

The Ready2Respond Rapid Diagnostic: An Emergency Preparedness and Response Capacity Assessment for Himachal Pradesh

Final Report & Investment Proposal



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Abbreviations

ALS	Advanced Life Support
API	Application Programming Interface
BBB	Build Back Better
BLS	Basic Life Support
BMTPC	Building Materials and Technical Promotion Council
CBRN	Chemical, Biological, Radioactive, Nuclear
CSSR	Collapsed Structure Search and Rescue
CWC	Central Water Commission
DDMA	District Disaster Management Authority
DDMC	District Disaster Management Centre
DDRF	District Disaster Response Force
DEOC	District Emergency Operation Centre
DFO	District Fire Officer
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
DSS	Decision Support System
DVA	Detailed Vulnerability Assessment
EMRT	Emergency Medical Response Team
EP&R	Emergency preparedness and response
ESF	Emergency Support Functions
EWS	Early Warning Systems
FSI	Forest Service of India
GIS	Geographic Information Systems
GLOF	Glacial Lake Outburst Flood
GPS	Global Positioning System
IDRN	Indian Disaster Resource Network
IIRS	Indian Institute of Remote Sensing
IMD	Indian Meteorological Department
IMS	Information Management System
MBT	Main Boundary Thrust
MCT	Main Central Thrust

MHA	Ministry of Home Affairs
MoHUPA	Ministry of Housing and Urban Poverty Alleviation
MOU	Memorandum of Understanding
MTA	Market Trader Association
NBC	National Building Codes
NDMA	National Disaster Management Act
NDMP	National Disaster Management Plan
NDRF	National Disaster Response Force
NFSC	National Fire Service College
NGO	Non-governmental Organisation
NPD	National Policy on Disaster Management
PCDRM	People Centred Disaster Risk Management
PWD	Public Works Department
QR	Quick Response
RBW	Restricted Building Work
RIP	Risk Informed Programming
RVA	Rapid Visual Screening
RWA	Residential Welfare Association
SDMA	State Disaster Management Authority
SDRF	State Disaster Response Force
SEC	State Emergency Committee
SEOC	State Emergency Operations Centre
SFAC	Standing Fire Advisory Committee
SMS	Short Message Service
SOPs	Standard Operating Procedures
SVA	Simplified Vulnerability Assessment
UGRIP	Uttarakhand Green Resilient Inclusive Development Project
UK-SDRF	Uttarakhand State Disaster Response Force
USD	US Dollars
VC	Video Conference
WBG	World Bank Group

Executive Summary

In 2023, the World Bank commissioned an assessment of emergency preparedness and response capacities and capabilities within the Indian states of Uttarakhand and Himachal Pradesh using the Ready2Respond (R2R) diagnostic methodology. Based on the findings produced by the assessment, a series of recommendations were made for priority emergency preparedness and response (EP&R) investments at the state level. This report describes the assessment of Himachal Pradesh EP&R capacities and capabilities and the associated recommendations for priority investments.

The Ready2Respond (R2R) diagnostic

The R2R methodology is designed to provide an objective, data-driven foundation to engage stakeholders on EP&R development. It builds on the five core components of EP&R:

1. Legal and institutional frameworks
2. Information
3. Facilities
4. Equipment
5. Personnel

Each of these are further divided into 18 criteria, 71 indicators and 360 attributes.

R2R diagnostic results for Himachal Pradesh

The R2R diagnostic generated an overall score of 157 out of 360 for the state of Himachal Pradesh. The scores range widely across each of the criteria examined, with the lowest scores obtained for Emergency Operations Centres, and logistics, warehouses, and response stations.

The R2R diagnostic process reveals that despite a vast number of improvements being made to support EP&R capacities within the state, clear development needs remain. Improvements in multi-stakeholder coordination for response are required to support response efforts requiring multiple actors during large scale disaster events given the vast hazard profile present within the state. Major challenges within the state also include establishing well-developed facilities for the delivery and coordination of response efforts, a joint understanding of disaster risk management planning across EP&R actors, resource tracking both within and between departments and personnel capacity growth.

Investment Plan

The recommendations put forward from this analysis amount to an investment total of 12,478,000 USD. Recommended activities are prioritised into a set of priority groupings each designed to produce a step-change in the EP&R capacity present within the state. This is summarised in the table below.

The largest return-of-investment from the projects identified within this project is expected to be obtained when the full investment plan is followed, projects are programmatically

connected, and a process of institutional capacity development is undertaken. Only then will the program results be greater than the sum of the isolated elements.

Simultaneous to investments in development projects, the government is advised to structurally grow personnel budget and hire and train new personnel in order to absorb the new projects, facility creation, data management and other tasks associated with the maturing system. The government is also advised to budget for maintenance and replacement of equipment and facilities at the end of the expected life span.

Table ES-1: Investment priorities of suggested projects

Priority	Suggested Project	Target Institution	Component	Cost estimate (USD)
Priority 1	<u>Support improved understanding of disaster risk management planning, multi-stakeholder collaboration and the creation of departmental DRM plans and associated operational SOPs</u>	The State Disaster Management Authority (SDMA), the State Disaster Response Force (SDRF), the Fire Service, the Forest Department, the Medical Health and Family Welfare Department, the Home Guards and Civil Defence	Legal and institutional frameworks	220,000
	<u>Support increased DRM training courses for governance officials</u>	The State Disaster Management Authority (SDMA) and Governance officials within the state and district government	Information	140,000
	<u>Support the creation of a dedicated State Emergency Operations Centre (SEOC)</u>	The State Disaster Management Authority (SDMA)	Facilities	1,500,000
	<u>Support the strengthening of disaster risk management capacities within the Medical Health and</u>	The Medical Health and Family Welfare Department	Facilities	1,010,000

Priority	Suggested Project	Target Institution	Component	Cost estimate (USD)
	<u>Family Welfare Department through the creation of a dedicated command-and-control room and the conductance of an in-depth critical infrastructure assessment.</u>			
	<u>Support the strengthening of the HP-SDRF through the creation of a command-and-control room and the provision of dedicated response stations and storage facilities</u>	The State Disaster Response Force (SDRF)	Facilities	2,500,000
	<u>Support the strengthening of the Fire Service through the creation of a command-and-control room and the conductance of an in-depth critical assessment of available response stations</u>	The Fire Service	Facilities	1,010,000
	<u>Support strengthening of the Forest Department through the creation of a command-and-control toom, improved storage facilities and the provision of mobile support facilities</u>	The Forest Department	Facilities	2,090,000
	<u>Support an in-depth critical assessment of equipment levels within the Forest Department</u>	The Forest Department	Equipment	210,000

Priority	Suggested Project	Target Institution	Component	Cost estimate (USD)
	<u>Support an in-depth critical assessment of equipment levels within the HP-SDRF</u>	The State Disaster Response Force (SDRF)	Equipment	210,000
	<u>Support an in-depth critical assessment of equipment levels within the Fire Service</u>	The Fire Service	Equipment	210,000
	<u>Support an in-depth critical assessment of the Fire Hydrant System operationalised by the Fire Service</u>	The Fire Service	Equipment	210,000
	<u>Strengthen the operational personnel structure of the SDMA</u>	The State Disaster Management Authority (SDMA)	Personnel	120,000
	<u>Strengthen the operational personnel structure of the Fire Service</u>	The Fire Service	Personnel	120,000
	<u>Support improved training and capacity building within the HP-SDRF</u>	The State Disaster Response Force (SDRF)	Personnel	144,000
Priority 1 total:				9,694,000
Priority 2	<u>Support the increased use of social media within EP&R departments</u>	The State Disaster Management Authority (SDMA), the State Disaster Response Force (SDRF), the Fire Service, the Forest Department, the Medical Health and Family Welfare Department, the	Information	48,000

Priority	Suggested Project	Target Institution	Component	Cost estimate (USD)
		Home Guards and Civil Defence		
	<u>Support capacity growth to monitor and forecast hydro-meteorological disasters within the SDMA</u>	The State Disaster Management Authority (SDMA)	Information	240,000
	<u>Creation of an interoperable resource tracking database between departments and strengthening of the IMS</u>	The State Disaster Management Authority (SDMA), the State Disaster Response Force (SDRF), the Fire Service, the Forest Department, the Medical Health and Family Welfare Department, the Home Guards and Civil Defence	Information	1,426,000
	<u>Support strengthening of the shelter system</u>	The State Disaster Management Authority (SDMA)	Facilities	150,000
	<u>Support the provision of a wireless communication system for the Forest Department</u>	The Forest Department	Equipment	130,000
	<u>Improved training programs for disaster risk management within the Medical Health and Family Welfare Department</u>	The Medical Health and Family Welfare Department	Personnel	150,000
	<u>Improved training and capacity building of response departments</u>	The State Disaster Management Authority (SDMA), State Disaster	Personnel	400,000

Priority	Suggested Project	Target Institution	Component	Cost estimate (USD)
		Response Force (SDRF), the Fire Service, the Forest Department, the Home Guards and Civil Defence, the Medical Health and Family Welfare department		
	<u>Strengthening of the exercises and drills program</u>	The State Disaster Management Authority (SDMA)	Personnel	240,000
Priority 2 total:				2,784,000

1 Introduction

The Ready2Respond (R2R) framework was designed to improve national, sub-national and city resilience mechanisms and protects development gains through investments in emergency preparedness and response (EP&R) systems informed by the encompassing City Resilience Program (CRP) and other World Bank platforms. The purpose of the framework is to provide a knowledge base for the generation of more targeted guidance and reference materials for task team leaders and their clients regarding EP&R programs, and to inform future World Bank Group (WBG) operations and technical assistance to countries (GFDRR, 2017).

1.1 This report

This report includes the assessment of the EP&R capacities of Uttarakhand based on the R2R methodology as designed by the World Bank and executed by JBA Consulting. Data from a desk review and key informant interviews conducted within in-person field missions resulted in the generation of findings on the five components of the diagnostic tool- legal and institutional frameworks, information, facilities, equipment, and personnel—which include 18 criteria, 72 indicators, and 360 attributes in total.

This report provides a summary of the EP&R capacities per component, structured in accordance with the R2R methodology. The report also identifies and makes recommendations about key investments that the World Bank and other stakeholders can consider as they seek to strengthen EP&R capacities in Himachal Pradesh.

1.2 State risk profile

Himachal Pradesh is highly vulnerable to a multitude of hazards including earthquakes, landslides, floods, flash floods, cloudbursts, glacial lake outburst floods (GLOF), avalanche, lightning, and fire. In the past Himachal Pradesh has experienced numerous disaster events of varying magnitudes which have resulted in significant damage and loss.

Climate change is expected to significantly increase the magnitude and frequency of floods, flash floods, cloudbursts, GLOF and fire events within the state. Himachal Pradesh has also been identified as a potential site for a catastrophic earthquake in the future.

The physical vulnerability of the state has been further exacerbated by ongoing anthropogenic practices, including rapid population growth, uncontrolled urbanization, ecological degradation, deforestation, and industrialization.

2 Methodology

This assessment utilises the Ready2Respond Rapid Diagnostic to provide an objective, data-driven foundation to engage stakeholders on emergency preparedness and response development. It builds on the five core components of emergency preparedness and response shown in Figure 2.1: legal and institutional frameworks, information, facilities, equipment, and personnel.

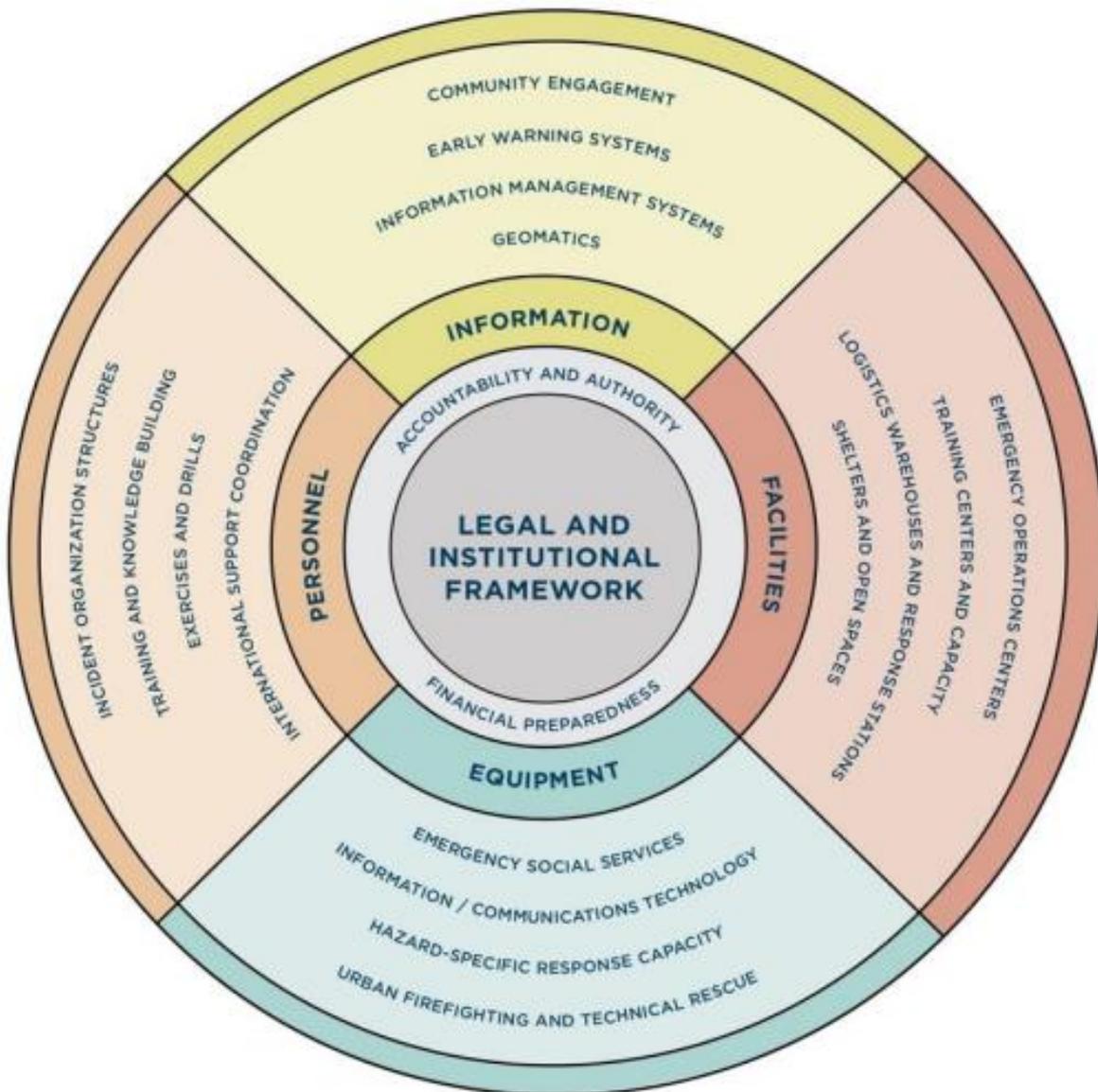


Figure 2-1: Emergency preparedness and response system core components according to the Ready2Respond Framework

Each component is measured by a set of criteria that addresses an aspect of a functional EP&R system for a given jurisdiction. In addition, 72 indicators related to 360 attributes have been developed to score each criterion.

