCTION

1.1 Overview of the Location

This is one of a series of case studies developed for “hotspots” in the Indian State of Uttarakhand and is one of four relating to disaster risk management issues and strategies to address tourism concerns in the State. As such, the strategic focus is entirely on tourism. Other case studies deal with the strategies to address earthquakes, flooding and landslides in both urban and rural settings within the State. These documents should be consulted with respect to non-tourism-based strategies.

The strategies are for municipal leaders and planners, and are not technical. They are easy to understand, realistic, and they are all achievable. Successful implementation of the strategies will reduce the risk profile of this location. Promotion of effective disaster preparedness in tourism destinations is a governmental function yet requires the participation of all at the destinations.

It is important to recognise that tourism from the DRM point of view needs to be considered in terms of individual destinations and the way people travel to and from these. Even so, leadership in this regard has to come from Government, the industry is a key stakeholder but is not likely to undertake a holistic approach to the management of the problem. Moreover, policy and regulations may need to be enforced as it has been demonstrated elsewhere that short-term commercial imperatives will frequently assume prominence over long-term benefits to the whole economy and society at large.

Disaster management needs to be systematic and positive in approach DMP should promote collaboration between public, private and community stakeholders and seek proactive responses to perceived threats. Adopting strategies that are positive, integrating and adaptable to change due to changing circumstances is important.

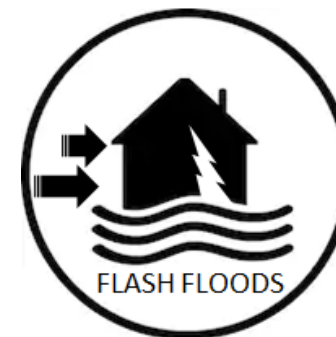
The Mussoorie Tourism Strategic Risk Mitigation strategies presented here are intended to provide key strategies and their priority with respect to mitigation of identified risks to tourist and the tourism industry associated with earthquakes (**High**), landslides (**High**), flooding (None) and flash flooding (None). Greater detail is provided in the Risk profile below.



HIGH RISK



HIGH RISK



NO RISK



NO RISK

It is strongly advised that these documents be consulted with respect to non-tourism-based strategies and a comparable approach be adopted with respect to overall Disaster Management Planning (DMP) in Mussoorie. It is an underlying assumption of this case study that a DMP process will be undertaken adopting this approach.

In undertaking DMP for Tourism in Mussoorie it is equally important to include an assessment of the tourism value chain in the assessment, planning and organization process. In the case of the Uttarakhand hotspots and elsewhere there is more than one tourism type then there is more than one value chain that needs to be taken into consideration. Value chains (nee supply chains) need to be understood so that all aspects of the DM plan can build the necessary links to all key stakeholders, the other relevant sectors and the broader community.

Mussoorie was one of 9 Prime destinations identified for the ACNielsen ORG-MARG survey undertaken for the Ministry of Tourism using 2005-2006 data. Historically a hill town with its close proximity to Dehradun greater than 99% of a total of some 848,736 of guests checked in 2005-6 were domestic tourists (ACNielsen ORG-MARG Pvt 2006). At the same time it has been reported that the infrastructure of the town is being overwhelmed by its popularity with a shortage of water, poor sewage management and roads, and very rapid expansion of hotels and lodges.

In April 1959, after fleeing Chinese occupation of Tibet, the Dalai Lama decided to establish the Tibetan Government of Exile in Mussoorie, which eventually moved to Dharamshala in Himachal Pradesh. The first Tibetan school was established in Mussoorie in 1960. Today, some 5,000 Tibetans live in Mussoorie. One remnant of this is the prevalence of Tibetan restaurants in Mussoorie (as well as in part so Dehradun).

Map 1 gives the extent of the hotspot within the block. Although we do not deal with the whole block in this instance, the strategies are applicable to locations outside the designated risk hotspot.

Tourism features as a prime element in the Uttarakhand Vision 2022¹. The two goals are:

- Promote the state as a global tourist destination by highlighting its spiritual, cultural and adventure tourism.
- Target 5 lakh international tourists by 2022.

Inflow of foreign tourists into the state increased from 1.01 lakh in 2014-15 to 1.05 lakh in 2015-16.

The strategies are for municipal leaders and planners, and are not technical. They are easy to understand, realistic, and they are all achievable. Successful implementation of the strategies will reduce the risk profile of this location.

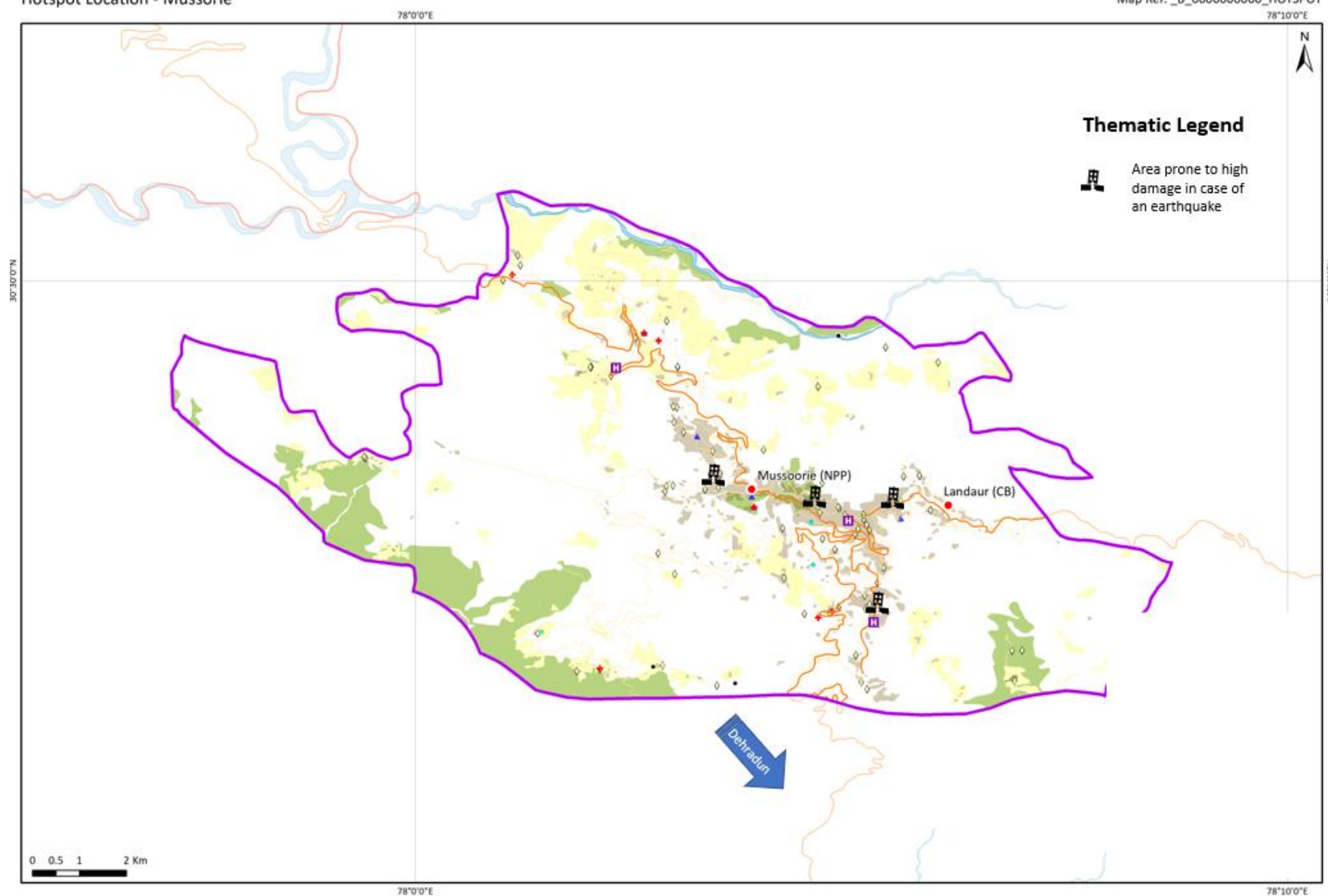
¹ IBEF Brief Uttarakhand May 2017 www.ibef.org

Tourism Hotspot Plan

Hotspot Location - Mussoorie

Disaster Risk Assessment of Uttarakhand (2016-2018)

Map Ref: _B_0000000000_HOTSPOT



Map 1: Extent of the Mussoorie Hotspot Boundary

1.2 About this Strategic Plan

This document is an output of the Disaster Risk Assessment. It is one of 14 strategic plans produced under the study that aim to reduce risk in the selected locations and serve as case studies for other areas of risk in the State.

This Strategic Plan is built upon the hazard risk analysis undertaken by the project and formulated around key elements of the disaster risk management (DRM) framework embodied in the Sendia Framework.

The DRM process is sequential (cyclic) in order to allow adaptive improvement over time in order to build back better. It is also intended to incorporate a focus on pre-impact preparation through planning in order to mitigate risk associated with incidents before they occur.