2.1 Stakeholders

The stakeholders engaged within this project contained within the State of Himachal Pradesh consists of:

- The State Disaster Management Authority (HP-SDMA)
- The State Disaster Response Force (HP-SDRF)
- The Fire Service, Himachal Pradesh
- The Forest Department, Himachal Pradesh
- The Home Guards and Civil Defence, Himachal Pradesh
- The Health and Family Welfare Department.

3 Overall R2R results

The R2R methodology’s 360 attributes represent elements of the EP&R system that should be in place for a system to be considered as fully mature. To support an overall understanding of the relative weakness or strength of elements in the EP&R system, the average score for each of the five components and 18 criteria have been calculated and transposed to scales from 0 (absent) to 5 (fully in place). These are listed in Table 3-1 and Table 3-2 and graphically represented in Figure 3-1.

Table 3-1: Average EP&R component scores for Himachal Pradesh

	Component	Score (0-5)
1	Legal and institutional accountabilities	2.98
2	Information	1.71
3	Facilities	1.49
4	Equipment	2.42
5	Personnel	2.68

Table 3-2: Average EP&R criterion scores for Himachal Pradesh

	Criterion	Score (0-5)
Legal and Institutional Accountabilities		
1.1	Legislated accountabilities	3.80
1.2	Financial preparedness	2.15
Information		
2.1	Community engagement	2.24
2.2	Early Warning Systems	1.83
2.3	Information Management Systems	1.31
2.4	Geomatics	1.46
Facilities		
3.1	Emergency Operations Centres	0.88
3.2	Training centres	2.43
3.3	Logistics, warehouses, and response stations	0.95
3.4	Shelters and open spaces	1.71
Equipment		

	Criterion	Score (0-5)
4.1	Emergency social services	3.13
4.2	Information and communications technology	1.19
4.3	Hazard-specific response capacity	2.50
4.4	Urban firefighting and technical rescue	2.88
Personnel		
5.1	Incident organization structures	2.46
5.2	Training and knowledge building	2.50
5.3	Exercises and drills	2.85
5.4	International support coordination	2.92

The results of the diagnostic process show that improvements are required across the EP&R spectrum within the state of Himachal Pradesh.

Although the legislated accountabilities criteria within the framework appears to perform strongly within the diagnostic process, obtaining a score of 2.98, this is not believed to reflect the on-the-ground reality of the situation. There is a need to improve understanding and multi-stakeholder collaboration within disaster risk planning activities to overcome current perceptions that such efforts are siloed under that of the SDMA and DDMA's. Multi-stakeholder operational response plans and SOPs should also be strengthened to ensure a consolidated response. This is to provide increased institutional capacity and provide a bridge to grassroots efforts towards effective disaster risk management.

The Information component of the R2R diagnostic is identified to be a key area of improvement with an overall score of 1.71. Within this component, community engagement is found to need significant enhancement through improved community outreach conducted by departments through innovative methods such as increased use of social media similar to the successful awareness programs of the SDRF, and investments in community capacity for response. Improvements to the early warning systems in place are also required, through development of improved hazard and risk assessment, the establishment of improved systems for monitoring and forecasting and enhanced dissemination and communication systems. Information Management Systems were found to be a significant area for investment, reflected in a score of 1.31 within the diagnostic. Consolidated databases within each of the departments, capable of interoperability with state level systems operationalized by the SDMA were found to be required alongside increased multi-stakeholder usage of a strengthened IMS and associated DSS. This will allow improved risk-informed decision making of managers present within the EP&R system, improved multi-stakeholder coordination and resource sharing and subsequent consolidation of response efforts. This should further be supported by increased usage of GIS within the

EP&R system, requiring associated increased technical capacity building within each of the departments.

The Facilities component of the R2R diagnostic obtained an overall score of 1.49 on the diagnostic demonstrating that improvements are required. Emergency Operations Centres obtained a score of 0.88 on the diagnostic, reflecting a key need for targeted investment to improve the capacity for command and control within the EP&R system. Currently, the State Emergency Operations Centre (SEOC) operates out of a temporary, make-shift facility and is staffed on a temporary basis, limiting the ability of the SDMA to conduct monitoring of evolving emergency situations and build capacities during ex-ante periods despite being identified as the nerve-centre for such operations within the state disaster management plan. Command and control rooms are similarly lacking within the SDRF, the Fire Service and the Forest Department, limiting their ability to consolidate response efforts across their networks, provide logistical support to those in the field and establish effective command attributions during ex-ante periods.

Logistic, warehouses and response stations similarly obtain a low score of 0.95 on the diagnostic, demonstrating a need for investment and system strengthening. Currently, the SDRF are heavily constrained in this regard owing to a lack of dedicated facilities for their use. This should be addressed as a matter of urgency through the designation of three sites for the creation of storage facilities and response stations for each of their three battalions located in Shimla, Kangra and Mandi to support their growth beyond their infancy and allow formulation into a well-equipped and effective force for response. Similar storage facilities are also required within the Forest Department to enhance wildland firefighting capacities and capabilities, with equipment currently stored in the beats with a lack of organisation limiting the potential for rapid deployment in times of emergency, Within the Medical Health and Family Welfare Department the fundamental limitation placed on effective service delivery is identified to be that of building restraints, requiring an in-depth assessment of pre-existing facilities and identifying the best-way to utilise available space. Within the Fire Service additional response stations are also found to be required to keep pace with the rapid urbanisation occurring within the state and provide an adequate level of service delivery following a detailed assessment of current population demographics, encroachment and response times.

The Equipment component of the diagnostic performs relatively strongly on the diagnostic, obtaining a score of 2.42. Within this component emergency social services are found to be well established, however a lack of awareness similar to that of the shelter system was found amongst the stakeholder departments requiring increased training and awareness building of field personnel. Information and communication technology obtained a score of 1.19 reflecting a need to provide the Forest Department with a wireless communication system with personnel currently relying on WhatsApp for coordination in the field despite the difficulties and delays in communication often experienced owing to the steep hillsides present within the state. Within the indicator for wildland firefighting capabilities, basic capabilities, equipment, and personnel to suppress localized and contained wildland fires were found to be notably absent, reflected in the score of 2.75 obtained within the

diagnostic. There is thus a need to provide additional equipment to the Forest Department to facilitate an effective response to forest fires.

Capabilities for flood and water-based emergency rescue were similarly found to be constrained within the SDRF owing to a lack of trained deep-sea divers or personnel trained in advanced rescue techniques and a lack of equipment to support rescue during floods or water-based emergencies. Additional equipment is also required within the SDRF for structural collapse and entombed rescue and should be provided following an in-depth assessment of the operational condition of current equipment possessed by the department. Capabilities for urban firefighting were found to be relatively well established within the state. However, additional equipment is also required following an in-depth assessment of current equipment levels, assessing the wear and tear of current equipment in operation and proposing additional equipment based on new technologies available for use in the field. In addition to improvements required in the availability of equipment, there is also an urgent need to reform the hydrant network system in operation to support the Fire Service in providing an effective response to incidents of fire. The hydrant system is a key concern, with hydrants within the current system often failing to maintain adequate fire pressure and subsequently limiting the effectiveness of response operations.

The Personnel component of the R2R diagnostic obtained an overall score of 2.68, reflecting the need to provide strengthen in related areas. Within the incident organisation structures improvements were found to be required within the SDMA its SEOC to provide relevant hazard teams as well as increased technical experts in GIS and forecasting. Within the Fire Service, available manpower was also found to be a key area of concern with an urgent need to review current manpower levels dedicated to operationalising each of the posts contained within their network. Additional manpower was also found to be required within the Forest Department to provide effective capacity for forest fire response with 25% of frontline worker positions currently identified to be vacant.

Training and capacity building obtained a score of 2.50 on the diagnostic, reflecting a need to support the departments through targeted investment to support continual growth in terms of technical capacity. Such support should include the creation of dedicated training management teams tasked with conducting training needs assessments specific to individual technical teams within their departments, the introduction of improved annual training calendars and inter-operable rosters of response personnel. Similarly, despite obtaining a score of 2.85 on the diagnostic, the exercises and drills program within the state was also identified to require significant strengthening with the current program found to be ineffective and lacking the integration of live exercises.

The international support coordination indicator received the lowest score within the diagnostic process of 1.88. Given that such activities are carried out at the national level, this was not identified to be a key area for targeted investment within the state.

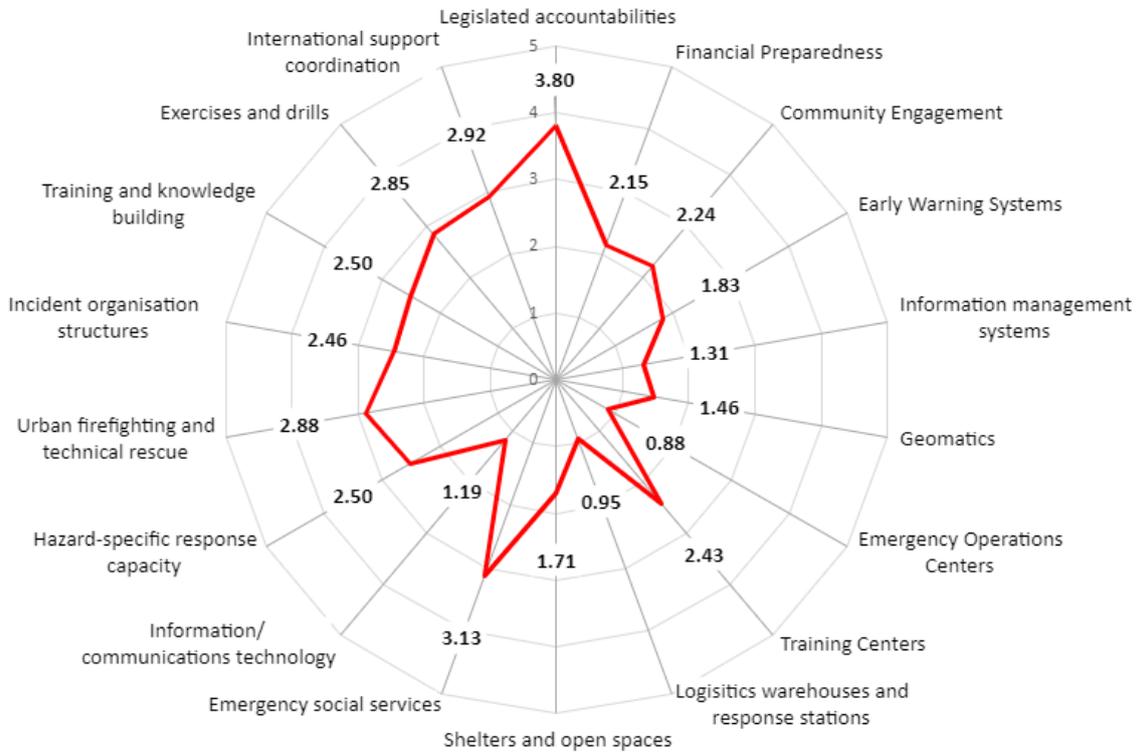


Figure 3-1: Diagnostic scores for Himachal Pradesh

4 Legal and institutional Frameworks

4.1 Component overview

Internal and external clarity about the role of various public and private agencies is critical during disaster and emergency response. Where ambiguity exists, inefficiency and jurisdictional overlap are likely, and human and economic losses may be greater than they would otherwise be.

Improving clarity about institutions' preparedness and response roles can be a potential means to improve resilience at various levels of government. Further clarity about roles ensures that World Bank investments in capacity do not lead policy but instead that policy comes first, with timely financial and technical support provided to the most relevant agency.

Accountabilities should be clearly enshrined in legislation with directive regulations. Where possible, coordinated policy instruments should identify the operational expectations for agencies assigned a preparedness and response mandate. However, even in the absence of complete organizational clarity, investment in preparedness and response can often improve a jurisdiction's ability to mitigate impacts and limit disaster- and emergency-related losses (GFDRR, 2021).



Figure 4-1: Scoring for legal and institutional accountability, Himachal Pradesh

4.2 Component conclusions

Emergency Management Legislation

The results of the diagnostic tool show that great improvement to emergency management legislation has been undertaken within the state, with both state level disaster management plans and associated district level disaster management plans currently in place. However, despite the existence of such plans, there is an enduring perception within stakeholder departments that the responsibility for their creation and application is siloed with the SDMA and DDMA. Enhanced understanding of disaster risk management planning within response agencies is thus required to enhance existing policies, strategies, and other measures to prevent new disaster risk, reduce existing disaster risk and manage residual risk (through disaster preparedness, response, and recovery), contributing to the strengthening of resilience and reduction of disaster losses to a multitude of hazards.

Operational response plans

Improvements to multi-stakeholder operational response plans are required to support improved stakeholder coordination and collaboration across horizontal and vertical institutional networks of the EP&R system. Current high-level guidance produced within the State and District Disaster Management Plans and associated 'Emergency Support Functions' of response agencies should be strengthened to provide increased details of how stakeholders should interact and coordinate during a disaster event to provide an effective and consolidated response.

Current practices of stakeholder collaboration are described as that of 'basic interaction' requiring strengthening between all stakeholders of the EP&R system. Despite preparedness and response activities being undertaken within individual stakeholder departments, such activities are found to be lacking in coordination with those undertaken in other departments. Although resources may be shared through requests made by the district administration during a disaster event, multiple stakeholders expressed the opinion that they currently function as separate entities with a distinct lack of shared resources and planning. Addressing this lack of collaboration could contribute to achieving a consolidated response and system strengthening.

Within the State Disaster Management Plan (State Government of Himachal Pradesh, 2017) expected roles and responsibilities of the SDMA, and DDMA are outlined, in addition to expectations of other response agencies through the provision of emergency support functions during a disaster. Similar SOPs for the DDMA are also provided within the relevant district disaster management plans. Despite the existence of these high-level expectations of roles and responsibilities, there is a need to make these SOPs more practical for application in the field. Following on from multi-stakeholder collaborative discussions, they should provide increasing detail of how stakeholders should interact and coordinate during a disaster event to provide an effective and consolidated response.

It is therefore suggested that increasingly comprehensive multi-stakeholder SOPs should be created by an external consultant with relevant experience. These should provide

detailed assigned roles and responsibilities of each of the relevant stakeholders for each kind of disaster risk present within Uttarakhand to streamline efforts for response and relief, provide unity of command and minimize potential conflict. Such SOPs should be created in digital format to enable their integration within the DSS and IRS developed within the state and be easily accessible and understandable by the entirety of the EP&R system.

Additionally, in order to support the effective coordination of operations and the sharing of resources within the departments there is an urgent need to create a dedicated management team for command and control within each of the departments within a dedicated centralized, state level control room.

The Forest Department

Within the Forest Department a lack of systematic coordination for response and a single-line command system was found, with the concept of an 'incident commander' also found to be lacking. It is therefore believed that the introduction of comprehensive and applicable SOPs is required within the department with a particular focus given to response operations in order to strengthen risk-informed decision making in times of disaster and create a systematic order which is well understood by all personnel.

The HP-SDRF

According to the Government of Himachal Pradesh (2020) Rev (DMC) (f) 11-48/2009/SDRF, the SDRF was created in order to 'help the state Government to promptly respond to any disasters or disaster like situation... in line with the National Disaster Response Force as per Section 4.8.1 of Himachal Pradesh's State Police on Disaster Management'.