This approach has been adopted at the National level.

While response and recovery are recognised as being reasonably short time frame processes (hours and days to months), Mitigation and Preparation are seen as much more strategic processes over longer time frames (months to years).

The National DRMP recognises three recovery periods after a disaster: a) Early – three to eighteen months, b) Medium – within five years and c) Long-term – within five to ten years. The concept of “build back better” points to continuous improvement in the mitigation and preparation process and its implementation, over all time frames as funds and resources come to hand, risk profiles change, and skills and mitigation outcomes are increased or realised. Continuous improvement represents a learning curve reflecting successes and failure – what has worked, what has not worked and how do we do better into the future?

By developing strategies around the separate phases of DRM and recognizing the opportunity for improvements over time it is possible to prioritize the actions that need to be taken. For each strategy presented here there is an initial list of key Actions include as the start of the process.

The strategies offered here are intended to aid the Municipality and its citizens, local authorities, businesses, private residents, and local NGOs, with the intent of driving a ground up approach within a State level top down policy context. The challenge is for all organizations and individuals to take upon themselves the responsibility of being prepared and being better able to offset the risks and manage the consequences of these disasters.

What is a Strategy, Plan, Action?

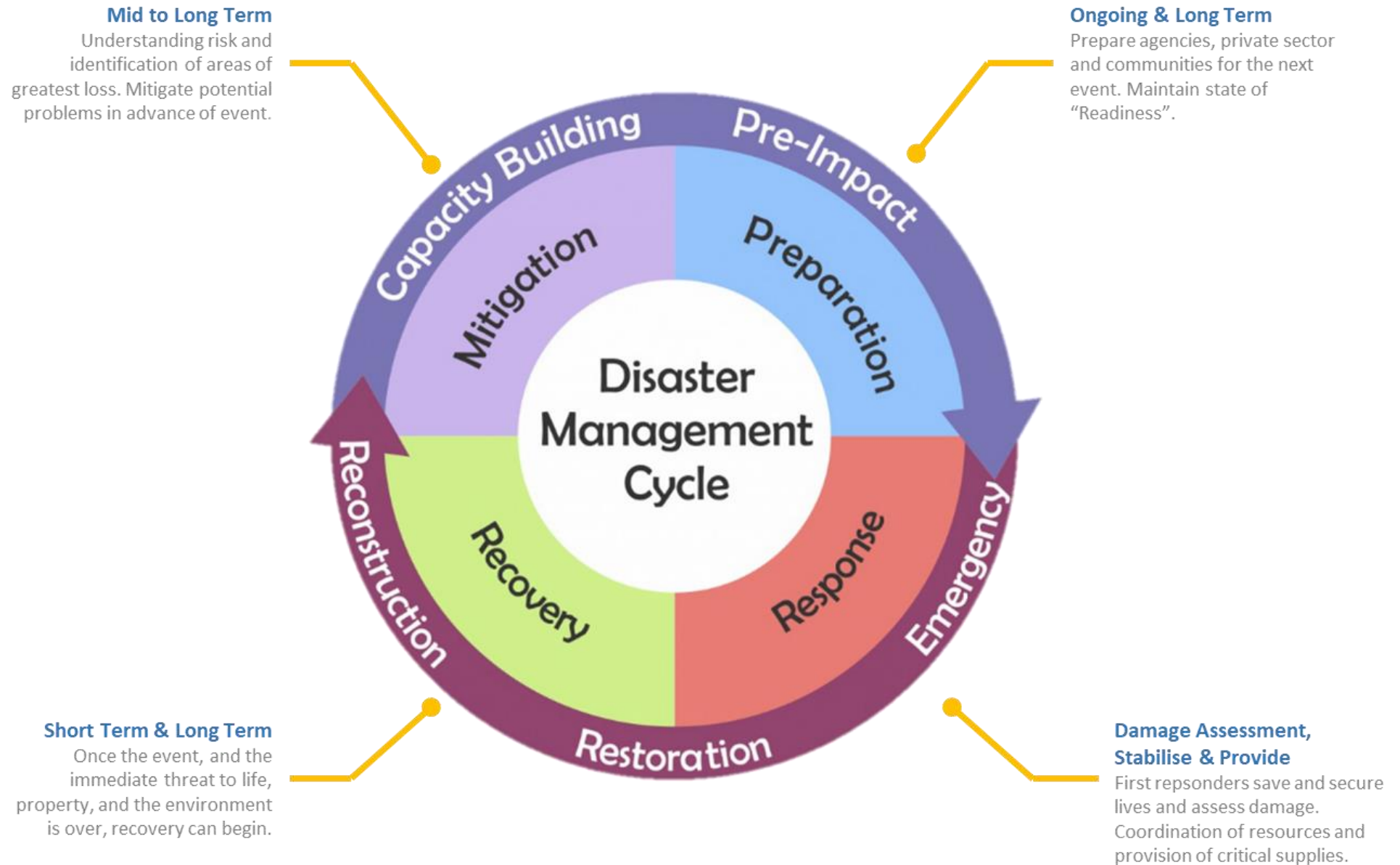
“... a plan of action designed to achieve a long-term or overall aim.”

A **Strategy** is a planning tool developed with a long-term perspective. It provides a common vision and includes certain guiding principles and priorities. It needs to incorporate certain flexibility and periodic evaluation mechanisms to adjust course, evolve and adapt to changing circumstances, while continuing to provide guidance.

A **Plan** provides the operational orientation for implementing the strategy. It defines specific goals to reduce ... risk together with priority actions and activities to achieve these goals. It goes into needed detail as it assigns roles and responsibilities, mobilizes resources and allocates budget. It also sets timelines, indicators, and mechanisms for monitoring progress.

An **Action** is a key step to be taken in concert with other actions also needed for the Plan to succeed.

Abstracted in the main from: Implementation guide for local disaster risk reduction and resilience strategies, UNDSIR 2018



1.3 Area and Community Profile

1.3.1 Topography

Mussoorie has an average elevation of about 2,005 metres or 6,580 feet. It is located at the start of the Middle Himalaya physiographic zone: Between the MBF and the Main Central Thrust (MCT) with ridges as high as about 3000 m.

1.3.2 Climate

Mussoorie has a fairly typical subtropical highland climate for the mid-altitude Himalaya. Summers are warm and very wet, with July and August averaging approximately 26.0 inches of rain per month due to orographic lift of the extremely moist monsoonal air. The pre-monsoon seasons in April and May are warm to very warm and generally dry and clear, giving way to heavy rainfall from mid-June, while the post-monsoon season is also dry and clear but substantially cooler. In winter, the general weather is cool and partly cloudy.

1.3.3 Demographics

Mussoorie hotspot has a residential population of 33,657 with a literacy rate of 82% and a sex ratio of 814 females to 1000 males (Census 2011). The total workers comprise of 36% of the population with a majority amongst them engaged in the 'others' category (95%). Small parts of the population are engaged in agriculture (2.5%) and the Household industry (2.7%). The decadal growth rate of the Mussoorie hotspot was at around 15%, which is less than that of Uttarakhand (18.8%) and India (17.64%) indicating an out-migration of people (Census 2011 vs 2001). Being a popular tourist destination, large number of tourists visit Mussoorie from all over the world but majorly from India. Hence, the transient tourist population assumes greater significance from the disaster risk mitigation perspective. The summer peak season of 2018 was marred by long traffic jams due to a large number of vehicles seeking entry into Mussoorie far outnumbering the parking spaces available. Mussoorie has parking space for around 3000 vehicles but has recently been visited by up to double the number of vehicles on some days.

1.3.4 Economy

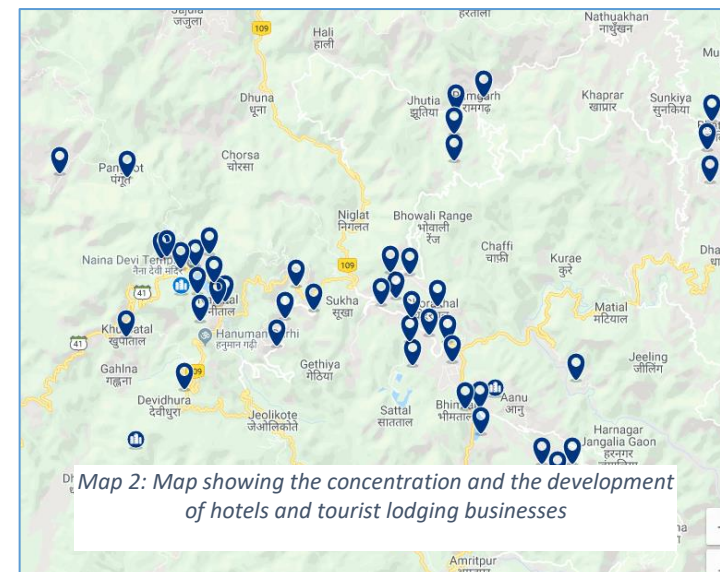
The most important and significant source of revenue is the tourism sector as Mussoorie is one of the closest locations to the plains region that offer great access to the beautiful mountain range and is a vibrant hill town with a colonial heritage. However, the tourism economy has placed significant strain on Mussoorie's infrastructure and resources due to unauthorized constructions and the burgeoning urban sprawl. Other small but significant sectors in the Mussoorie economy are agriculture, animal husbandry and handicrafts.