Within this document it is noted that the SDRF is envisioned as a specialised force, 'capable of handling any situation with a high degree of professionalism', not to be deployed 'for any purpose except for disaster management related activities'. However, despite its mandate to respond only to larger emergencies in which frontline responder capacity is overwhelmed, the HP-SDRF is currently responding to many different types of smaller, routine emergencies and assisting in the upholding of law and order that should remain the responsibility of other agencies such as the police. There is thus a need to reduce the competing priorities introduced by such responsibilities, allowing the SDRF in Himachal Pradesh to concentrate efforts on building capacities and capabilities to fulfil their mandated role. The police should continue to respond to smaller events, as they were doing prior to the creation of the HP-SDRF, allowing the HP-SDRF to concentrate efforts on building capacity to respond to larger scale events in which the capability of the normal system is overwhelmed.

The mandated responsibilities of the HP-SDRF need to be made clear to all stakeholders via the introduction and improved awareness of formalised SOPs of which agencies should be responsible for specific response operations in order to preserve the limited resources of the HP-SDRF and allow for their continued growth beyond their infancy. Currently, the decision to deploy the HP-SDRF following a call made to the universal toll-free number 112

is decided by the HP-SDMA, written standardised protocols behind such decision-making are thus required.

4.3 Key investment opportunities

Recommendation	Description
Support improved understanding of disaster risk management planning, multi-stakeholder collaboration and the creation of associated departmental DRM plans and operational SOPs	Despite legislated accountabilities being in place within the State Disaster Management Plan, its associated 'Emergency Support Functions' and District Disaster Management Plans, enhanced awareness of its contents is required across the EP&R system. Furthermore, support should be provided to the Forest Department and the HP-SDRF to create comprehensive SOPs to reinforce their organisational structure and raise awareness of their mandated responsibilities both within the department and amongst other agencies present within the EP&R system. Improvements to multi-stakeholder operational response plans should subsequently be made to support improved stakeholder coordination and collaboration across horizontal and vertical institutional networks of the EP&R system and provide increased details of how stakeholders should interact and coordinate during a disaster event to provide an effective and consolidated response.

4.4 Suggested projects

Project	Project Description	Cost Estimate (USD)
Support improved understanding of disaster risk management planning, multi-stakeholder collaboration and the creation of departmental DRM plans and associated operational SOPs	<p>A series of workshops should be designed and delivered to increase multi-stakeholder coordination between the departments and general awareness of ongoing efforts across the EP&R system within the state. Within these workshops:</p> <ul style="list-style-type: none"> A session should be delivered outlining the contents of the state disaster management plan and the district disaster management plans. Expectations on departments during disaster events should be demonstrated in exercise scenarios to instil that planning activities should be a collaborative effort between stakeholders rather than a siloed responsibility of the DDMA's and SDMA's. The consultant should engage with each department to assist in the formulation of comprehensive DRM plans for preparedness and 	<p>Consultancy fees (250 working days): 150,000</p> <p>Training and capacity building workshops: 40,000</p> <p>Travel of experts to the state: 30,000</p>

Project	Project Description	Cost Estimate (USD)
	<p>response to a multitude of hazards, with particular attention paid to the Forest Department and the SDRF</p> <ul style="list-style-type: none"> • A subsequent workshop event should be conducted to facilitate the creation of multistakeholder SOPs for both preparedness and response efforts present within the IMS system and ‘Emergency Support Functions’ should be reviewed in a collaborative setting with all departments present. This should produce both digitised refinement of SOPs as well as brochures to be distributed within departments to increase understanding of field officers and personnel. Within such SOPs: • The role of the SDRF should be clarified to all stakeholders in line with the Government of Himachal Pradesh (2020) Rev (DMC) (f) 11-48/2009/SDRF, with clear guidance and standardised protocols on when the SDRF should be deployed following a call made to the universal toll-free number 112. • Practices should be developed to ensure coordination and communication between departments, with key personnel identified as contact points within a communication network. This network mapping exercise should be undertaken to circumvent current practices in which all contact is conducted through district administrations in times of crisis and associated time delays. 	<p>Total: 220,000</p>

5 Information

5.1 Component overview

The collection, analysis, and swift dissemination of information enables better decision-making in advance of emergencies, during response operations, and through the transition to early recovery. Impacts from emergencies are felt locally, and so community engagement is vital to a well-developed state of preparedness.

The information used for preparedness and response includes the information generated from early warning systems. This information provides local residents, and the response teams that support them, with advance notice of emerging hazardous events. Other relevant emergency information comes from responding agencies and social media; coordination of this information ensures horizontal and vertical situational awareness that enables efficient, coordinated, and prioritised response operations.

The development of hazard and vulnerability maps along with other georeferenced emergency information, captured digitally and shared electronically, provides decision-makers with a key resource for planning across time scales to reduce risk. For high-quality information to have an impact, it must be utilised both by the affected community and by well-trained, committed personnel that have the appropriate equipment to respond safely and effectively to the given event (GFDRR, 2021).

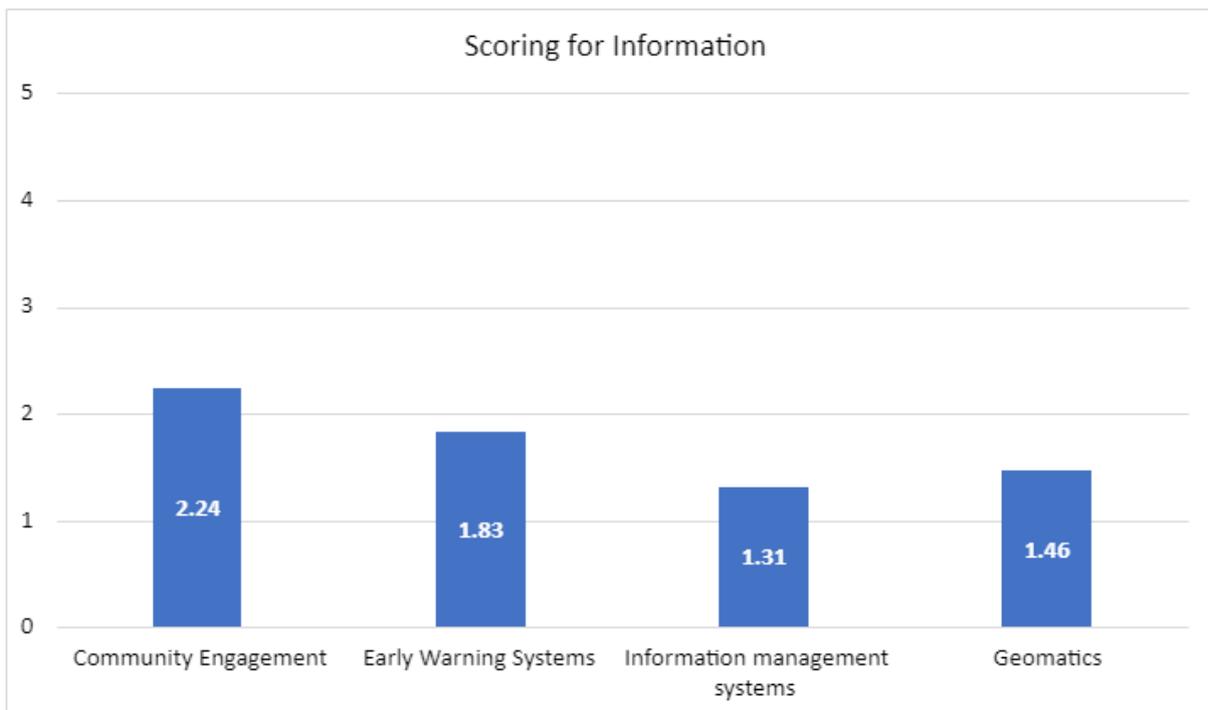


Figure 5-1: Scoring for information, Himachal Pradesh

5.2 Component conclusions

Programs for community engagement and community education

Programs for community education obtained a score of 2.24 within the diagnostic, demonstrating a need for improvement to facilitate a culture of awareness in which individuals are stimulated to undertake their own actions for improved preparedness and response rather than relying solely on those provided by institutions. In order to facilitate such a shift, improved risk communication to the public through innovative uses of social media, TV and FM radio broadcasts should be undertaken by all disaster risk management departments, with the accompanied designation of a dedicated social media officer. Other community engagement practices for awareness generation should also include the following:

- The sharing of disaster management documentary short films on social media in the local language.
- Mass awareness weeks such as those undertaken by the West District, Delhi for prevention and mitigation effects of disaster and for undertaking a holistic, coordinated and prompt response to any disaster.
- State and district level seminars conducted within all districts.
- Increased use of the community radio station, proven to be one of the cheapest and strongest medium for bridging the communication gap between government, local authorities, and the community.
- Public engagement exercises at religious festivals
- The issuance of guidelines to tourists, pilgrims, and mountaineers of proactive disaster risk reduction action steps they can employ to make their visit a safe one
- The District Disaster Management Plans should be expanded to include knowledge building plans with specific aims for awareness creation and mass sensitisation and include detailed strategies to ensure information is provided in a user-friendly manner for the purpose of capacity building within the community with a particular focus given to vulnerable population groups such as women, children, the elderly and the differently-abled

Additionally, community-based disaster risk management should be promoted through conductance of regular drills at the block level, through schools, hospitals and in public spaces such as shopping malls with comprehensive guidelines produced.

The HP-SDRF effectively utilize social media to communicate with the public, with official HP-SDRF accounts possessing 1,600 followers on Twitter and 3,800 followers on Facebook, with plans to concentrate on this area as a focus for growth in the future. Three members of staff are dedicated to maintaining the HP-SDRF's social media presence, creating content, monitoring, and providing real-time updates to their followers.

Twitter, Instagram, and Facebook are utilised for both community engagement and the communication of warning messages, providing locational-specific information, weather updates, basic information for preparedness and in-case of emergency contact information. Messages are stated to mostly be communicated using the local language, however the

HP-SDRF are keen to expand into the use of other languages in the future, particularly during the high tourist season. The HP-SDRF are suggested to be the only agency using social media in this way within the State, promoting its use as a cheap and effective manner of communicating with the public. Additionally, the HP-SDRF is in the process of ensuring permits issued to mountain climbers include phone numbers for emergency contacts and the HP-SDRF social media handles.

Given recent technological shifts within society an additional focus should be placed on the use of social media, similar to the tactics employed by the HP-SDRF within all other departments present within the EP&R system under the authority of a dedicated social media officer.

Education and tools for local leaders

Education and tools for local leaders in disaster risk reduction are severely lacking within the state, which is of great concern given the reliance on district level administrations to coordinate the response effort during times of disaster. This should be rectified as a matter of urgency with a comprehensive training calendar established to assist leadership in providing proactive risk management and coordinating an effective response with strong prior understanding of the hazard risk, vulnerabilities, capacities and capabilities of emergency responding agencies, and multi-stakeholder arrangements. Such training should be provided to district administrations on their appointment, with refresher training provided on a regular basis and tied to the disaster management plans in all disaster risk management phases.

Progress in this area should follow the example provided by the National Institute of Disaster Management (NIDM) of the Ministry of Home Affairs (MHA) in their ambitions to create a 'culture of disaster resilience' through the engagement of all stakeholders including state and local governments, academic institutions and technical institutions. In order to achieve this culture of awareness, the Delhi Disaster Management Authority, under the strategic guidance of NIDM previously organized a three-day state consultation on the 'Update of the disaster management plan of Delhi' provided to officials and representatives of line departments, to provide sensitization of all concerned state and district authorities. Guidance was additionally provided by the NIDM to the state level training program.

Early Warning Systems

The Government of India has designated specific agencies to monitor the onset of natural hazards, set up adequate Early Warning Systems (EWS), and disseminate necessary warnings or alerts regarding impending hazards. These agencies provide inputs to the Ministry of Home Affairs, which issues alerts and warnings to the respective State Governments and district administrations through various communication channels (a breakdown of these responsible agencies is available in

Table 5-1.

Table 5-1: Hazard-specific national level agencies

Hazard	National level agencies
Flood	Central Water Commission (CWC)
Earthquake	National Centre for Seismology
Landslide	Geological Survey of India
Cloudburst and hailstorm	India Meteorological Department

The Indian Meteorology Department (IMD) of the Ministry of Earth Sciences issues four types of forecasts on thunderstorms and associated weather conditions such as lightning, strong winds and hail at medium range (1 to 5 days), short range (24 hours) and very short range or now-cast scale (3 hours). The forecasts closest to the event are most accurate and location specific. These location specific now-casts, which are generated and transmitted at 3-hour intervals, utilise the latest observations of the event from the Indian and Global Observatory and Meteorological satellites, Doppler Weather Radar network and the data from the lightning detector network of the Indian Air Force and the Indian Institute of Tropical Meteorology (IITM). The alerts are specific to important towns and district headquarters throughout India. They contain information of the time of occurrence of severe weather events, as well as the likely impact.

As now-casts are valid for the next two to three hours, it gives only a limited lead-time for dissemination. These location-specific now-casts are provided to Relief Commissioners, State Control Rooms, District Collectors, Disaster Management Units, media personnel, various non-governmental organisations, Indian radio stations and the affected sectors of the general public through SMS, WhatsApp, the IMD website and via email. These authorities then further disseminate these forecasts in near real-time through their own state and sector specific warning network. Closer to the occurrence of the event the Ministry of Earth Sciences communicates warning directly to the general public through the DAMINI mobile app and the RAIN ALARM mobile app about 30-40 minutes in advance of the event. Warnings for lightning occurrence is also provided up to three hours in advance through other mobile apps such as MAUSAM, UMANG and MEGHDOOT with provision for auto-notifications to users.

Currently, the IMD provides location-based information for large areas, resulting in difficulties for the state to issue targeted location-based warnings. Support should thus be provided to the SDMA to build in-house capacity to monitor and forecast weather-induced disasters through the engagement of private sector firms that provide hydro-meteorological forecasting services. This should utilise an approach similar to the ongoing project to provide a Flood Forecasting Early Warning System (FFEWS) for the city of Kolkata designed to provide forecasts as well as real-time updates from sensor nodes installed in key points throughout the city. Information generated by the FFEWS will enable informed decision-making before and during disasters with the system including: weather forecasts; flood models for various intensities of rainfall; real-time information on key pump stations,

sump and canal water levels, actual rainfall, inundation levels; and a messaging system to provide warnings and real-time information to city officials and citizens.

The Early Warning System (EWS) for floods can be positioned as a centralised system (managed by agencies such as the Central Water Commission) or can be decentralised in the case of a particular city or community operated EWS. The data is collected through sensors which measure precipitation and water levels. The Central Water Commission has developed a categorisation system based on flood magnitudes to determine the potential severity of flood situations. These are as follows:

- Low flood: The given river is said to be in a low flood situation at any flood forecasting site when the water level of the river touches or crosses the warning level, but remains below the danger level of the forecasting site.
- Moderate flood: If the water level of the river touches or crosses its danger level but remains 0.50m below the highest flood level of the site.
- High flood: If the water level of the river at the forecasting site is below the highest flood level of the forecasting site but is still within 0.50m of the highest flood level.
- Unprecedented: When the water level of the river crosses the highest flood level recorded at the forecasting site so far. In this situation, a special Red Bulletin is issued by the Central Water Commission to the user agencies, which contains the 'special flood message' related to the unprecedented flood situation.

In order to support the above additional improvements are required within the SDMA to provide increased expertise in forecasting and remote sensing with one member of staff currently identified to possess GIS expert capability and no forecasting expert in place. The department is thus unable to support the generation and dissemination of effective early warning messages within the state at the current time, hindering the implementation of effective preparedness and early action response operations.

Information Management Systems (IMS)

An IMS system is currently operational within the state, with the NDMA previously providing training on aspects of the IMS to the HP-SDMA and its subsequent integration within state disaster management planning. However, this system remains untested and is not currently formulated upon a GIS-based system due to the unavailability of disaster risk databases within the SEOC producing significant constraints on its development. The lack of incorporation of real time data further prevents the IMS from achieving a comprehensive live overview and proper functioning required for effective incident management. There is therefore a need to develop an IMS under the control of HP-SDMA, fed by real-time data repositories maintained by each of the departments and supported by capacity growth within the HP-SDMA. This system should provide a single platform for incident management, accessible by officers contained within each of the departments and incorporating an effective DSS to aid risk-informed decision making and facilitate effective multi-stakeholder coordination for a consolidated response at the state level. The implementation of such a system has the potential to produce vast improvements to

disaster risk management capacity and capability within the state and should therefore be a key focus in the future with budget for the regular, periodic or continual updates of system data established. Budget allocation is also required within the EP&R departments to support the regular training of personnel in the use of the IMS, increasing interoperability across the EP&R system and supporting consolidated and risk-informed response efforts during a disaster event.

The IMS currently in use within the state is found to be unable to integrate GIS generated data, with geo-located, current and comprehensive hazard and vulnerability information unavailable within the IMS for major hazards. Base-map information (such as roads, rivers etc.) is also unavailable, in addition to geo-located and current critical infrastructure and response resource information. The results of the diagnostic further show that the IMS in operation within the state is currently incapable of integrating early warning system data to support situational awareness. No early warning system data for known hazards is integrated within the IMS, no historical data from the early warning system is able to be presented to IMS users through maps or geo-referenced visual display and no hazard monitoring data from the early warning system is presented. Given the reliance on the central agencies for early warning monitoring and surveillance information this lack of integration within a state level IMS to assist in providing an effective response is unsurprising. There is thus an urgent need to provide additional early warning and forecast specialists within the HP-SDMA to enable the integration of such vital information within the IMS to support EP&R activities across all phases on the disaster risk management cycle.

Databases of available resources and equipment are currently maintained by each of the departments present within the emergency preparedness and response system within the state. However, these are found to be insufficient to meet the demands for effective logistical support and command and control during a disaster situation and are often outdated, failing to reflect the up-to-date situation on the ground. Many stakeholders currently rely on use of the IDRN to monitor resource levels within their department. This system, whilst a valuable resource at the national level, is unable to support effective risk-informed decision making at increased granularity within the state level. There is therefore a need to develop comprehensive databases of compiled real time data of personnel and equipment levels, as well as training undertaken by personnel, and maintenance operations conducted on such equipment.

A multi-stakeholder database repository at the State level is further required with uploading of standardized data enabling a comprehensive state-wide view of available resources. Currently, the IDRN is relied upon for this purpose, however this system is not fit for purpose and unable to support subsequent developments of an effective IMS for command and control.

In order to facilitate the implementation of improved real time data tracking databases within the departments the establishment of effective command and control within each of the departments will be required, providing coordination and organisation of efforts and ensuring an effective response during times of disaster.

The Fire Service

The Fire Service currently rely on the IDRN to track equipment availability within the department, however this is poorly maintained and not updated in real-time so information is often out of date and of limited use for decision makers and unable to support the development of an effective IMS within the department.

There is therefore a need to introduce a departmental database with the real time tracking of equipment availability, maintenance carried out, its storage location and other necessary information. Such a system should be accessible by the fire post in question as well as state command and supported by the introduction of technology such as a QR system to ease the burden on personnel. This introduction of a systematic database with standardized reporting would have the capacity to improve monitoring and inform an effective IMS to enable effective command and control of response efforts.

The Forest Department

Within the Forest Department there is a lack of systematic coordination for response and a single-line command system. An IMS is thus required with inclusion of personnel levels, the training they have received, personnel able to act as Incident Commanders, and real-time inventories of available equipment and its location. Currently, a lack of centralised inventories of available equipment is limiting the development of effective IMS and risk-informed decision making. Although available inventories of equipment exist these are often not updated. A real-time database and IMS is therefore required to enable the tracking of equipment availability, maintenance carried out, repairs required and its general management. This should be accessible for each beat (local administrative unit) and at the central level. The introduction of such a system would support the planning process conducted during the pre-fire season, enabling decision makers to detect what is needed and ensure its best placement within the field through targeting of resources and provide improved coordination and logistical support for response teams in the field during the active fire season.

Medical Health and Family Welfare

An improved IMS, supported by real-time data provision is required by the Health and Family Welfare Department to enable district managers to monitor the evolution of a disaster situation and enable effective risk-informed decision making. The Directorate of Science and Technology is currently in the process of creating GIS based inventories of staffing, vehicles, bed availability, doctors available and the training they have. However, this is yet to be delivered and the department are unsure of exactly how such a system will be implemented. This is despite the value of such a tool being recognised by the department in terms of its ability to enable officers to make effective risk-informed decisions in the allocation of resources and patient load.

In order to effectively implement the above proposed improvements, a command-and-control room is thus required to monitor and allocate resources within a dedicated facility such as the allocation of one room within a pre-existing office space. Such a facility should be able to view a computerised system which provides real-time tracking of patient load and

the level to which a facility is currently equipped to manage a large number of people in order to support effective incident management efforts. The development of this system and its supporting functionality would allow the Health and Family Welfare Department to coordinate with the police and ensure those in need of assistance are directed towards hospitals with availability during a large-scale disaster event. Within the command-and-control room a dedicated team should be nominated to provide this coordination with agencies such as the police, Fire and Emergency Services, HP-SDMA, and the HP-SDRF.

5.3 Key investment opportunities

Recommendation	Description
Support the increased use of social media within EP&R departments	Improved use of social media is required to support community awareness and education initiatives conducted by each of the EP&R departments. Through use of social media departments are able to provide widespread messages to the population and increase penetration of relevant preparedness information and strategies for response they are able to employ in times of disaster.
Support increased DRM training courses for governance officials	Improved sensitisation of government officials is recommended across vertical networks of governance to support the mainstreaming of disaster risk reduction within policy making and strategic direction. Improved sensitisation and awareness raising of officials, administrators and policy makers at both the state and district level is required to improve the mainstreaming of disaster risk reduction efforts within broader development programming and support the long-term reduction of disaster risk within the state. Disaster risk reduction and disaster risk management training should therefore be linked to the assembly accession in which policy makers and governance officials are provided with information on risk, vulnerability, exposure, hazards, and the protocols of response.
Support capacity growth to monitor and forecast hydro-meteorological disasters within the SDMA	As demonstrated by the score of 1.83 obtained in the diagnostic, there is a need to improve forecasting capacity for hydro-meteorological disasters within the state. By increasing forecasting capacity and capability within the state targeted location-based warnings can be provided to reduce damage and loss in the face of disasters.

Recommendation	Description
<p>Creation of an interoperable resource tracking database between departments and strengthening of the IMS</p>	<p>As demonstrated by the 1.31 score obtained within the Information Management System of the R2R diagnostic, effective disaster risk management is hindered within Himachal Pradesh owing to a lack of available data and database management systems. Although a valuable resource at the national level, the IDRN is unable to meet the requirements of an effective Incident Management System (IMS) at the state level, and therefore bespoke databases should be created within each of the departments to provide real time tracking of resources and support logistical management for disasters. To develop an efficient and effective IMS, there is therefore a need to improve the availability of real time information within all stakeholder departments of the EP&R system. Currently the lack of such information is a significant challenge requiring the implementation of consistent and accurate databases operating on standardised data formats of available resources, capacities and capabilities within all departments.</p> <p>Similarly, the IMS requires strengthening with the state, with the current system hindering risk-informed decision making and the production of a coordinated response effort across disaster risk management agencies. The stakeholder departments are yet to be incorporated within the IMS in operation and the system is found to not be operated in practice and is therefore unable to support collaborative arrangements for response.</p>

5.4 Suggested projects

Project	Project Description	Cost Estimate (USD)
<p>Support the increased use of social media within EP&R departments</p>	<p>The World Bank should provide support to each of the departments through a series of short online training on the effective use of social media which is currently underutilised beyond the SDRF as a means of conducting outreach to the community. This should include training on producing department specific strategies for social media engagement and outreach conducted by each department with the establishment of dedicated social media accounts for each department. Awareness generation activities conducted on social media should include information of hazard risk, preparedness actions individuals are able to undertake and response strategies they are able to employ in disaster event. This should be communicated in the local language as well</p>	<p>Consultancy fees (80 days): 48,000</p> <p>Total: 48,000</p>

Project	Project Description	Cost Estimate (USD)
	as additional languages to cater for tourists visiting the state with tracking of the penetration of such posts to develop long-term strategies for engagement.	
Support increased DRM training courses for governance officials	<p>Support should be provided to the SDMA to develop an initial workshop and subsequent refresher training courses for governance officials linked to their accession into the assembly. Within disaster prone states such as Himachal Pradesh, disaster risk management should form a cornerstone of all policy making and strategic direction, however, currently this is lacking. This training program should include the following elements:</p> <ul style="list-style-type: none"> • Risk, vulnerability, exposure, hazards, and the protocols of response. • Provide local leaders with the education and tools needed to advocate for resources, policies and programs associated with emergency preparedness and response. • Education programs for local leaders which include considerations for constructive decision-making during planning periods and response operations. • Regular refresher training should additionally be provided on a quarterly basis to provide regular communication to the State Government for updates on policy, protocol or operational changes such as updates to the State Disaster Management Plan or District Disaster Management Plans. 	<p>Consultancy fees (150 days): 90,000</p> <p>Training and capacity building workshop: 20,000</p> <p>Regular travel of experts: 30,000</p> <p>Total: 140,000</p>
Support capacity growth to monitor and forecast hydro-meteorological disasters within the SDMA	<p>An external agency with relevant experience should be commissioned to support the SDMA in developing monitoring and forecasting capacity for hydro-meteorological events in collaboration with private firms conducting similar activities elsewhere in India. This should include detailed assessment of requirements to provide:</p> <ul style="list-style-type: none"> • The establishment of a network of sensors to monitor specific hazard-related observations such as rain gauges, rainfall 	<p>Consultancy fees (350 days): 210,000</p> <p>Travel of experts: 30,000</p> <p>Total: 240,000</p>

Project	Project Description	Cost Estimate (USD)
	<p>radar, or in-situ gauges (e.g. river gauges) with observations assimilated into forecast models</p> <ul style="list-style-type: none"> • The functionality to import, store and process multiple meteorological and hydrological forecasting and nowcasting model outputs. • Deterministic forecast models and ensemble/probabilistic forecasting products (e.g. hydrological forecast models) to support the estimation of the associated uncertainty of forecasts. • The linking of forecasts with hazard and impact maps: procedures and a functionality to perform monitoring and evaluation of events such as floods should be in place. The output locations should be defined as well as the related thresholds for warnings, connected by hazard and risk maps. • The establishment of a back-up system, running in parallel with the main system. Forecasters should be able to operate the (sub)systems on a 24/7 basis. • The incorporation of real time reservoir management and operation. That means hydrological and or hydraulic models should be able to simulate the effect from reservoir operations. • Training and capacity building requirements in terms of personnel and skill sets required to operationalise the system of a 24/7 basis. 	

<p>Creation of an interoperable resource tracking database between departments and strengthening of the IMS</p>	<p>A technical consultancy should be commissioned to produce:</p> <ul style="list-style-type: none"> • A common database platform for each of the departments to improve the real-time tracking of resources. This should build upon the current IDRN system utilised for such purposes with increased functionality to provide live reports on the level and quality of equipment as well as manpower and the skills available within each of the departments at any given time. This new database platform should have interoperable functionality between departments and capacity to feed directly into the IMS system. • The creation of this platform should be accompanied by a series of capacity building workshops delivered to personnel tasked with the continued operation of the system within each of the departments as well as those located with such facilities within storage facilities with associated learning materials made readily available on the protocols for the periodical update of data, use and operation of the application. • The current IMS system in operation within the state should be strengthened to reach a higher level of functionality. This strengthening should include: <ul style="list-style-type: none"> ○ Updating of Disaster Risk Assessments ○ Addition of an API for DSS for real-time location of equipment and personnel to support improved decision making. ○ Incorporation of EWS for hydrometeorological events with involvement of private players ○ Incorporation of EWDS for effective early warning to people ○ Development of a system for drone/satellite-based post 	<p>Consultancy fees (260 days): 156,000 for requirement gathering from multiple agencies, software development, testing, documentation and training to create and implement interoperable databases.</p> <p>Consultancy fees (2,000 days): 1,200,000 for IMS strengthening.</p> <p>Training and capacity building workshops: 40,000</p> <p>Regular travel of experts to the state: 30,000</p> <p>Total: 1,426,000</p>
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disaster damage and loss assessment

- This IMS should provide access to any senior officers contained within stakeholder departments to allow for the diffusion of live information and enable a coordinated effort and efficient use of available resources.
- An application tool interface is required within the IMS with data synched to the server via an application programming interface (API) and the integration of push and pull data of different systems.
- The development of such software will need to be interoperable between stakeholder departments and integrated with GIS to allow each stakeholder to effectively interface with the system.
- To increase the functionality of the IMS, strengthening of the DSS is required through improved integration of more models to increase the reliability of information with scenario generation exercises undertaken to ensure its capability.
- Increased integration of GIS-generated data is required within the IMS including geo-located vulnerability information, base maps (such as roads, rivers etc) and critical infrastructure and response resource information. The IMS should also be expanded to accept mobile and real-time updated GIS data to enhance situational awareness during response and recovery.
- Early Warning system data should be incorporated within the IMS.
- An improved IMS should be fed by improved real-time data provided by the steps outlined above.

Project	Project Description	Cost Estimate (USD)
	<p>Following the development of this IMS a series of capacity building workshops should be delivered to the stakeholder departments to increase operationalisation of the system including practical demonstrations of its use within live situations.</p>	

6 Facilities

6.1 Component overview

Coordination of effort for EP&R activities requires a structural presence, be it for command and control, movement of emergency aid, or the staging of response teams and their equipment. These physical facilities act as a core element in establishing a culture of preparedness, ensuring a dependable common operating picture and resilient services when most other critical infrastructure and government services are disrupted. This component ensures that there is a nexus for information, personnel, and equipment as the EP&R system matures through focused investment (GFDRR, 2021).