1.3.5 Development History

British officers started settling in the Mussoorie-Landour region in the early 19th century to escape the oppressive heat of the northern plains of India. Landour became a military cantonment, contiguous with Mussoorie. Many Europeans built homes and other buildings that gave Mussoorie its unique colonial architecture. Soon the twin towns were named the “Queen of the hills” and became a popular tourist spot post India’s independence. This led to rapid urbanization for the construction of hotels, restaurants and markets. Mussoorie has grown at a rate faster than 15% in the past decade in terms of built-up area.

1.3.6 Regional Context

The area defined under this hotspot includes Mussoorie town along with other tourist attractions such as Landour in the east and Kempty falls area in the west. The main access road to Mussoorie is from Dehradun. Mussoorie is also connected to Tehri in the east and Vikasnagar-Barkot road in the west.



1.3.7 Critical Facilities/Infrastructure

Mussoorie has a bus depot and taxi stand that are particularly busy during peak tourist seasons. Below is a snapshot of lifeline buildings and helipads, which are important from the disaster risk management perspective:

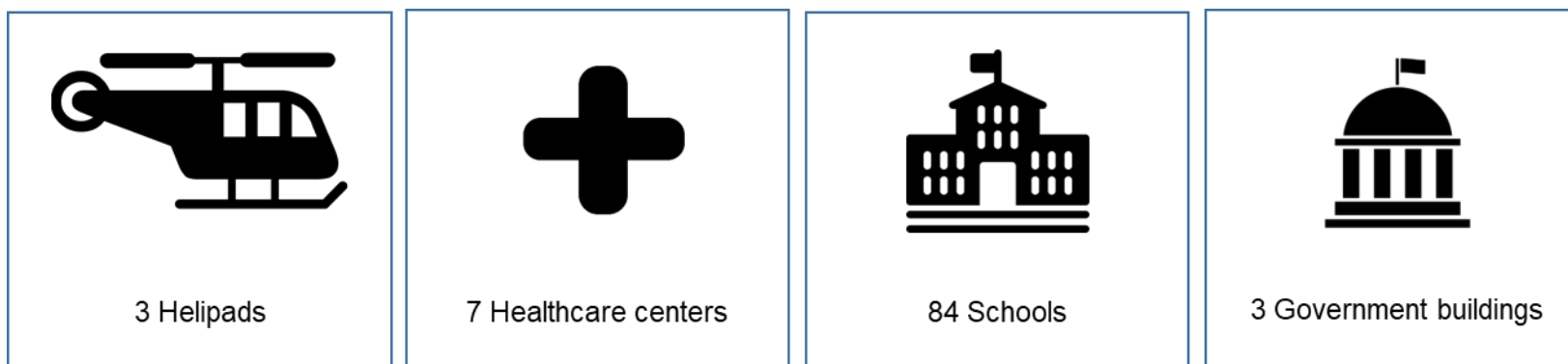


Figure 1: Snapshot of Lifeline Buildings and Infrastructure

The health care facilities consist of 3 sub-centers, 1 PHC, 1 CHC and 2 hospitals. The total lifeline buildings in the Mussoorie hotspot is approximately 90.

The sewage management system in Mussoorie is rudimentary with the construction of STP's and a piped network currently at a nascent stage. Most buildings use on-site sanitation systems or drain untreated sewage into the streams and rivulets of the area.

The water supply is sourced from around 20 separate springs but is inadequate for the peak season requirements with many commercial buildings relying on tankers for water supply. The government is considering pumping up water from river Yamuna via a multi stage lift amongst other alternatives to plug the gap in water supply.

The urban areas in Mussoorie and Landour towns use LPG for cooking gas and the rural parts still use traditional fuels such as firewood and cow dung.

This hotspot is a mixture of urban/military and rural areas. Some of the DRM strategies may require efforts that cut across administrative boundaries. Mussoorie (NPP) and Landaur (CB) are the urban towns and Dehradun is the block and tehsil for the rural section.

1.4 Mussoorie Risk Profile

1.4.1 Social Vulnerability

The social vulnerability has been ascertained by analyzing a combination of indicators that define certain characteristics or qualities (such as socio-economic and demographic attributes) within social systems that create the potential for loss or harm.

According to this study, Mussoorie has a high proportion of vulnerable communities with a major part of the vulnerable zones over lapping with the densely populated zones.

As is visible in Maps 3 and 4, the areas stretching from central Mussoorie to Landour in the east are both vulnerable and densely populated.



1.4.2 Earthquakes

Mussoorie City block is classified as being High Risk with respect to earthquakes. Due to tourism, the built-up area has grown at a very fast pace in the area. This urban expansion has led to a congested landscape especially in the market areas of this hotspot where an earthquake can have serious consequences.

Maps 5 to 7 illustrates the earthquake risk in Mussoorie hotspot area.

1.4.3 Fluvial Floods & Flash Floods

There is no fluvial flood or flash flood risk in the Mussoorie hotspot demarcation.

1.4.4 Landslide Hazard

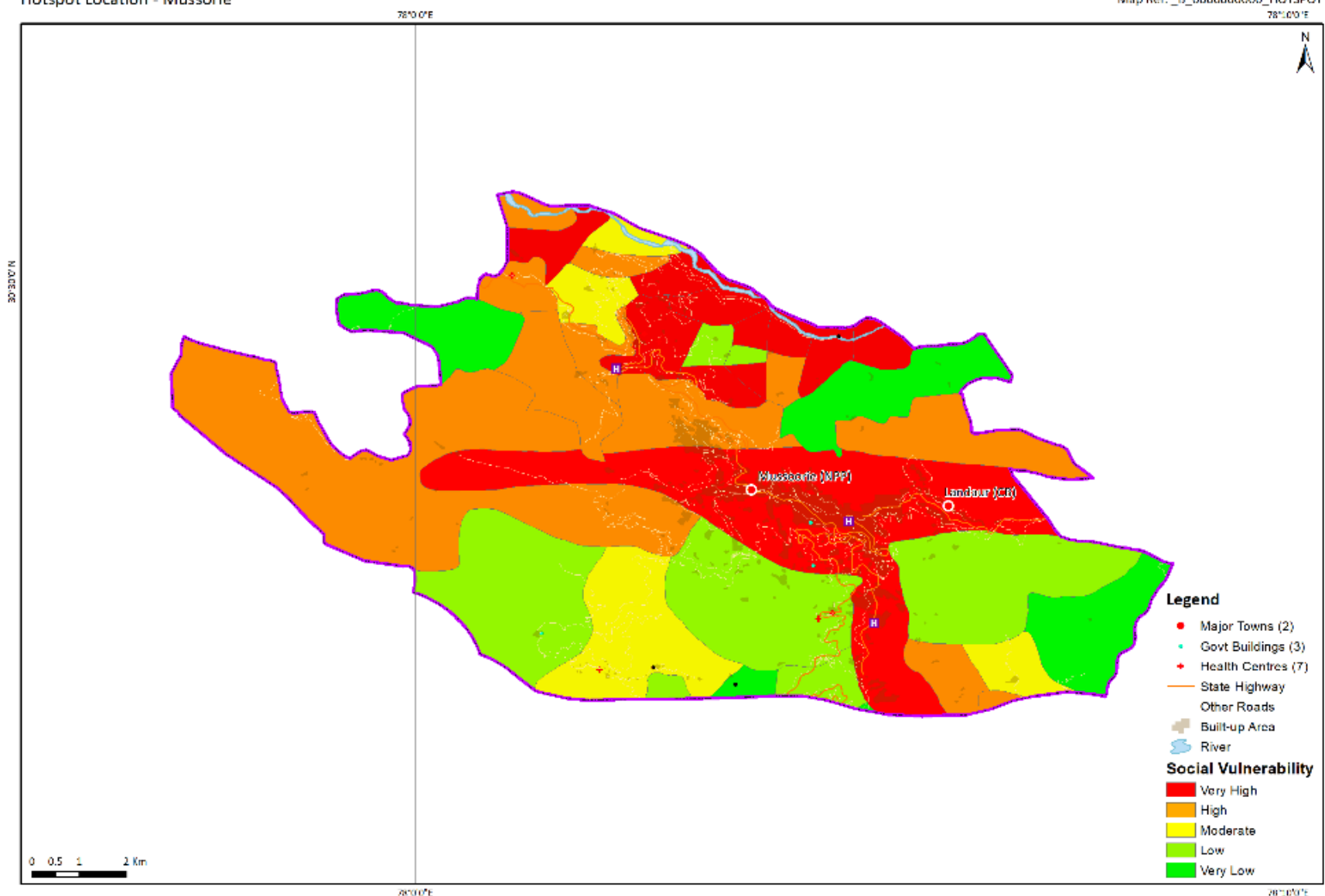
Landslides have been assessed as a high-risk hazard in Mussoorie. Landslide susceptibility in this hotspot is mostly due to steep slopes in some parts and numerous tectonic discontinuities (that include lineament and fault plane) in other parts. Development works must be controlled or regulated in high landslide susceptibility areas.