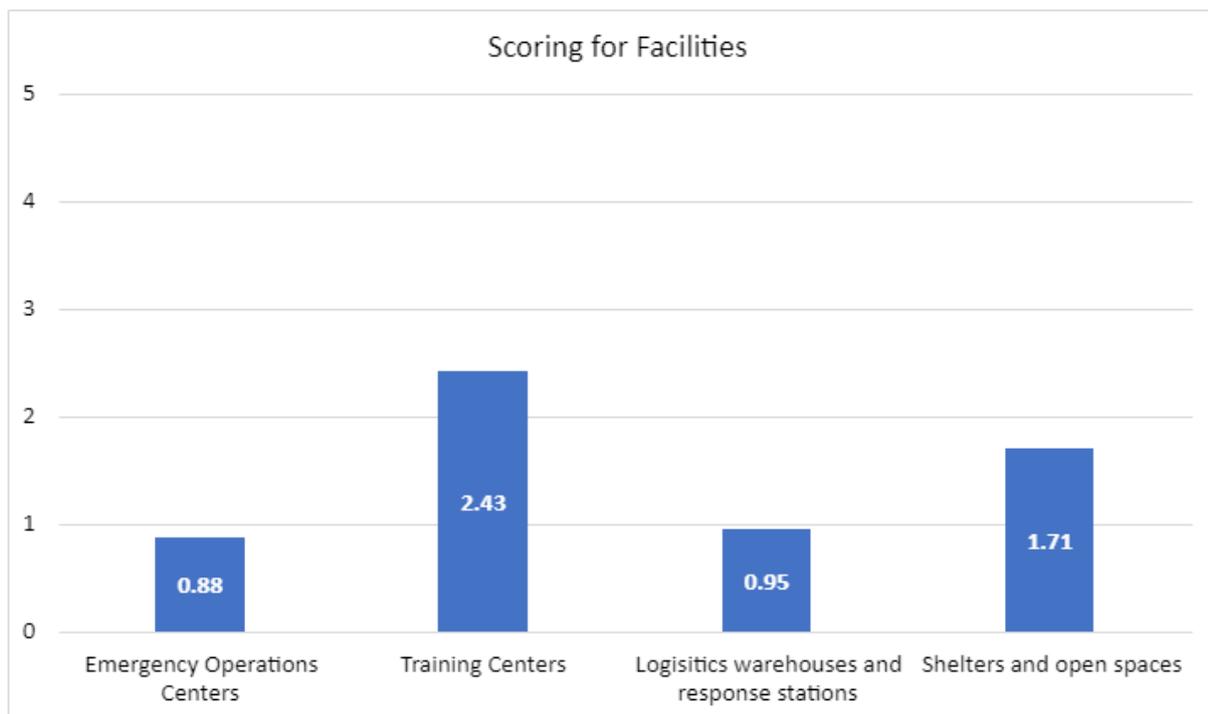


Figure 6-1: Scoring for facilities, Himachal Pradesh

6.2 Component conclusions

Emergency Operation Centres

Emergency Operations Centres are severely lacking within the state demonstrated by the score of 0.88 obtained on the R2R diagnostic and thus provide a key area for improvement.

The State Emergency Operations Centre (SEOC) is identified as the hub of all activities related to disaster response within the state, playing a key role in providing a well-coordinated response in the management of disasters. However, despite being identified to provide such crucial functions to the EP&R system within the State Disaster Management Plan, the SEOC is currently operating out of makeshift facilities which are not fit for

purpose. Furthermore, the SEOC does not currently possess resilient systems to ensure continuous operation during critical service disruptions within times of emergency. No back-up site has been established were the primary SEOC to require evacuation and the SEOC is yet to be operated by personnel on a 24/7/365 basis by a permanent team of staff.

Command and control rooms are also required by each of the departments present within the EP&R system identified within this project. This is to allow for organization of response efforts during times of disaster, enable effective coordination with other agencies and ensure best practice is upheld. Such a facility is suggested to be in the pipeline for the development of each department analysed within the project, yet these remain in early discussion stages with no firm commitments in place.

In order to provide an effective roadmap for the introduction of such facilities the centralised command-and-control point, namely the SEOC, should be improved to provide a best practice example of how such a facility should look and operate, which the various departments would be able to replicate for their own purpose.

HP-SDRF

A HP-SDRF command and control room is required within the state, to allow consolidation of response efforts across their network and assist in command-and-control functions during times of disaster.

The Fire Service

The Fire Service Department urgently requires the establishment of a command-and-control point from which it can operationalise a real-time incident response system capable of providing effective management, make risk-informed decisions and provide logistical support. The facility should be equipped with the necessary software, and hardware for it to function effectively.

The Forest Department

The Forest Department within Himachal Pradesh is currently operating without a command-and-control room, contributing to a response which lacks coordination. A rudimentary concept of a control room has been created; however, this requires refinement of concept by external experts in addition to the creation of SOPs and training provided to all personnel to ensure its effective integration within current systems.

Medical Health and Family Welfare

In order to effectively implement the proposed improvements to command and control and implement an effective IMS, a command-and-control room is required by the department to monitor and allocate resources during a disaster situation within a dedicated facility such as the allocation of one room within a pre-existing office space. Such a control room should be able to view a computerised system which provides real-time tracking of patient load and the level to which a facility is currently equipped to manage a large number of people in order to support effective incident management efforts. The development of this system and its supporting functionality would allow the Health and Family Welfare Department to coordinate with the police and ensure those in need of assistance are directed towards

hospitals with availability during a large-scale disaster event. Within the command-and-control room, a dedicated team should be nominated to provide this coordination with agencies such as the police, Fire and Emergency Services, HP-SDMA, and the HP-SDRF.

Logistics Hubs and Warehouses

HP-SDRF

Improved storage space for equipment is a key requirement of the HP-SDRF owing to a current reliance on shared spaces provided by other departments. This has resulted in poor equipment management, with equipment often left lying on the floor. Two Lakhs were previously provided by the State Government for the purchasing of storage racks for such facilities; however, a system is required for effective management and storage including the creation of SOPs, guidance materials, spot checks and training to ensure equipment is maintained and upkept to a high standard to ensure its ready deployment in the field and ease of location in times of emergency.

The Forest Department

Within the Forest Department, equipment is mostly stored in the beats, the smallest administrative unit with responsibilities for its correct storage and maintenance held by the beat guard. Such storage facilities are described as 'a small room within a small hut' with a lack of organization. Improvements are thus required to such facilities to provide increased organisation in addition to the introduction of comprehensive SOPs for storing and maintenance and the use of sorting shelves to allow rapid deployment in times of forest fire.

Response Stations

Capacity, resources, and abilities of local response stations are shown to be similarly constrained within the state, with response stations found to lack adequate equipment and staff to respond effectively to most daily emergencies as well as lacking adequate resources to continue to respond to daily emergencies during disasters or increased surge periods.

HP-SDRF

The HP-SDRF is currently composed of three battalions located in the Kangra, Mandi, and Shimla districts. Such battalions are currently utilising shared space provided by other agencies and as such are lacking their own physical built infrastructure which is fit for their specific purpose. Within Kangra and Mandi, the HP-SDRF is located within sites operated by the Indian reserve battalions, whilst the HP-SDRF headquarters in Shimla is currently located within the police headquarters. Within Kangra, a site has been allocated for use by the HP-SDRF by the State Government, however no agreements have been made for construction. In Mandi and Shimla no such allocations have been proposed.

There is an evident need to allocate land for HP-SDRF sites within the state allowing for the management of their own infrastructure network and facilities, with dedicated space provided to meet their needs for disaster risk management. Such a network should include

their own dedicated headquarter facility and battalion sites including storage facilities and adequate space for the conductance of training exercises.

The Medical Health and Family Welfare

The fundamental limitation faced by the Health and Family Welfare Department in Himachal Pradesh is that of building constraints, with a lack of available space faced by offices and hospitals operated by the department. Dialogue was initiated with the HP-SDMA to find solutions to the problem of such building constraints in 2016; however, owing to the Covid-19 pandemic these are yet to be progressed further. There is thus a need for a study to be conducted by an external consultant with expertise in hospital management and engineering to produce an in-depth infrastructure assessment of what is required and the best way to utilise pre-existing available space within the budget constraints of the department that will satisfy design requirements. Such analysis should also take account of the need for infrastructure to be both earthquake and fire resistant given the significant seismic risk in the state.

The Fire Service

Twenty-two fire stations, three sub-fire stations, and 44 fire posts have been established by the Fire Service within Himachal Pradesh with their distribution shown in Figure 6-2.

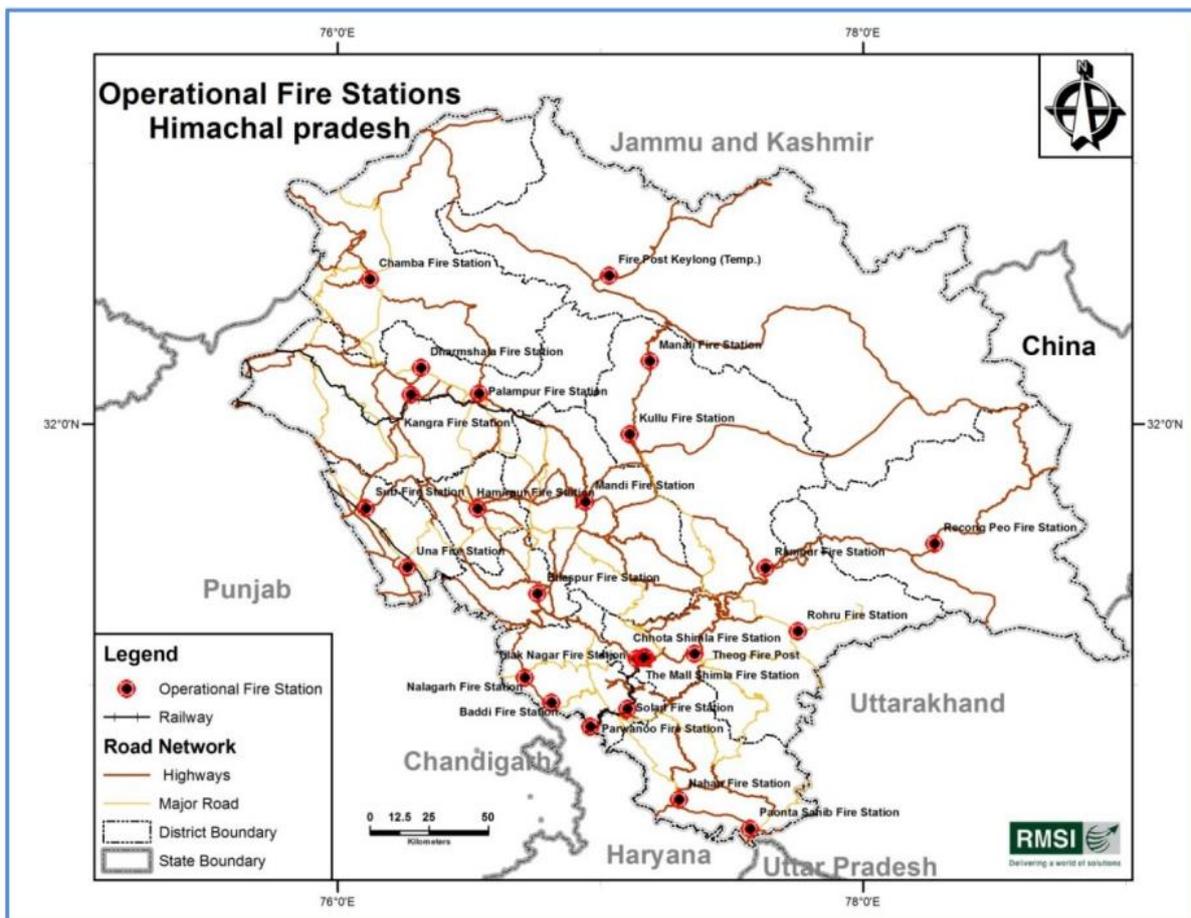


Figure 6-2: Locations of operational fire stations in Himachal Pradesh (RMSI, 2012)

Additional posts are required to keep pace with the rapid urbanisation occurring within the state and provide an adequate level of service delivery. Previous analysis conducted by the RMSI (2012) proposed the need for an additional 11 fire stations/posts in urban areas, and 83 within rural areas, with the department at the time described as operating with an overall station deficiency of 79%. Additional scoping strategies based off current population demographics, encroachment and other contributing factors to determine how many additional posts are required and where they should be placed given the rapid pace of urbanisation which has occurred since the production of the RMSI (2012) report should thus be conducted to ensure an adequate level of coverage within the state to facilitate a rapid response.

The Forest Department

Hazard specific disaster responders are found to be unable to remain operational in field settings for at least 72 hours without resupply within Forest Department. This is of particular concern given their need to be deployed to remote areas to contain instances of wildfire. Additional supporting facilities would thus be of great use owing to response teams often having to remain in the field, in close proximity to forest fires for long periods, sometimes through the night. Response teams would therefore benefit from the provision of caravans or mobile kitchens which would provide frontline responders with a place to rest, hydrate and eat whilst mounting a response. At the current time, communities sometimes provide such facilities to the response team in the field. This is not always the case and responders may also be working in areas in which there are no surrounding communities. Such support facilities could be manned by volunteers such as the Home Guards to reduce the strain on personnel their introduction may cause.

Emergency housing and temporary shelter

Verification should be undertaken to ensure enough open space and shelters are available to accommodate the anticipated displaced population which may be produced by a worst-case scenario seismic event to take place. Currently, a lack of consideration is given to the development of an adequate shelter system were a worst-case scenario disaster to occur. Improved examination of such facilities is thus required within the planning stage with a need to carry out assessments of available designated open spaces and temporary shelter facilities.

Additional awareness generation of the current shelter system, including key facilities for use during a disaster event should be conducted within all response agencies to ensure the knowledge of field personnel and their ability to communicate this with affected populations. This should also include understanding of safe evacuation routes which have been identified to be resilient to known hazards.

6.3 Key investment opportunities

Recommendation	Description
Support the creation of a dedicated State Emergency Operations Centre (SEOC)	The State Emergency Operations Centre (SEOC) is identified as the hub of all activities related to disaster response within the state, playing a key role in providing a well-coordinated response in the management of disasters. However, despite being identified as providing such critical functions within the EP&R system, the SEOC is currently operating out of makeshift facilities which are not fit for purpose, with staffing only provided on a temporary basis following the onset of a disaster event, reflected in the 0.88 score for Emergency Operations Centres obtained within the R2R diagnostic.
Support the strengthening of disaster risk management capacities within the Medical Health and Family Welfare Department through the creation of a dedicated command-and-control room and the conductance of an in-depth critical infrastructure assessment.	In order to effectively implement the proposed improvements to command and control and implement an effective IMS, a command-and-control room is required by the department to monitor and allocate resources during a disaster situation within a dedicated facility such as the allocation of one room within a pre-existing office space. Such a control room should be able to view a computerised system which provides real-time tracking of patient load and the level to which a facility is currently equipped to manage a large number of people in order to support effective incident management efforts. A review of critical infrastructure operationalised by the Medical Health and Family Welfare Department should also be undertaken to ensure the ability to meet patient demand during a disaster event and ensure its resilience to maintain critical service delivery in times of emergency. This review should also take into account that the fundamental constraint faced by the department is that of limited physical space within which critical services can be delivered, both in terms of medical service delivery and administrative purposes.
Support the strengthening of the HP-SDRF through the creation of a command-and-control room and the provision of dedicated response stations and storage facilities	A command and control room is required by the State Disaster Response Force to allow for improved organisation of response efforts during times of disaster, enable effective coordination with other agencies and ensure best practice is upheld. Logistics warehouses and response stations are similarly lacking within the SDRF owing to a lack of dedicated facilities. Within the SDRF a lack of dedicated response stations limits their ability to act as a consolidated force for disaster response with the three battalions located in Kangra, Mandi and Shimla currently operating out of shared space provided by the Indian Reserve Battalions and the Police which are not fit for purpose and able to support capacity growth of the department. Facilities are thus required to provide the SDRF with the required storage space for rapid deployment of equipment in times of disaster as well as response operations and practice drill grounds.