Tourism Hotspot Plan (Social Vulnerability)

Hotspot Location - Mussoorie

Disaster Risk Assessment of Uttarakhand (2016-2018)

Map Ref: _B_0000000000_HOTSPOT



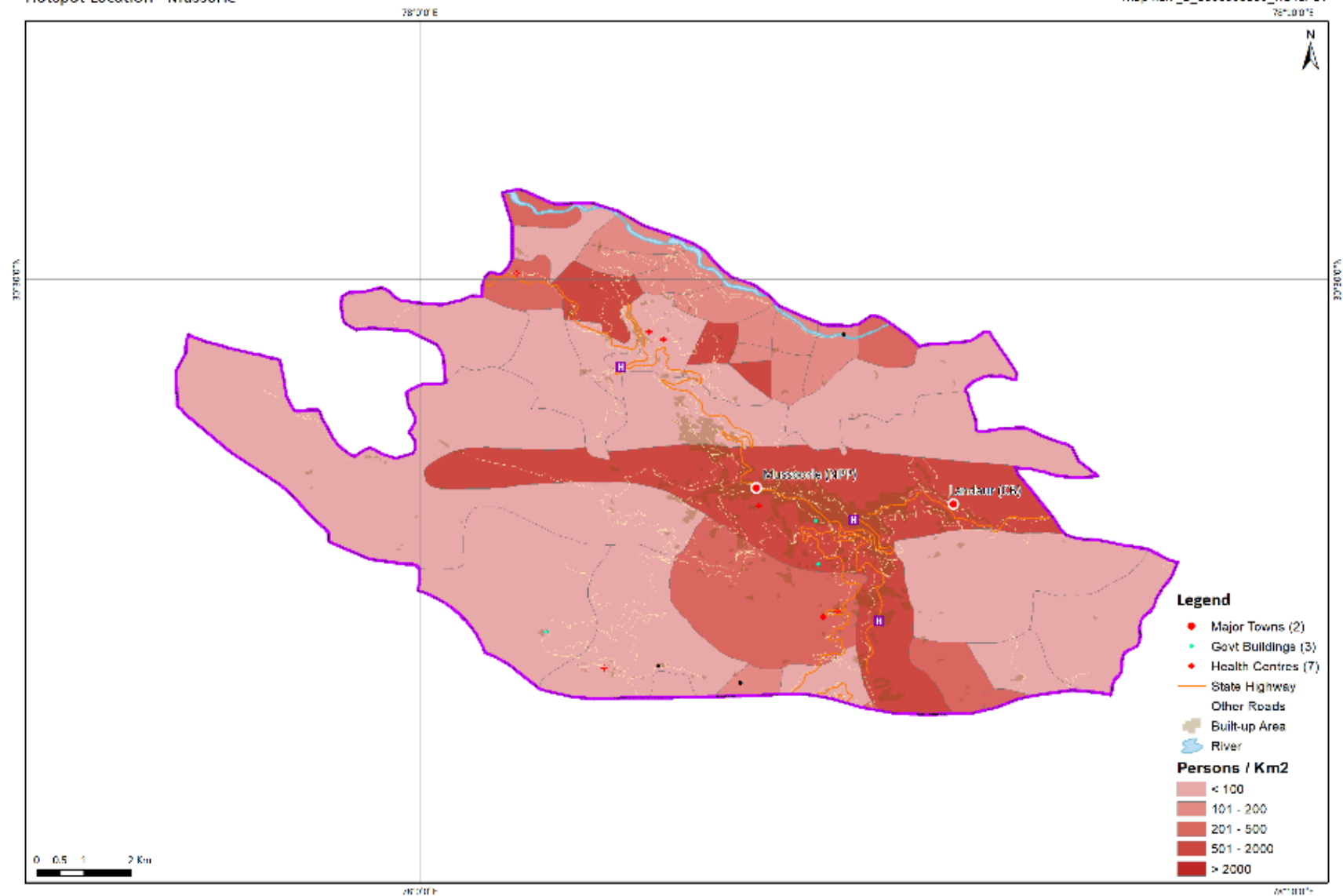
Map 3: Integrated Social Vulnerability Index for Mussoorie

Tourism Hotspot Plan (Population Density 2011)

Hotspot Location - Mussoorie

Disaster Risk Assessment of Uttarakhand (2016-2018)

Map Ref: _B_0000000000_HOTSPOT



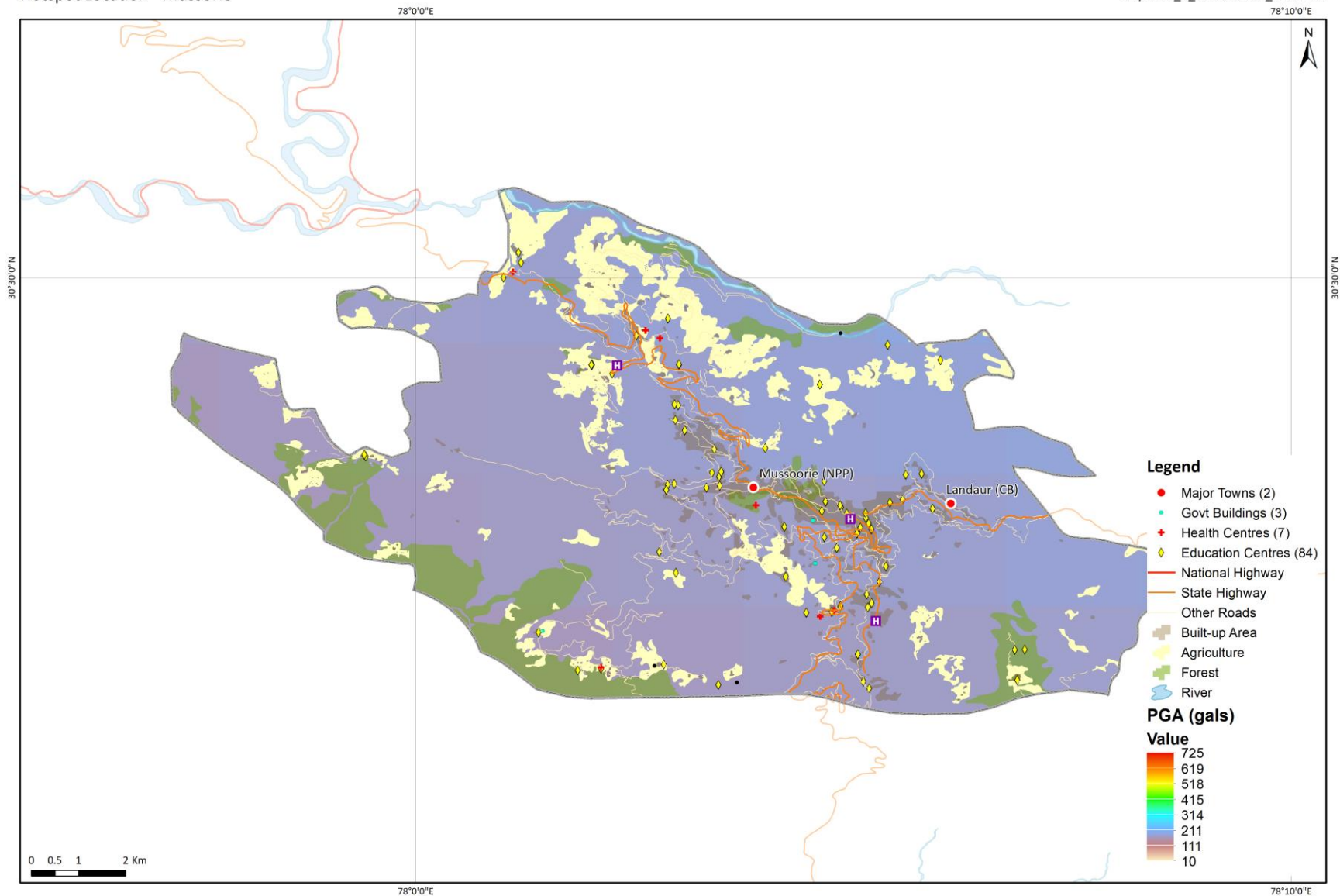
Map 4: Population Density of Mussoorie

Tourism Hotspot Plan (Earthquake: 100yr RP or 40% chance in next 50 yrs)

Disaster Risk Assessment of Uttarakhand (2016-2018)

Hotspot Location - Mussoorie

Map Ref: _B_0000000000_HOTSPOT

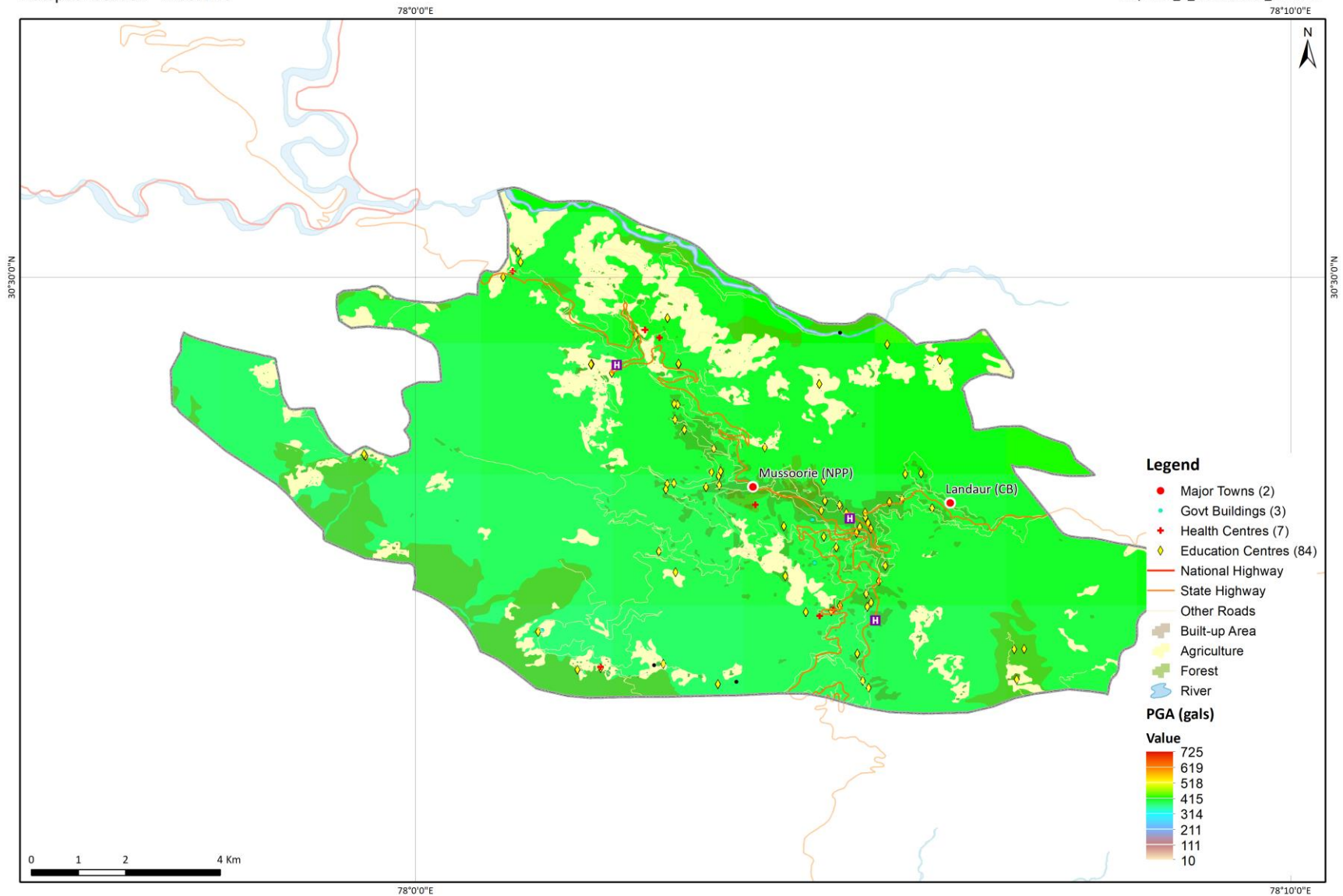


Tourism Hotspot Plan (Earthquake: 475 yr RP or 10% chance in next 50yrs)

Disaster Risk Assessment of Uttarakhand (2016-2018)

Hotspot Location - Mussoorie

Map Ref: _B_0000000000_HOTSPOT



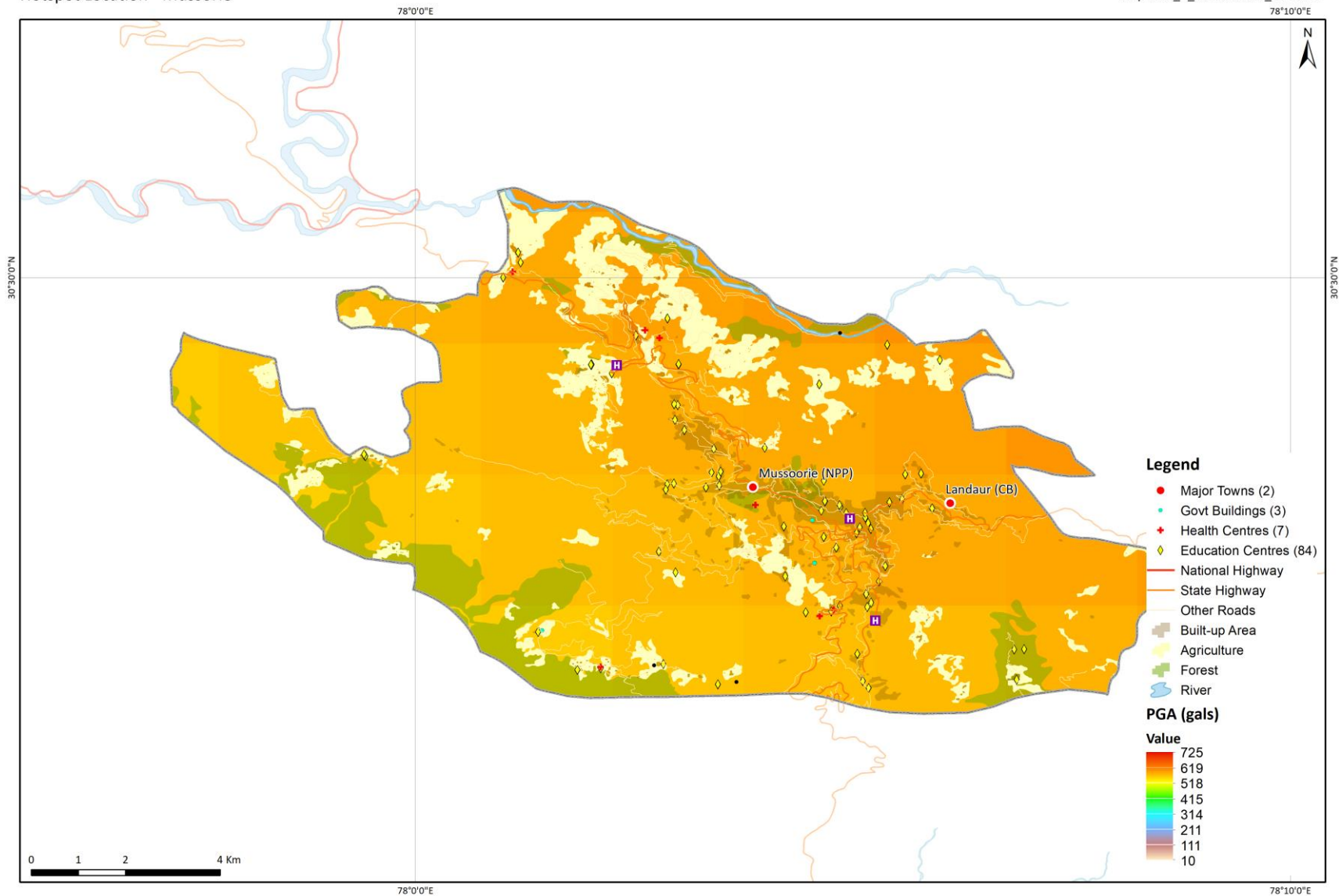
Map 6: Predicted Earthquake Intensity (475 Yr RP) in Hotspot Location

Tourism Rural Hotspot Plan (Earthquake: 1,000 yr RP or 5% chance in next 50yrs)

Disaster Risk Assessment of Uttarakhand (2016-2018)

Hotspot Location - Mussoorie

Map Ref: _B_0000000000_HOTSPOT



Map 7: Predicted Earthquake Intensity (1000 Yr RP) in Hotspot Location

1.5 Strategy Implementation, Monitoring, Evaluation

1.5.1 Challenges in Implementation

Three challenges have been identified with respect to DRM in Mussoorie and surrounds. In brief these are:

Finance & HR - Section 40(2) of the DM Act 2005 stipulates that every department of the State, while preparing the DM plan shall make the provisions for financing the activities proposed therein.

The marginal cost involved in mainstreaming DRR in existing programs, activities and projects of the department are not very sizable and the departments may not find it difficult to arrange such funds. However, funds for disaster prevention and mitigation may not be available so easily unless the departments are able to negotiate such projects with the planning and finance departments with proper Cost Benefit Analysis (CBA).

The relevant departments are also seen to be understaffed to enforce building compliance and other risk mitigation measures as a majority of officials are stressed with other operational works related to managing the massive tourist season in the region.

Technical – the way data and other information are acquired and transferred is still essentially dependent on manual processes. As a result, planning and awareness are both compromised, as is an ability to take an effective overview and achieve a ‘whole of government’ capacity to integrated strategic planning. Best practice statutory planning and regulation (including enforcement) is now done at this level using a spatial approach with a GIS and data sets available with all departments. It is time for the city to enter the digital age in this respect. First steps are related to recruiting young graduate qualified spatial planners and engineers to deliver access to the requisite GIS data sets and facilitate planning and regulation.