Recommendation	Description
Support the strengthening of the Fire Service through the creation of a command-and-control room and the conductance of an in-depth critical assessment of available response stations	The Fire Service is currently operating without a command-and-control room, thus limiting the ability to provide effective organisation of response efforts during times of disaster, enable effective coordination with other agencies and ensure best practice is upheld. Additional fire response stations are also required to keep pace with the rapid urbanisation occurring within the state and provide an effective response to instances of fire.
Support strengthening of the Forest Department through the creation of a command-and-control room, improved storage facilities and the provision of mobile support facilities	The Forest Department is currently operating without a command-and-control room, thus limiting the ability to provide effective organisation of response efforts during times of disaster, enable effective coordination with other agencies and ensure best practice is upheld. Additional storage facilities are also required with equipment currently stored in a haphazard manner within the beats which is not conducive to rapid deployment or effective resource tracking. The Forest Department would also benefit from the provision of support facilities with field responders currently unable to remain operational in the field for a minimum of 72 hours. This is of particular concern within the department given their need to be deployed to remote areas to contain instances of forest fire and remain operational in the field in close proximity for long periods of time, and sometimes through the night.
Support strengthening of the shelter system	Within the State level disaster management plans a lack of consideration is given to the development of an adequate shelter system were a worst-case scenario disaster to occur. Improved examination and ongoing maintenance of such facilities is thus required within the planning stage to ensure its operational readiness to accommodate large, displaced populations during a disaster event.

6.4 Suggested projects

Project	Project Description	Cost Estimate (USD)
Support the creation of a dedicated State Emergency	A state level command and control room is currently in operation by the SDMA. However, this is not currently fit for purpose and requires improvement to provide effective logistical support and command capability across the	Creation of a SEOC site: 1,500,000 Total: 1,500,000

Project	Project Description	Cost Estimate (USD)
Operations Centre (SEOC)	<p>EP&R network. There is thus a need to strengthen the SEOC into a centre of excellence to provide an effective and coordinated response effort of its personnel in the field. Such a facility should produce a well-organised system for early warning and alerts, data analysis, research, and monitoring. It should contain GIS software, display screens and expert personnel. In addition to the provision of this facility, associated budgets for the provision of equipment, its ongoing maintenance and repair as well as technical staff will also be required. During the design phase, a detailed assessment of land allocation should be undertaken to ensure the facility's resilience in the face of known hazards to ensure its continuous functioning in times of disaster in addition to its optimal placement within the field in regards to population demographics, key shelter sites and in close proximity to other departmental networks.</p>	

Support the strengthening of disaster risk management capacities within the Medical Health and Family Welfare Department through the creation of a dedicated command-and-control room and the conductance of an in-depth critical infrastructure assessment.

Creation of a command-and-control room

A dedicated command-and-control room should be provided to the Medical Health and Family Welfare Department, with the equipment and personnel required to implement the computerised GIS-based inventory system currently under development by the Directorate of Science and Technology which has the potential to greatly enhance disaster risk management within the state.

Associated budget allocation should also be made for the establishment of a permanent team of staff with dedicated personnel capable of leading the response effort in times of disaster as well as providing improved planning efforts as well as the provision of equipment and tools necessary to support the effective operation of the facility, including the establishment of resilient and backup systems to ensure continuous operation despite critical service disruptions.

Review of critical facilities

- A project by an external consultancy with relevant technical experience in hospital management should be commissioned to produce an in-depth assessment of current infrastructure operationalised by the Medical Health and Family Welfare Department.
- This study should produce a gap analysis of current facilities and provide recommendations of the best way to utilise pre-existing available space within the budget constraints of the department which will satisfy design requirements.
- This analysis should also take account of the need for infrastructure to be both earthquake, flood and fire resistant given the significant risks faced within the state.
- Outputs from this process should include a needs-based gap assessment with subsequent recommendations in a format which the department is able to begin discussions with the State Government.

Creation of a command-and-control room: 800,000

Consultancy fees (300 days): 180,000

Expert travel to the state: 30,000

Total: 1,010,000

Project	Project Description	Cost Estimate (USD)
<p>Support the strengthening of the HP-SDRF through the creation of a command-and-control room and the provision of dedicated response stations and storage facilities</p>	<p>Creation of a command-and-control room A state level command and control room is not currently in operation by the HP-SDRF, limiting the potential to provide effective logistical support and command capability across the HP-SDRF network. There is thus a need to provide the HP-SDRF with an effective command-and-control room to provide an effective and coordinated response effort of its personnel in the field. Such a facility should produce a well-organised system for early warning and alerts, data analysis, research, and monitoring. It should contain GIS software, display screens and expert personnel. In addition to the provision of this facility, associated budgets for the provision of equipment, its ongoing maintenance and repair as well as technical staff will also be required. During the design phase, a detailed assessment of land allocation should be undertaken to ensure the facility's resilience in the face of known hazards to ensure its continuous functioning in times of disaster in addition to its optimal placement within the field in regards to population demographics, key shelter sites and in close proximity to other departmental networks.</p> <p>Response stations The HP-SDRF is currently composed of three battalions located in the Kangra, Mandi, and Shimla districts. Such battalions are currently utilising shared space provided by other agencies and as such are lacking their own physical built infrastructure which is fit for their specific purpose. Within Kangra and Mandi, the HP-SDRF is located within sites operated by the Indian reserve battalions, whilst the HP-SDRF headquarters in Shimla is currently located within the police headquarters. Within Kangra, a site has been allocated for use by the HP-SDRF by the State Government agreements have not yet been made for construction. In Mandi and Shimla no such allocations have been proposed. Dedicated facilities are thus required to provide the</p>	<p>Command-and-control room: 1,000,000</p> <p>Creation of 3 dedicated response stations, including storage facilities: 1,500,000</p> <p>Total: 2,500,000</p>

Project	Project Description	Cost Estimate (USD)
	<p>SDRF with the ability to dictate their growth beyond their infancy and formulate a consolidated force for response in line with their mandated responsibility; to be capable of protecting life and minimising economic losses in the face of extreme disasters, in which the capacity of other response agencies is overwhelmed.</p> <ul style="list-style-type: none"> • Budget allocation for the acquisition of land and construction of physical infrastructure is required in Mandi to provide a dedicated facility for the SDRF battalion. The facility should include storage facilities and adequate space for the conductance of training exercises. • Budget allocation for the acquisition of land and construction of physical infrastructure is required in Shimla. This is to provide a dedicated facility for the SDRF battalion that includes a dedicated headquarter facility, storage facilities and adequate space for the conductance of training exercises. • Within Kangra, land has already been allocated. Budgets should be established for the creation of physical infrastructure including dedicated storage facilities and open space for the conductance of training exercises. <p>Warehouses</p> <p>Within the SDRF, a lack of dedicated logistics and warehouse facilities is resulting in an inability to provide effective equipment management and hindering response efforts. Currently the SDRF is operating out of shared space with equipment often left on the floor and stored in an inefficient manner for rapid deployment in the field. In order to improve response efforts and allow for improved technical capacity through the ability to drill for response, the following is required:</p> <ul style="list-style-type: none"> • Dedicated storage facilities are required in the three planned response stations at Kangra, Mandi and Shimla. 	

Project	Project Description	Cost Estimate (USD)
	<ul style="list-style-type: none"> • These storage facilities should be designed and constructed in such a manner that provides effective resilience against known hazards to ensure their continuous operation in times of disaster. • Initially, temporary storage facilities such as containers should be utilised for such purposes prior to the construction of physical, permanent built infrastructure. • Provision of accompanying storage racks and a storage system should be provided including the creation of SOPs, guidance materials, spot checks and training. These should be developed with support from the NDRF or the World Bank to ensure equipment is maintained and upkept to a high standard to ensure its ready deployment in the field in line with best practice. 	

<p>Support the strengthening of the Fire Service through the creation of a command-and-control room and the conductance of an in-depth critical assessment of available response stations</p>	<p>Creation of a command-and-control room A state level command and control room is not currently in operation by the Fire Service, limiting the potential to provide effective logistical support and command capability across the Fire Service network. There is thus a need to provide the Fire Service with an effective command-and-control room to provide an effective and coordinated response effort of its personnel in the field. Such a facility should produce a well-organised system for early warning and alerts, data analysis, research, and monitoring. It should contain GIS software, display screens and expert personnel. In addition to the provision of this facility, associated budgets for the provision of equipment, its ongoing maintenance and repair as well as technical staff will also be required. During the design phase, a detailed assessment of land allocation should be undertaken to ensure the facility's resilience in the face of known hazards to ensure its continuous functioning in times of disaster.</p> <p>Response stations 22 fire stations, 3 sub-fire stations and 44 fire posts are currently in operation within the state, however this number is insufficient to provide effective coverage and keep pace with rapid ongoing processes of urbanisation. Therefore, the following process should be undertaken:</p> <ul style="list-style-type: none"> • An in-depth scoping strategy should be undertaken by an external consultant with relevant technical experience to assess the distribution of response posts against current population demographics, encroachment and other contributing factors. This will determine how many additional posts are required. GIS should be extensively utilised within such a project with mapping of the road network, hazards and risks to determine the optimal placement of such facilities to provide effective response times. 	<p>Creation of a command-and-control room: 800,000</p> <p>Consultancy fees (300 days): 180,000</p> <p>Expert travel to the state: 30,000</p> <p>Total: 1,010,000</p>
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Project	Project Description	Cost Estimate (USD)
<p>Support strengthening of the Forest Department through the creation of a command-and-control room, improved storage facilities and the provision of mobile support facilities</p>	<p>Creation of a command-and-control room A state level command and control room is not currently in operation by the Fire Service, limiting the potential to provide effective logistical support and command capability across the Fire Service network. There is thus a need to provide the Fire Service with an effective command-and-control room to provide an effective and coordinated response effort of its personnel in the field. Such a facility should produce a well-organised system for early warning and alerts, data analysis, research, and monitoring. It should contain GIS software, display screens and expert personnel. In addition to the provision of this facility, associated budgets for the provision of equipment, its ongoing maintenance and repair as well as technical staff will also be required. During the design phase, a detailed assessment of land allocation should be undertaken to ensure the facility's resilience in the face of known hazards to ensure its continuous functioning in times of disaster. Associated SOPs should also be created to provide description of role expectations and practical operational duties of incident commanders required to provide effective command and control in the field during disaster response operations. Individuals capable of acting in such roles should be identified and training provided based on the SOPs delivered to ensure they possess the necessary skills and understanding to be effective in the field. Additional training should also be provided across field personnel and those in command and control to ensure the integration of such positions within the operational structures of the department.</p> <p>Logistics hubs and warehouses Within the Forest Department, a lack of dedicated logistics and warehouse facilities is resulting in an inability to provide effective equipment management and hindering response efforts. Currently equipment is mostly stored in the beats, the smallest</p>	<p>Creation of a command and control room: 600,000</p> <p>Consultancy fees (200 expert days): 120,000</p> <p>Creation of storage facilities: 750,000</p> <p>Consultancy fees (100 expert days): 600,000</p> <p>Caravan provision: 20,000</p> <p>Total: 2,090,000</p>

Project	Project Description	Cost Estimate (USD)
	<p>administrative units, with responsibilities for its correct storage and maintenance held by the beat guard. Such facilities are described as a 'small room within a small hut' and lack any organisation. Improved logistics hubs and warehouses are therefore required to allow the stockpiling of equipment in a state of ready and effective deployment during disaster events.</p> <ul style="list-style-type: none"> • Within each of the beats improved storage facilities should be provided in the form of lockers or small containers with provision of storage racks and • An associated system for the tracking of equipment, including SOPs, guidance materials, spot checks and training should be created, necessitating beat guards provide regular reports on the availability and condition of equipment to the central state level. <p>Support facilities</p> <p>Field responders within the Forest Department are currently unable to remain operational in the field for at least 72 hours owing to a lack of supporting facilities. This is of particular concern within the department given their need to be deployed to remote areas to contain instances of forest fire and remain operational in the field, in close proximity for long periods of time, and sometimes through the night. Such facilities would enable field personnel to rest and rehydrate in the field. This should reduce the potential for staff injury whilst responding to incidents of forest fire.</p> <ul style="list-style-type: none"> • The Forest Department should be provided with 5 caravans containing mobile kitchen facilities to provide frontline responders with a place to rest, hydrate and eat whilst mounting a response. 	

<p>Support strengthening of the shelter system</p>	<p>An external agency should be commissioned to undertake a thorough review of designated open spaces and shelter facilities currently identified for use during a disaster event by the SDMA. This review should include the following steps:</p> <ul style="list-style-type: none"> • A field survey to collect data on current open spaces and shelters, including a field survey that collected updated data on open-space and shelter attributes, general environment assessment, preparation of updated maps for all locations, assessment of available evacuation routes and development of open-space digital platform including an open-space map atlas. • This survey should also include details as to whether designated open spaces have remained in their pre-identified condition in terms of emergency preparedness, the presence of water, sanitation and hygiene facilities, critical infrastructures and other emergency facilities. • The total useable area of flat land should be identified within the open-space map atlas developed as well as vicinity maps showing nearby emergency services and short descriptions of each open space. • All outputs, including GIS-based data sets and maps produced within the project should be produced in formats compatible for incorporation within the IMS system in operation within the state. • A training and capacity building workshop should subsequently be conducted for relevant members of staff within the SDMA to incorporate findings of the survey within a clear shelter and open spaces management plan. <p>A further training and capacity workshop should be held for response agencies, to increase understanding within the hazard specific response departments with associated online learning materials produced</p>	<p>Consultancy fees (150 days): 90,000</p> <p>Training and capacity building workshops: 40,000</p> <p>Expert travel to state: 20,000</p> <p>Total: 150,000</p>
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Project	Project Description	Cost Estimate (USD)
	for distribution. This is required to increase understanding of field personnel who will come into contact with displaced populations during disaster events with a current lack of knowledge displayed.	

7 Equipment

7.1 Component overview

The appropriate acquisition, use, and maintenance of preparedness and response equipment ensures timely information sharing and safe, effective rescue operations. It allows for effective communication in even the harshest conditions. Investments in equipment help governments overcome the capital requirements to ensure access to lifesaving technologies and resources. When combined with clear implementation guidance, established parts and service supply chains, and program budgets for maintenance and upgrades, these elements ensure a government’s core preparedness and response agencies have the tools to safely and effectively deliver their services (GFDRR, 2021).