Integrated mitigation, planning and preparation - An integrated approach across Government, the private sector and the community is required to ensure fully effective DRM. A simple example is the need to pay much attention to Police & Fire, health specialisation viz; how to evacuate disabled, sick people or evacuation during fire/ smoke etc, During the development of any evacuation plan whether for city or rural, these specialisation need to be considered.

Most of the mitigation activities involves funds, therefore is it necessary to do the Economic Analysis/ Cost Benefit Analysis of proposed activities?

1. There is no separate budgetary provision in each line departments for mitigation activities.
2. Who will take the ownership of mitigation plan? Maintenance/ updating plans?
3. There is no regulatory provisions/ compliance mechanism for most of the mitigation activities.
4. Should there be any time line for completing each mitigation activity?

1.5.2 Proposed Management and Governance Structure

It is proposed that a Mussoorie Tourism Disaster Management Working Group is established by appropriate municipality. The Group is seen as being responsible for coordinating implementation of plan's strategies and undertaking an annual review process. In order to develop momentum for plan implementation, the Group will establish an appropriate timeframe for the meeting schedule as plan implementation begins.

The HMWG will meet annually to identify funding needs for the implementation of mitigation strategies, evaluate the effectiveness of the plan, and develop new mitigation strategies to reduce loss from natural hazards. The HMWG must have core level of funding to facilitate their own activities as well as giving effect to key recommendations at the District/Block, Gram Panchayat level. Reporting to the State on all such Expenditure is also an annual obligation.

1.5.3 Monitoring and Evaluation

The National DMP calls for all DMPs to be updated annually through a process of stakeholder review and revision. It is proposed here that Uttarakhand State, the Districts and Sub-Districts undertake an annual assessment and adopt a reporting process on the status and progress made in implementing the strategies adopted in taking the respective DRMPs forwards. If formulated as a report card then this can be used as both a governmental and Institutional device to drive mitigation, planning and preparation processes and yielding political and funding benefits to support the continuation of the process.

For each strategy there is the need to determining an indicator of progress and success. It is international best practice for all strategies to have a monitoring and evaluation component so that progress can be measured and reported upon. Such a key performance indicator (KPI) needs to be defined using realistic time periods and a quantitative rather than a qualitative measure. For each strategy presented here a Key Performance Indicator (KPI) has also been provided is a measurable value that demonstrates how effectively the strategy is being achieved. These KPIs are indicative and need to be agreed and adopted as implementation part of the implementation process the relevant stakeholders.

2 STRATEGIES

2.1 Overarching Strategies for Tourism

DRM is undertaken as five basic and sequential tasks (UNEP 2008)

- 1 *Identifying hazard risks:* analyzing hazards resulting from a natural or manmade event, along with an understanding of the full range of probable effects and consequences.
- 2 *Assessing a community's vulnerability to the risk:* a community's vulnerability may be measured in terms of its size, geographic location, economic status, level of organization, and available resources; infrastructure, and response capability, among other factors. Its vulnerability will therefore depend upon the level of exposure and its capacity to adapt, respond to or recover from the hazard.
- 3 *Developing a preparedness and mitigation plan:* a plan will be required to address any institutional or systemic weaknesses, which could limit the destination or community's ability to mitigate disaster risks.
- 4 *Implementing the plan:* implementation may be simulated to ensure that the plan is workable during real disaster conditions. It is also important to document the lessons learned from the exercises in order to assemble a databank of learning, experience and information.
- 5 *Monitoring, evaluating, revising and updating the plan:* the information assembled provides essential learning for revising and updating the plan, correcting any areas of weakness or ineffectiveness, reallocating resources

These elements are not static but revolve around a continuous cycle of activity and interaction among the responsible and collaborating agencies. For such groups a common objective to reduce the probability for disaster occurrence is important. This is the framework used here in developing strategies for the hot spots.

For DRM in tourist hotspots, there needs to be very specific data internalized to the process. For example, when managing tourism disaster risks, the tourism value chain must be central to the planning and organization process. This needs to be understood so that all aspects of the DM plan can build the necessary links to the other relevant sectors and the broader community.

In the case of the Uttarakhand hotspots and elsewhere there is more than one tourism type and as a result there is more than one value chain that needs to be considered.

DRM needs to be adopted as a continuous cycle of activity and interlocation among the responsible and collaborating agencies, united by a common objective to reduce the probability for disaster occurrence.

In preparing a Tourism DM plan for individual locations the following key strategies need to be adopted:

2.1.1 Mitigation

STRATEGY	DRIVER	OUTCOMES	KPI
Establish a Tourism Disaster Management Committee (TDMC).	The TMDC needs to be led by the appropriate municipality and include representation from relevant government agencies, police, fire, govt. healthcare, the Army, highway construction, Dam construction, hotel association, tourist operators, restaurants, All India Radio, Met office, Water Commission, Gram Panchayat and community tourism representatives.	A TDMC with responsibility to ensure a TDMP is formulated, understood and implemented with an obligation to report to the respective city/ward and state government.	A committee established and appropriate TOR agreed and signed off on within 6 months.
Develop a Hazard Identification Prioritisation and Tourism Risk (HIPTR) assessment by mapping of hazard areas against tourist areas, activities and movements (vulnerable populations), to derive a level of exposure and value chain for each of the tourist categories ²	The development of a knowledge management system, which is regularly updated is an important first step. The DRMA data portal is a prime source for some but not all of the required data. A series of surveys will be required. Risk mitigation and management options need to be derived.	A risk assessment of which tourist, where and when they are exposed, as well as the exposure of the relevant service industries and secondary suppliers.	HIPTR to be drafted within 6 months of the TOR being finalized.
Establish a TDMC funding arrangement and resourcing to undertake technical aspects of the work.	The formulation of the HIPTR is going to be a specialized set of tasks that will require skills not already available in administration i.e. GIS, community consultation, undertaking a range of	A funded and resourced task team to undertake key elements of data collection, analysis and plan preparation.	A five-year funding plan to be established within 6 months of TDMC inception. Recruitment/contracting of key personnel within 3 months of TOR being signed

² There is a need to understand the risk profile in terms of loss of life and assets but also any additional risks including risks to tourism resources (e.g. biodiversity, water supply), plant and infrastructure (e.g. coastal resorts), business risks (e.g. supply disruptions, changes in insurance coverage), or market risks (e.g. changes in competitiveness through increased transportation costs).

	survey and economic evaluations. Specialist training may be required.		
Develop a Tourism Disaster Management Plans (TDMP) at all levels of jurisdictions, across departments, the industry and communities.	A TDMP is the basis on which all forward planning for mitigation and preparation is based. Risk mitigation and management options need to be assessed and adopted.	A well prepared and tested DMP that is regularly reviewed, amended and distributed.	DM Plans developed within 6 months of the drafted HIPTR, followed by annual reviews.
As part of the TDMP, increase public awareness, understanding, support & demand for hazard mitigation through the development of a city-wide sales and marketing strategy and campaign focused on building awareness and a "need to know" desire focused on key participants in the tourism sector.	Community awareness, preparedness and response capability is predicated on risk awareness and right response behavior. This process needs to be fast tracked and focused on.	A well informed tourism sector capable of planning for and responding to disasters at a level that will significantly diminish probable loss of life and assets.	A public awareness campaign designed and sponsored within 12 months.

2.1.2 Planning and Preparation

STRATEGY	DRIVER	OUTCOMES	KPI
Establish an integrated Hazard Emergency Warning System and awareness education for all tourists on arrival.	The warning or alarm elements of a EWS need to be simple in its approach and easy to understand so that public awareness is not compromised due to complexity.	A readily understood EWS notification system integrated to include all hazards and an indication of level of response needed.	EWS established within 12 months, awareness training and education material created and distributed as soon as W EWS activated.
Develop a Tourist DM Evacuation Plan (TDMEP) and ensure it is widely distributed and understood.	The TDMEP not only needs to be part of the mainstream processes of the city but tailored to the site characteristics associated with the tourism type. Signage (international/Multilanguage) and other awareness programmes to be developed.	A well prepared and tested TDMEP that is regularly reviewed, amended and distributed.	Development of the DMP within 12 months followed by regular annual reviews.

Emergency response testing (closing the gap).	Experience elsewhere shows that education and awareness does not guarantee the right responses nor in a timely manner. Response testing with tourists is not normally possible in terms of a training exercise but can be checked through questionnaires to assess understanding and to improve awareness. Such questionnaires can be used to also gain valuable feedback data on tourism processes.	An effective awareness programme tested against regular measures of understanding and response.	Annual survey reports based on awareness and response testing.
Develop damage assessment competency as part of the HIPTR process	As with all DMPs an understanding the damage the sector has suffered as a result of a disaster is fundamental to planning for future recovery and mitigation. In this case socio economic data are critical as is the need to present a realistic picture of the level of damage and functionality to tourist.	Competent assessors able to undertake evaluations with respect to infrastructure, socio-economic conditions, supply chain functionality.	Annual assessments as part of the overall TDM plan and assessment review
Seek out mechanisms to introduce both microfinance and micro-insurance opportunities relating to the tourism supply chain as a way to build resilience in the sector.	Both micro-finance and micro-insurance needs a lot of efforts to put in place such as onboarding authorities, re-insurers, local insurers and banks with their distribution channels. This takes time and effort but both have been shown to make a positive contribution in disaster situations towards improving livelihoods and building resilience as a result of readily available funding to help people and businesses get back on their feet.	A reduced dependency on post event State funding for compensation of loss to life, property, livelihood etc.	Annual assessment of share of people/buildings insured.
Develop a specific Hazard identification Prioritisation and Risk (HITR) assessment to deal with large numbers involved and the need for crowd control during response and initial recovery post an event.	There is a fundamental issue that comes out of the sheer numbers involved. Mass movement is a critical issue. Panic will be a major issue should a large hazard event occur and	An analysis focused on the primary recreational areas and a plan to manage congestion, choke points and potential solutions.	HIPR to be drafted within 6 months of the TOR being finalized.

	crowd control will be paramount as a first response capability in this situation. Focus needs to be on understanding temple capacity, inclusive of all waiting areas and develop plans to deal with this. Consider reasonable waiting time - compare with requirement and assess faster turnaround. Escape routes and safe places to be clearly identified.		
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2.1.3 Response

STRATEGY	DRIVER	OUTCOMES	KPI
Develop local warden skills in tourist guides and comparable staff in hotels, medical and police forces.	Language and cultural differences can vary amongst all tourists. Such traits are exacerbated under stress. As a result there is a need for designated wardens trained in suitable communications and cultural behaviors/understanding during emergency evacuation and response situations.	A well recognised and trained Warden task force capable of bridging both language and cultural gaps under emergency situations.	Evaluation of effectiveness under annual DM training programs.
Development of an international, national language and cultural aid database.	All countries are tied to international tourism with respect to their own citizens as a result of their proactive use of travel advisors and aid in time of crises. Understanding how to take advantage of both and to seek support in times of crises is an important resource for the management of the tourism sector and the region's perception in the market.	A resources database and communications process relating to foreign country tourists facilitating access to interpreter skills and travel advisory content.	An annual review of a database accessible through the TDM process.

2.1.4 Recovery

STRATEGY	DRIVER	OUTCOMES	KPI
Undertake tourism Sector damage assessment as part of the DM response process	An understanding of the damage the sector has suffered is fundamental to planning for future recovery and mitigation. Including the need to present a realistic picture of the level of damage and functionality to tourism within the market in order to minimize losses.	Competent assessment of the status and actions needed with respect to infrastructure, socio-economic conditions, supply chain functionality.	An immediate assessments as part of the overall DM response and recovery process with the first 6 months
Establish a Sector recovery plan including a media plan to inform national and international perceptions.	A sector recovery plan serves 2 functions. One is to ensure that the hardships associated post even recovery are minimized and the sector reestablishes it functionality as a soon as possible. The second it to advise the market of the real status of the sector as opposed to what is frequently reported in the media and in travel advisory's.	A well planned recovery minimizing socioeconomic losses and human hardship. A well informed national and intentional market as to the unfolding realities.	Number of returning tourist and the reestablishment of the supply chain on an initial 6 an then 12 monthly basis,.

2.2 Specific Strategies for Earthquakes

2.2.1 Introduction

Earthquakes of any magnitude in highly urbanized areas bring a particular challenge that means many people and much property is at risk as result of the high population and building density. Many - although not all - parts of Mussoorie are definitely in a category where serious loss to life and property damage demands full attention to both structural and non-structural solutions in reducing risk and improving resilience.

2.2.2 Earthquakes - Planning and Preparation

STRATEGY	DRIVER	OUTCOMES	KPI
Design & develop public education campaign for emergency preparedness & hazard mitigation for those who live & work in Mussoorie city and surrounds.	Just as DM needs to become mainstream in the thinking and actions of Government institutions so should Disaster response awareness in businesses and the community generally be integral to their daily lives. This awareness will then play a key part in reducing vulnerability, raising resilience and reducing impacts of a disaster as a result of people responding in a well informed and disciplined manner. Significant research ³ shows that “shock” from traumatic situations can be very debilitating but can be overcome through awareness and training.	Create community resilience through emergency preparedness & hazard mitigation awareness programs via communication channels such as TV, print, pamphlets, street plays etc.	An awareness campaign plan should be developed for 12 months.

³ See for example: Laurence Gonzales, *Deep Survival*, 2017;

Increase the community resilience by expanding the number of Community Emergency Response Teams (CERT) in Mussoorie City and surrounds.	CERTS are seen as excellent first responders as they are first on-site, have in-depth knowledge of resources and victim location likelihood, strongly motivated and effective networks. Funding remains an issue. As per the guidelines of GOI, 10% of State Disaster Response Fund (SDRF) can be spent on Training & capacity Building programs; Every DDMA needs a yearly allocation out of SDRF for this purpose.	Increased community resilience through first response capability by community members.	Formation of CERTS within 6 months & their training. follow-up trainings every 3 months.
Modify evacuation plans to incorporate City Public Safety Agencies such as Police & Fire, Health departments.	Evacuation plans need to be developed hazard specific & in consultation/collaboration with the specialized agencies.	A well updated & documented evacuation plan can reduce the life loss.	Ongoing process.
Train employees & practice City Facility Evacuation Plans.	The evacuation plans need to be well disseminated amongst community, business community, schools, city facility centers , offices.	Increases community resilience	Ongoing process. Practice every 3 months.

2.2.3 Earthquakes - Mitigation

STRATEGY	DRIVER	OUTCOMES	KPI
Strengthen planning, management and regulation of EQ risks on infrastructure through improved understanding of existing and future risk (data) to private and public infrastructure, transport and communications.	Several State & National level Institutes/ Organizations in the State, are engaged in the researches concerning hazard zonation & risk/vulnerability assessment of the State, however the recommendations/ results of the studies are not commonly available to the concern authorities.	Preparation & updating of Hazard Zonation maps of the City as the basis to planning and preparation procedures and training simulations.	Complete within a three year period mapping of all areas in the City with annual reporting of progress against an agreed plan of priority areas.

	Mapping should be done on a priority area basis focused on high density or vulnerability areas first.		
Review current building standard compliance and develop mechanisms to strengthen levels of compliance.	Enforcement of the most current Building Codes Standards to protect the built environment in the City is required as is retrofitting. The State has amended building by-laws and the Town & Country Planning Act, however due to non-compliance/ or lack of enforcement by the concerned authorities, the habitation of unsafe/high risk areas is expanding.	Effective compliance to building codes and statutory planning zonation and codes for the City and surrounds,	Ongoing process. Review every 6 months by State Govt.
In line with the overarching strategy to audit lifeline buildings, formulate a policy for retrofitting of existing public facilities & services according to contemporary standards.	The seismic safety of all lifeline buildings must be assessed in a time bound manner. A approach should be to selectively retrofit lifeline structures and buildings on the basis of priorities to be fixed by the Govt.	A detailed & comprehensive safety assessment of buildings/ structures to determine type of retrofit technique.	Assessment should be completed within 3 years.
Enforce Earthquake Safe Construction Technology in the City and incentivize with insurance benefits and/ or utility access.	All departments/ agencies must ensure that construction undertaken by their depts. and agencies under their control strictly comply with the standards & specifications prescribed by the Bureau of Indian Standards & further included in the NBC.	Appropriate mechanism for compliance & review of all construction designs submitted to ULBs/ Development Authorities/ construction agencies.	Ongoing process
As part of the overall awareness campaign, emphasize reduction of non-structural hazards in homes, schools, business centers & offices of the city.	Significant harm can occur to people in situations where non-structural hazards fall onto them during an earthquake. Awareness and subsequent repositioning/fastening etc. can significantly reduce the risks of damage.	Improved resilience to harm and likely damage as a result of awareness and small amounts of preparation/investment.	Ongoing process

2.2.4 Earthquakes – Response

See strategies listed in Overarching Strategies above.

2.2.5 Earthquakes - Recovery (Short & Long Term)

See strategies listed in Overarching Strategies above.

2.3 Specific Strategies for Landslides

2.3.1 Introduction

Landslides (including rock falls) are a common geohazard and although frequently considered a secondary consequence of earth quakes co-seismic landslides are not uncommon and can be of great consequence. They are also caused by flooding, heavy rain and hydraulic soil changes, land clearing and infrastructure development such as dams and roads landslides. Apart from directly threatening life and property, in road systems they can cause frequent long periods of obstruction with all the direct and indirect consequences experienced by what are frequently poor or already marginalized communities. Landslide dams can lead to upstream flooding, downstream flash flooding when breached, bank erosion and silting of dams. Note that “landslide” is generic term for a range of slope failure processes including rock falls, slides, slumps, flows and a combination of failures leading composite or complex movements. As such it requires considerable skill and technical support to map high risk areas and propose mitigation strategies. Particular reference with respect to a broad understanding of landslides should be made to Parkash Surya (2012). Training Module on Comprehensive Landslides Risk Management. National Institute of Disaster Management, New Delhi - 110002, Pages 282.