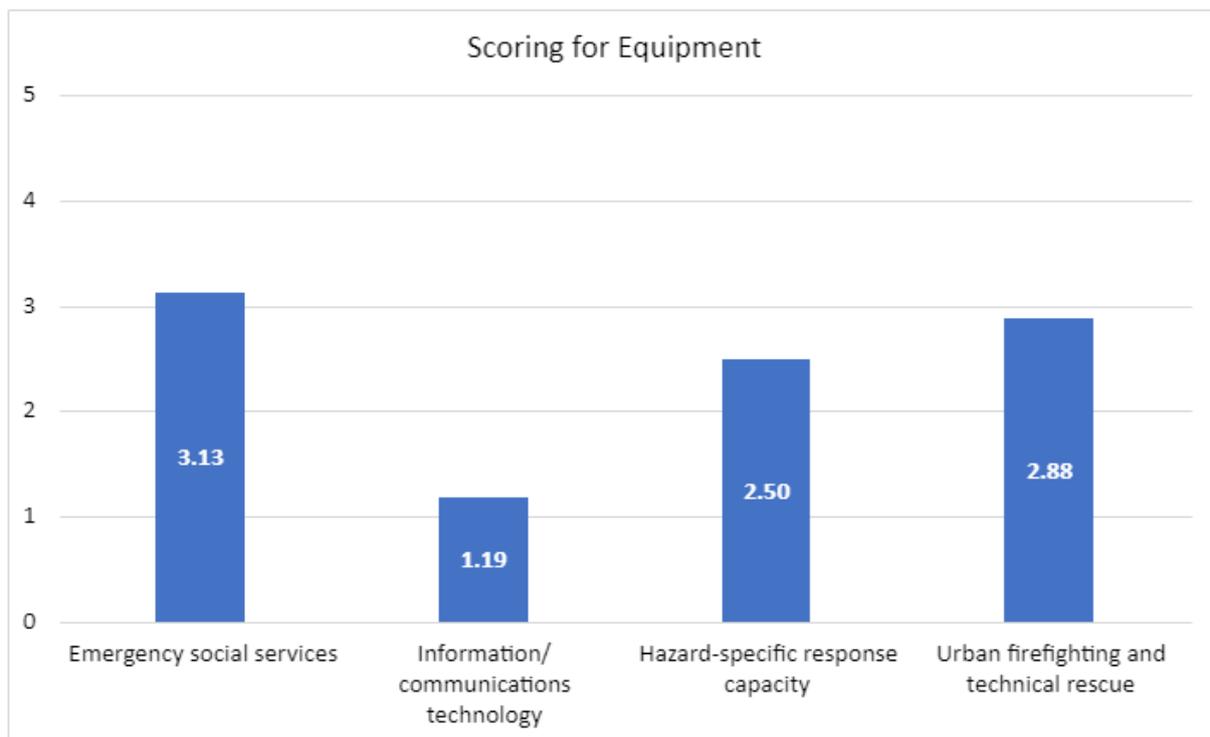


Figure 7-1: Scoring for equipment, Himachal Pradesh

7.2 Component conclusions

Emergency Social Services

Social service programs to support families and vulnerable populations during emergencies and disasters are established within the state under the authority of the Medical Health and Family Welfare, reflected in the score of 3.13 obtained in the diagnostic. However, awareness of such schemes remains low within the Home Guards and Civil Defence, the Fire Service, the HP-SDRF and the Forest Department suggesting a need to improve

training and awareness within these departments so that they are able to provide direction to such services to the affected populations during their interactions within the field.

This training should include information on the availability of counselling available for mental healthcare following a disaster, reunification centres or services to help connect family members who may have become separated during times of emergency or disasters, child health and child support services as well as support services for the elderly.

Information and Communications Technology

A wireless communication system is required to be operationalised by the Forest Department, with personnel currently relying on WhatsApp for coordination in the field. This is of particular concern given the difficulties and delays in communication often experienced owing to the steep hillsides present within the state. Such a wireless system of communication was once in operation by the department, but this was during a time in which devices were too heavy and large for responders to carry into the field and they were thus phased out. Given the recent technological improvements to provide increasingly lightweight communication devices, these systems should be reintroduced with interoperability to other stakeholder organisations such as the HP-SDMA and district administrations provided.

Wildland firefighting capabilities

Basic capabilities, equipment, and personnel to suppress localized and contained wildland fires are notably absent, reflected in the score of 2.75 obtained within the diagnostic. There is thus a need to provide additional equipment to the Forest Department to facilitate an effective response to forest fires.

There is uncertainty as to whether current levels of provision are sufficient due to a lack of a centralized list of current equipment levels at the state level. Despite this uncertainty it is believed that additional fire protective suits, lighting and breathing apparatus is required, in addition to the provision of drones. In order to be fit for purpose such equipment must be small and lightweight given that forest department personnel are often required to climb vertically in the forest upon arrival at the scene to provide a response.

Capabilities for flood and water-based emergency rescue

Capabilities for rescue during floods or water-based emergencies are severely constrained within the HP-SDRF. Currently, a lack of trained deep-sea divers hinders the ability to provide effective flood response capability with responders not currently trained in water rescue techniques including the use of rescue boats and training in advanced water rescue. Equipment is also lacking for flood and water rescue, including personal protective equipment, boats and water vessels and jurisdictional budgets are not currently able to support outreach, ongoing training, management and investment in new technologies and equipment.

Capabilities for structural collapse and entombed rescue

The state is largely viewed to have rescue capacity in place for structural collapse and entombed rescue. Emergency first responders are equipped and trained for localized structural collapse and specialised training conducted for structural collapse rescue with knowledge of relevant tools and techniques. Additional local heavy equipment is able to be requisitioned from local industry in times of disaster to provide construction and earth moving vehicles to respond to landslides. Medium or heavy urban search and rescue teams are available for deployment during catastrophic circumstances or seismic events.

The HP-SDRF

Five crores worth of equipment have previously been provided to the HP-SDRF by the State Government; however, equipment provision thus far has been limited to basic goods with additional, specialised equipment to facilitate a more sophisticated response capacity required.

The HP-SDRF have compiled a list of additional equipment required using NDRF general guidelines. However, such NDRF guidelines are now five years out of date and thus do not take into account recent technological advances which have occurred. Such NDRF guidelines are also found to be very general in nature, and as such fail to take into account the unique context of Himachal Pradesh and its hilly terrain which will require additional specific equipment for disaster management. It is suggested that critical analysis of the list of proposed equipment should be carried out to remove items which are no longer required and provide recommendations for additional equipment which may be new on the market or has not yet been considered. Such analysis could also be made in comparison with current equipment levels of SDRF Uttarakhand.

In terms of vehicles, the HP-SDRF currently has 10 vehicles for response including three trucks and three buses able to seat 26 persons with a distinct lack of specialised vehicles such as hydraulic platforms. Discussions are underway with the State Government to procure 36 additional vehicles. The HP-SDRF suggested an intention to modify trucks once they are procured using locally available re-fabricators so that they are fit for purpose. However, this process is inefficient, with recommendations made for specialised vehicles to be promoted within procurement efforts. In order to increase understanding it is suggested that the HP-SDRF should be supported to visit and inspect specialised vehicles previously provided to UK-SDRF and envision how they could be used to improve capacity and capability.

Capabilities for urban firefighting

Jurisdictional programs for fire prevention are currently in existence within the state and delivered by the Fire Service. There is a network of fire services equipped with personal protective equipment and sufficient functional equipment to safely suppress exterior and interior fires. However, the Fire Service are currently limited in their ability to extinguish fires in high buildings of over 6 stories including residential and commercial structures and as such additional equipment is required to support the Fire Service in fulfilling their mandated

roles and responsibilities and provide an effective response in times of disaster. In depth scoping strategies and needs based assessments are therefore needed to ascertain the level of equipment across the state, assessing the wear and tear of current equipment in operation and proposing additional equipment based on new technologies available for use in the field.

In addition to improvements required in the availability of equipment, there is also an urgent need to reform the hydrant network system in operation to support the Fire Service in providing an effective response to incidents of fire. The hydrant system is a key concern, with hydrants within the current system often failing to maintain adequate fire pressure and subsequently limiting the effectiveness of response operations. The current network of fire hydrants within municipal areas around Shimla does not maintain a sufficient pressure given issues of water supply, with such hydrants being used to service households within urban areas. A widespread network of hydrants dedicated for the use of the fire service and its tenders should be created, which maintain a minimum pressure of 20psi following a detailed scoping strategy to ascertain the number required and their most efficient placement in the field.

7.3 Key investment opportunities

Recommendation	Description
Support the provision of a wireless communication system for the Forest Department	A wireless communication system should be provided to the Forest Department with personnel currently rely on WhatsApp for coordination in the field. This is of particular concern given the difficulties and delays in communication often experienced owing to the steep hillsides present within the state.
Support an in-depth critical assessment of equipment levels within the Forest Department	Basic capabilities in equipment and personnel are notably absent to suppress localized and contained wildland fires obtaining a score of 0.50 on the R2R diagnostic. There is thus a need to provide additional equipment to the Forest Department to facilitate an effective response to forest fires, however a lack of centralised equipment lists at the state level has resulted in uncertainty of equipment availability at the current time.
Support an in-depth critical assessment of equipment levels within the HP-SDRF	Hazard specific response capacity obtained a score of 2.50 on the R2R diagnostic demonstrating a need to strengthen equipment provision for response departments. Current equipment possessed by the SDRF for response is limited to that of basic goods which are unable to support a more sophisticated response to disasters in line with continued capacity and capability growth. In-depth assessment of current levels of equipment and its condition are thus required to ascertain where improvements may be made. Within this assessment, increased focus should be placed on the provision of heavy equipment and equipment required to support improved capacities and capabilities for water-based

Recommendation	Description
	emergencies.
Support an in-depth critical assessment of equipment levels within the Fire Service	Urban firefighting and technical rescue obtained a score of 2.88 on the R2R As such, additional equipment is required to support the Fire Service in fulfilling their mandated roles and responsibilities and provide an effective response in times of disaster following the conductance of an in depth scoping strategy and needs based assessment to ascertain the level of equipment across the state, assessing the wear and tear of current equipment in operation and proposing additional equipment based on new technologies available for use in the field.
Support an in-depth critical assessment of the Fire Hydrant System operationalised by the Fire Service	There is an urgent need to reform the hydrant network system in operation within the state to support the Fire Service in providing an effective response to incidents of fire. The current network of fire hydrants within municipal areas around Shimla does not maintain a sufficient pressure given issues of water supply, with such hydrants being used to service households within urban areas. A widespread network of hydrants dedicated for the use of the fire service and its tenders should be created, which maintain a minimum pressure of 20psi following a detailed scoping strategy to ascertain the number required and their most efficient placement in the field.

7.4 Suggested projects

Project	Project Description	Cost Estimate (USD)
Support the provision of a wireless communication system for the Forest Department	<ul style="list-style-type: none"> A radio communication system should be provided to the Forest Department. The provision of a radio communication network and associated devices will allow the Forest Department to provide effective mobilisation and logistical coordination amongst their network in times of disaster. The provision of such communication devices would additionally promote two-way communication channels, allowing those in the field to provide information to state level command. This system should include: Provision of radio communication handsets to officers present within the network and those operating central command and control. 	Consultancy fees (50 days): 30,000 Equipment provision: 100,000 Total: 130,000

Project	Project Description	Cost Estimate (USD)
	<ul style="list-style-type: none"> • Creation of supporting SOPs and training programs to assist in the provision and provide guidance on use and maintenance. • Radio communications should possess the same functionality as other response agencies, including the provision of repeater systems for VHF and/or UHF radio communication systems, make use of secure, encrypted, technology and be capable of supporting SMS text and mobile data. • Be interoperable with other departments including SEOC headquarters, the police, the Medical Health and Family Welfare department, SDRF, and the Fire Service 	

Project	Project Description	Cost Estimate (USD)
<p>Support an in-depth critical assessment of equipment levels within the Forest Department</p>	<p>Owing to a lack of centralised lists and databases there is great uncertainty within the department as to whether current levels of equipment are sufficient, however; It is understood that basic capabilities and equipment to suppress localised and contained wildland fires is absent within the state.</p> <ul style="list-style-type: none"> • An in-depth assessment of current equipment levels should be commissioned by an external agency with relevant experience with site visits carried out to ascertain the condition of current equipment. • From this study, a centralised list should be created within the department with a subsequent gap analysis carried out to reduce uncertainty as to whether current provisions are sufficient. • Attention should be paid to the need to provide: <ul style="list-style-type: none"> ○ Fire protective suits ○ Lighting ○ Breathing apparatus ○ The provision of a reliable and near-real-time fire detection and monitoring system based upon satellite sensors and Unmanned Air Vehicle (UAV) technology. <p>In order to support the above improvements, additional manpower is required within the department through associated budget allocation. Current estimations suggest that 25% of front-line worker positions remain vacant with recruitment carried out every 4-5 years, however, in order to fill such positions and support improvements in capacities and capabilities these should be conducted at an increased frequency.</p>	<p>Consultancy fees (300 expert days): 180,000</p> <p>Expert travel to the state: 30,000</p> <p>Total: 210,000</p>
<p>Support an in-depth critical assessment of</p>	<p>Equipment assessment An in-depth assessment of current levels of equipment and its condition is required within the Hp-SDRF to ascertain where</p>	<p>Consultancy fees (300 expert days): 180,000</p>

Project	Project Description	Cost Estimate (USD)
<p>equipment levels within the HP-SDRF</p>	<p>improvements may be made. Increased focus should be placed on the provision of heavy equipment and equipment required to support improved capacities and capabilities for water-based emergencies. This should follow the steps outlined below:</p> <ul style="list-style-type: none"> • An in-depth assessment of current equipment levels should be commissioned by an external agency with relevant experience with site visits carried out to ascertain the condition of current equipment. Subsequently, recommendations of additional equipment required to support the capacity growth of the department should be made. These recommendations should account for the unique hazard profile and topography of Himachal Pradesh and use best practice examples from elsewhere in India and the broader international arena. • Within this assessment particular attention should be paid to: <ul style="list-style-type: none"> ○ Equipment required to support improved capabilities for rescue during floods or water-based emergencies including personal protective equipment as well as boats and water tenders. ○ Specialised equipment such as hydraulic platforms for structural collapse and entombed rescue as well as specialised tenders to assist in complex rescue. ○ The provision of drones with multiple and varying functions. 	<p>Expert travel to the state: 30,000</p> <p>Total: 210,000</p>

Project	Project Description	Cost Estimate (USD)
<p>Support an in-depth critical assessment of equipment levels within the Fire Service</p>	<p>In depth scoping strategies and needs based assessments are required to ascertain the level of equipment able to be operationalised by the Fire Service across the state, assessing the wear and tear of current equipment in operation and proposing additional equipment based on new technologies available for use in the field. This assessment is required to increase understanding of current capacities and capabilities, identify key weaknesses and strengths within the system and support future improvements. This should follow the below steps:</p> <ul style="list-style-type: none"> • An in-depth scoping strategy should be commissioned by an external agency with relevant experience with site visits carried out to ascertain the level of equipment across the state, assessing the wear and tear of current equipment in operation. • Subsequent recommendations of additional equipment required to support the capacity growth of the department should be made. These should take into account the unique hazard profile and topography of Himachal Pradesh with proposals for additional equipment based on new technologies available for use in the field. 	<p>Consultancy fees (300 expert days): 180,000</p> <p>Expert travel to the state: 30,000</p> <p>Total: 210,000</p>
<p>Support an in-depth critical assessment of the Fire Hydrant System operationalised by the Fire Service</p>	<p>There is an urgent need to reform the hydrant network system in operation within the state to provide a widespread network of hydrants dedicated for the use of the fire service and its tenders which maintain a minimum pressure of 20psi following a detailed scoping strategy to ascertain the number required and their most efficient placement in the field. The following components should thus be undertaken:</p> <ul style="list-style-type: none"> • An in-depth scoping strategy should be commissioned for an external agency with relevant experience to assess the current hydrant system in its entirety within the state and provide recommendations for the 	<p>Consultancy fees (300 expert days): 180,000</p> <p>Expert travel to the state: 30,000</p> <p>Total: 210,000</p>

Project	Project Description	Cost Estimate (USD)
	<p>creation of a widespread network of hydrants for dedicated use by the Fire and Emergency Service and its tenders.</p> <ul style="list-style-type: none"> • This should include assessment of whether the previous gravitational system in place within the state may be reinvigorated for such a purpose as well as ascertaining the number of hydrants required and their most efficient placement in the field through use of detailed GIS analysis. 	