....In Nepal, there was a six-fold increase in landslide fatalities (from 20 to 120 on average per year, the average for the last five years is 152 deaths per year) between 1978 and 2005. A primary driver of this increased mortality has been a deadly combination of an increase in poorly constructed roads with more intense monsoon rains due to climate change.

(see: <http://blogs.worldbank.org/endpovertyinsouthasia/minimizing-risks-caused-geohazards-south-asia>)

2.3.2 Mitigation Strategies

STRATEGY	DRIVER	OUTCOMES	KPI
Identify the location & extent of landslide hazard areas in the city and surrounds.	Preparation & updating of Hazard Zonation maps of the City is required, which includes updating & maintenance of current maps of areas within the City that are subject to mass movements;	A basic tool for development planning.	Mapping exercise within 24 months.
Determine the level of risk presented by the existing development in landslide prone areas	Protect existing development in landslide prone area, which includes:- Provide information to residents on landslide prevention, retain & restore existing vegetation, avoid certain	Risk management strategies to protect property and life including advising all	Avoid construction for next 5 years.

and develop a landslide Risk Management Plan.	activities by private owner on landslide prone properties and construct debris flow diversion to protect existing properties.	owners and relevant City and Government agencies.	
Establish an assessment and approval process for all structures approved for construction in landslide zones.	Stringent planning and design requirements in landslide-prone and unstable areas need to be imposed.	Significant reduction in life and property loss as well as costs and social trauma associated with landslides.	Ongoing process.
Within the Land slide Management Plan there is a need to assess and manage hydraulic drivers for landslides.	Maintenance of public & private drainage system is a critical part of landslide prevention. This includes:- ensure that culverts, nalahs are inspected & cleared prior to rainy season each year; encourage pervious, and minimize impervious surfaces to reduce storm water runoff.	Increased resilience to land slide risk as a result of knowledge, planning and information transfer as well as active management of hydraulic structures.	Ongoing process.

2.3.3 Planning and Preparation

STRATEGY	DRIVER	OUTCOMES	KPI
Develop emergency response procedures as part of the City and surrounds Landslide Managements Plan.	Having understood areas of highest risk it becomes critical to then generate emergency response scenarios and plan for suitable responses.	An increased level of awareness leading to mitigation and improved preparation for response to landslides.	Establishment of response structure, tested annually.
Design & develop public education campaign for emergency preparedness & hazard mitigation for those who live & work in affected areas.	By creating awareness amongst exposed populations there may be a mitigation effect and also an improved resilience as a result of people understanding what has happened and how to respond.	An improved resilience as a result of people understanding what has happened and how to respond.	Ongoing process.

2.3.4 Planning for the Growth of Rural Adventure and Trekking Tourism

Adventure tourism such as mountain climbing, white water rafting, mountain biking and summer trekking are all growing in popularity worldwide. This is well recognised by Uttarakhand State (Vision 2022) and Government of India (GOI). The Ministry of Tourism, GOI, has published a *BASIC MINIMUM STANDARDS FOR MOUNTAINEERING* which covers, for tour operators, both the required certification and the essentials to be covered in an operating SOP. The Standard applies to a range of relevant activities including mountain climbing, trekking, zip wires and high ropes courses, rock climbing artificial wall climbing and abseiling, all-terrain vehicle (ATV), horse safaris, skiing/snowboarding, mountain biking, parasailing, skydiving, hang gliding/paragliding, hot air balloon, water sports, rafting and river cruising. For each activity there are specifics with respect to the requirements for dealing with Emergencies and Risk Mitigation.

On the premise that the SOPs and other requirements are met the instructors and guides are well trained in emergency response and first aid as well as appropriate evacuation methods.

The Standard makes no mention of Disaster Risk Management but this could be easily incorporated at a local level by authorities working with the operators to plan relevant evacuation (escape routes). At the same time, the guides and instructors would make excellent first responders given their training and experience of operating in arduous conditions.

Within the Mussoorie block the bulk of the tourism is changing from many days to shorter visits of a day through to several days only. The extent of adventure tourism associated with this changing tourism scene needs to be understood against the background of economic and where and when such activities are taking place. Experience elsewhere shows that increasing leisure by the overall change in economic circumstances and the closeness to centers of major urban growth (Dehradun and New Delhi) will see a continual pressure to increase access to adventure tourism and the exact nature of this, the associated investment and disaster risk, cannot be understood without persistent surveys and analysis.

Adventure travel involves exploration or travel to remote exotic areas. Adventure tourism is rapidly growing in popularity as a tourist seeks different kinds of vacations. Any constructive activity which tests the endurance of both a person and his equipment to its extreme limit is termed as Adventure.



Ministry of Tourism Government of India

STRATEGY	DRIVER	OUTCOMES	KPI
Develop an inventory of existing adventure tourism, its operators and the level of present	The present extent of existing adventure tourism in Mussoorie is not understood. This	A clear understanding of the existing level of adventure tourism in Mussoorie as the basis to mitigation and response planning	An assessment completed within 12 months, with seasonal survey

regulation and skills present in the Mussoorie block	needs to be the starting point in an evaluation and mitigation planning process		complete twice a year on an ongoing basis.
Develop a strategic economic analysis and planning approach to the growth of adventure tourism in anticipation of the likely impacts on both the economy, the infrastructures of Mussoorie and DRM needs.	The changing nature of tourism generally and adventure tourism specifically in Mussoorie is not understood in detail, nor is the associated value chain and where future investments will be.	An increased understanding of the role of adventure tourism in the economic growth of Mussoorie leading to mitigation and improved preparation for response to disaster risk	Ongoing process, reviewed annually
Assess and develop Disaster Risk Management capability of adventure tourism operators as auxiliary first responders, through assessment, regulation, additional training and maintenance of a contact and capability data base.	It is important to determine level of capacity the National SOPs and other requirements are met by the local instructors and guides in terms of how well trained they are in emergency response and first aid as well as appropriate evacuation methods.	An inventory of local instructors and guides in terms of how well trained they are in emergency response and first aid as well as appropriate evacuation methods.	Establishment of response capability assessed annually. Development of and implementation of annual plans to strengthen capability

3 LINKS TO NATIONAL AND STATE LEVEL PLANS

Sendai Framework

www.unisdr.org/we/coordinate/sendai-framework



National Disaster Management Plan

www.ndma.gov.in/en/national-plan.html



Uttarakhand State Disaster Management Authority

www.usdma.uk.gov.in



Uttarakhand State Disaster Management Plan

www.dmmc.uk.gov.in/files/pdf/complete_sdmap.pdf

Disaster Risk Assessment of Uttarakhand

Project Information Sheet

OVERVIEW

With support from the World Bank, the Uttarakhand State Government has engaged experts to complete a disaster risk assessment of the entire state so that it can understand the threat from natural hazards and the exposure of communities and critical infrastructure. This is the first attempt to develop an integrated disaster risk inventory for the state and is viewed as an important step to support the recovery efforts and to underpin future decision-making and planning.

This report is one of the outputs from the risk assessment and presents risk mitigation strategies for a location of high risk in the state. It serves as a case study for similar locations throughout Uttarakhand.

WHAT RISKS HAVE BEEN ASSESSED AND HOW?

This project assessed the threat and potential consequences of **flooding** (both fluvial and flash floods), **earthquakes**, **landslides**, and **industrial hazards** in Uttarakhand. It developed a comprehensive inventory of data for hazards and assessed the likelihood and consequence of these hazards in the future.

This hazard assessment adopted proven tools preferred by the World Bank for assessing risks, and the team collated existing data and completed field surveys to build up a strong profile of vulnerability and exposure across the state.



One of the tools is CAPRA. It is a software suite that is a free, modular, open-source, and multi-hazard tool for risk assessment. CAPRA provides a risk calculation platform integrating exposure databases and physical vulnerability functions under a probabilistic approach. CAPRA evaluates risk in terms of physical damage and estimates direct economic and human losses.

HOW WILL THE PROJECT BENEFIT UTTARAKHAND?

The outcomes from this project will help Uttarakhand to develop its resilience to natural and industrial hazards. The information will be used by the State Disaster Management Authority to support recovery efforts and future master planning. It will help them prioritise activities and investments in infrastructure.

The system deployed for is easy to maintain and manage and will add value for the State Government and communities. The team looks forward to engaging with local experts and stakeholders to understand the vulnerabilities and exposure of communities across the state.

THE TEAM

The project was completed by technical implementation experts from the following partner organisations:



www.dhigroup.com



www.ern.com.mx



www.ait.ac.th



www.earthobservatory.sg



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Track the project activity at:

www.facebook.com/UttarakhandDRA



PROJECT PROGRAMME

The project started in May 2016 and concluded at the end of October 2018.