8 Personnel

8.1 Component overview

A highly skilled and experienced workforce is the most valuable resource in any disaster preparedness and response system. To achieve this, there must be a culture of preparedness in which both the public and political entities trust the agencies tasked with ensuring public safety and minimizing economic disruptions. Developing such a culture requires intensive and extensive training of those involved in EP&R so that they acquire the necessary knowledge, skills, and practical experience. Training of personnel must take advantage of the best available plans, information, facilities, and equipment to ensure an interoperable systems approach is broadly understood. It must also enable deep capability in focused areas of expertise to ensure that personnel development spreads upward, from the individual to the team, and from the team to the agency (GFDRR, 2021).



Figure 8-1: Scoring for personnel, Himachal Pradesh

8.2 Component conclusions

Incident Organisation Structures

State Disaster Management Authority (SDMA)

An in-depth scoping strategy is required into the personnel and expertise required within the HP-SDMA to support the provision of disaster risk management to the multitude of hazards faced within the state is required. Previously, recruitment drives have focused on improving

personnel levels at the SDMA and DDMA, with the need to provide a permanent staff team within the SEOC being neglected, although this has been identified as a critical need to be addressed in the future. Such analysis should be conducted upon the human resource structure proposed for effective SEOC functioning by the NDMA, benchmarked against those present in other states' SDMAs and tailored to the unique needs of Himachal Pradesh.

In addition to improving the personnel structure of the SEOC, further improvements are also required in the broader HP-SDMA structure with analysis required of the best way to meet operational demands in the future. Additional human resources are required in task teams deployed to respond to disasters. Questions over the best way of structuring such teams and their officers within HP-SDMA remain among management owing to the different capabilities required in, for example, search and rescue, floods, and forest fires. Difficulties in maintaining manpower for each specialisation remain, with no expert present for each of the disaster types present within the HP-SDMA. Currently, the HP-SDMA relies on the national level for such expertise on a needs-basis, and is yet to develop a strategy of how such capacities could be developed the state level. Such a strategy should incorporate a mix of government officials, private individuals, volunteers, and NGOs to ensure collaborative functioning and comprehensive efforts in the future to mitigate and provide effective response to disasters in the future.

Furthermore, the SDMA also suffers from a lack of expertise in forecasting and remote sensing with only one member of staff is currently identified as possessing GIS expert capabilities and no forecasting expert in place. Recruitment for such expertise is ongoing yet positions remain currently unfilled.

The Fire Service

Within the Fire Service, available manpower was also found to be a key area of concern with an urgent need to review current manpower levels dedicated to operationalizing each of the posts contained within their network to ensure efficient service delivery for disaster risk management. The Fire Service currently operates its stations and posts with the personnel structure shown in Table 8-1.

Table 8-1: Fire and Emergency Service Department, Himachal Pradesh fire station/post personnel structure

Infrastructure type	Personnel team number
Fire Stations	27
Fire sub-stations	22
Fire posts	17

In-depth assessments are required to ascertain whether this number of personnel is adequate to man such stations and posts, with particular attention paid to the 17 strong team used to support the operation of fire posts given the need to account for annual leave and training needs.

Additional recruitment will also be required in the future to keep pace with planned expansion of the fire station and post network.

Training and capacity building

Within the Fire Service and the Forest Department there is a lack of SOPs, operation cycles and decision-making matrices to support the incident organisation structure. There is also a lack of supporting resource materials, such as checklists for each functional roles and planning processes, and training and experienced instructors are currently unavailable within the departments. Maintained standards, best practices, and or/guidelines are also required to support the incident organisation structure. These needs are reflective of the current incident organization structures of both departments. There is a need to provide effective headquarter departments and consolidated data from which planning can be undertaken to increase the efficiency of operations and move away from a focus on response to that of preparedness.

A roster of trained and experienced personnel for functional roles identified in the incident organization structure is stated to be in place. However, the HP-SDMA is currently relying on the IDRN to fulfil such purposes, which, although of value at the national level, is limited in its functionality at the state level to provide detailed assessments of capacities and capabilities for response present in the field during disaster events. No such databases are currently in operation within the Fire and Emergency Services and the Forest Department, suggesting this is a critical area in need of improvement.

Formal procedures to request personnel for specific functional roles from other levels of governance or jurisdictions are available to the HP-SDRF and the HP-SDMA through their close connections to both the NDMA, NDRF and military organisations. This is once again not reflected amongst the Forest Department and Fire Service and further underlines the need to improve the organization structure of both departments through consultations with national level experts and improve vertical levels of governance integration.

A categorized database of available common resources such as tools, equipment and vehicles is lacking within the state. This reinforces the findings discussed within the information component where a lack of systematic databases was identified. Improvement is needed in this area through the pooling of resources during times of high system stress to support a consolidated multi-stakeholder response in times of disaster. Relatedly, agreements for the sharing of emergency personnel and resources are also required to address cost-recovery and financial considerations of the source agencies.

Training programs are largely established for those identified in agency-specific emergency response plans and those with accountabilities in emergency response but improvements should still be made. In particular, there is a need to improve training programs to cover legislated job training requirements and increase the number of instructors available. Training materials should be produced within the HP-SDRF, Fire Service and the Forest Department that are consistent with best practices and reflect current legislation and accountability frameworks. This should increase efficiency of response operations and support sustained and continual increases in capacity and capability.

In order to support such developments, it is suggested that all departments establish a core team of dedicated personnel to ensure training programs are regular and cover the required scope of relevant knowledge and skills. They should track the attendance of personnel to understand the growth in trained resource capacity for to a range of hazards. This team should also assist in the creation of improved 'train the trainer' or 'master training systems' within the departments to ensure cost-effective manner diffusion of knowledge obtained by those attending training courses.

Additional duties of such capacity building teams should also include the creation of state-level databases within each department, to allow the tracking and viewing of the training individual personnel have received, how many personnel are trained in which areas, who has taken part in refresher training and who is overdue. Such a database would also allow increased risk-informed decision making and support the creation of an IRS for improved incident response.

HP-SDRF

Within the HP-SDRF an improved advanced training calendar is required in addition to the creation of specialised response teams to support increased capacities and capabilities for response. Within the current personnel structure, 120 posts are occupied by frontline workers, divided into teams of 40. However, a lack of trained deep divers currently hinders flood response capability, whilst a lack of a trained dog unit owing to a lack of land for such purpose limits search and rescue capability. Given that the HP-SDRF remains in its infancy, many staff members also remain new in their posts and the requisition of increased staff is yet to be undertaken.

Within the HP-SDRF, all training is obtained by sending teams to NDRF training centres across the country, including 'basic course' training for disaster management. Advanced courses have been undertaken in Collapsed Structure Search and Rescue (CSSR), Chemical, Biological, Radioactive, Nuclear (CBRN), and bore-well rescue. Further training on specialised rescue is scheduled to be conducted in the coming year. Health training is provided within the basic course catalogue. An improved advanced course training calendar is required for elements such as mountain rescue, running water rescue, and deep-water rescue with staff's attendance of such courses still pending. Fire training is yet to be considered for personnel.

The Medical Health and Family Welfare Department

Additional training of pre-existing personnel within the Medical Health and Family Welfare department is identified to be a critical area in need of improvement. In particular, training of nodal officers in disaster risk who may be able to provide coordination of response efforts is currently lacking. Nodal officers are charged with overseeing the hospital under their authority whilst during times of disaster the nodal officer will control the spaces required for treatment. By improving the understanding of health officials in the management of disasters, improvements can be made in coordination for response and the managing of triage operations in times of high stress. Such training should be delivered in a way that produces practical understanding.

Exercises and Drills

Stakeholders currently participate in exercises and drills for disaster response conducted at the district level under the authority of the DDMAs. However, these are often conducted in a casual manner that is often over-dramatized and as such do not produce the desired response in terms of stakeholder coordination and verification of EP&R system functioning. Such drills at the district level should thus be improved with the implementation of scenario-based testing to facilitate subsequent analysis of additional resources and procedure reform required to support improved service delivery between and within departments for disaster risk management. These district level exercises and drills should be overseen by a dedicated team at the state level to ensure they are conducted in an efficient manner with effective regularity whilst similar exercises and drills should also be conducted at the state level, to prepare for a potential worst-case scenario disaster event and enhance multi-stakeholder coordination and collaboration within vertical and horizontal networks of the EP&R system.

8.3 Key investment opportunities

Recommendation	Description
Strengthen the operational personnel structure of the SDMA	There is an urgent need to reform and improve the personnel structure of the HP-SDMA and associated SEOC to facilitate improved disaster risk management. Currently, a lack of technical expertise for response, GIS and forecasting as well as the lack of permanent staff within the SEOC hinders capacity and capability growth within the SDMA. There is a need for in-depth studies to ascertain the most cost-effective and efficient personnel structure required.
Strengthen the operational personnel structure of the Fire Service	Within the Fire Service, available manpower was also found to be a key area of concern with an urgent need to review current personnel levels dedicated to operationalizing each of the posts contained within their network to ensure efficient service delivery for disaster risk management.
Support improved training and capacity building within the HP-SDRF	Capabilities for rescue during floods or water-based emergencies are also severely constrained within the HP-SDRF owing to a lack of trained deep-sea divers and training in advanced water rescue techniques. Capabilities for structural and entombed rescue are similarly constrained owing to a lack of a specialised dog unit.

Recommendation	Description
Improved training programs for disaster risk management within the Medical Health and Family Welfare Department	Improved training of personnel for disaster risk management is required with the department with no specific disaster training currently undertaken for officials and officers who would be expected to assume command and control within a facility or across the network during a disaster event. Capacity building in this area is required for those at manager level and above with responsibilities to provide effective coordination during a disaster event. Traditionally, those in field positions at the grassroots level have been the focus of training initiatives. This has been identified as a crucial gap in capacity which should be remedied with urgency to minimise the initial chaos commonly experienced at the onset of a disaster event. Such training should include key information distilled from the State Disaster Management Plan and relevant district disaster management plans, descriptions of specific roles of key staff members, information and skills required to perform such roles during an emergency, how supplies and equipment are obtained during disasters, and back-up communication systems used during disaster emergencies
Improved training and capacity building of response departments	The indicator for 'training and capacity building' obtained a score of 2.50 within the diagnostic reflecting the need for significant improvement with all departments. Improved databases and dedicated personnel are thus required within each of the EP&R agencies to ensure training is efficiently planned and tracked through comprehensive learning management tools. Such personnel and tools should also be utilized to ensure training and learning plans are developed which are specific and tailored to each personnel, with monitoring of performance target conducted by managers.

Recommendation	Description
<p>Strengthening of the exercises and drills program</p>	<p>The exercises and drills indicator performs strongly on the diagnostic process, resulting in a score of 4.48. However, through stakeholder discussion this is found to be misleading. Despite the presence of an exercise and drill program on paper, strengthening is required to ensure they are capable of testing current institutional arrangements and resource levels in a live situation to deliver practical, hands-on training for personnel.</p> <p>Multi-stakeholder exercises and drills are conducted three times a year at the district level with attendance of all stakeholders of the EP&R system present within said district attending. However, such mock drills are yet to be held in a comprehensive manner and are insufficient to produce the distillation of lessons learned and improved system functioning. Additional drills are also carried out at the state level, however; these are described by stakeholders as ‘incomprehensible’.</p> <p>Improvements should therefore be made to exercises and drills, with training provided prior to the exercise to enhance coordination practices, whilst scenario-based exercises should be developed within a dedicated platform which are able to test available resources and enable sensitisation of those involved. Such mock exercises should also be run within ‘live situations’ in addition to the traditional table-top exercises.</p>

8.4 Suggested projects

Project	Project Description	Cost Estimate (USD)
<p>Strengthen the operational personnel structure of the SDMA</p>	<ul style="list-style-type: none"> • An in-depth study of the personnel structure of the SDMA and associated SEOC should be carried out with support provided from the World Bank, centralised NDMA or an external consultancy with relevant expertise to provide a guideline for an optimal operational personnel structure. • This analysis should include development of: <ul style="list-style-type: none"> ○ A permanent personnel structure to operationalise the SEOC on a 24/7/265 basis with surge capacity incorporated for times of disaster. ○ Personnel structures required to implement multi-hazard task 	<p>Consultancy fees (200 expert days): 120,000</p> <p>Total: 120,000</p>

Project	Project Description	Cost Estimate (USD)
	<p>teams to be deployed for response.</p> <ul style="list-style-type: none"> ○ Incorporation of governance officials, private individuals, volunteers and NGOs. ● Further to the above study, the following additional personnel are required: <ul style="list-style-type: none"> ○ Additional members of staff with GIS expert capability. ○ Additional members of staff with forecasting capability 	
Fire Service personnel structure	<p>The Fire Service should be supported to assess current needs and future requirements to produce an optimal operational structure for continued effective service deliver through a review of manpower levels required to operationalise each of the posts contained within their network. This process should follow the below project steps:</p> <ul style="list-style-type: none"> ● An in-depth study of the personnel levels currently allocated to the operation of Fire Stations, Fire Sub-Stations and Fire Posts should be carried out by an independent consultancy with relevant expertise to ascertain whether current levels are sufficient. ● Within this analysis, particular attention should be paid to the 17 strong team used to support the operation of fire posts given the need to account annual leave and training needs. ● Subsequent recommendations should be made in the form of a written report which the Fire Service are able to present to the State Government as impetus for future recruitment drives. 	<p>Consultancy fees (200 expert days): 120,000</p> <p>Total: 120,000</p>
SDRF training and capacity building	<p>The SDRF do not currently have personnel trained in deep-sea diving, advanced water rescue, or deployment of trained dogs for structural collapse and entombed rescue.</p>	<p>Consultancy fees (240 expert days): 144,000</p>

Project	Project Description	Cost Estimate (USD)
	<p>This hinders their ability to provide specialised technical response in times of disaster. The provision of such specialised personnel is required to support the capacity and capability of the SDRF to provide an effective response in times of disaster. Such teams will be vital in assisting the SDRF to meet their mandated responsibility to provide effective protection against the loss of life during flood and seismic events. This should include the following steps:</p> <ul style="list-style-type: none"> • The formation of a specialised flood rescue team is required, with personnel trained in deep-sea diving techniques and advanced water rescue. • The formation of a specialised dog unit is required, with dedicated space for their housing and training created within SDRF facilities. • Such teams and the broader SDRF should be allowed to utilise the Central Training Centre operationalised by the police including use of their deep-dive pool. Training should also be conducted in this facility across the departments to allow drills for a consolidated response across various scales. 	<p>Total: 144,000</p>

<p>Improved training programs for disaster risk management within the Medical Health and Family Welfare Department</p>	<ul style="list-style-type: none"> Improved training of personnel for disaster risk management is required with no specific disaster training currently undertaken for officials and officers who would be expected to assume command and control within a facility or across the network during a disaster event. Capacity building in this area is required for those at manager level and above with responsibilities to provide effective coordination during a disaster event. Traditionally, those in field positions at the grassroots level have been the focus of training initiatives. This has been identified as a crucial gap in capacity which should be remedied with urgency to minimise the initial chaos commonly experienced at the onset of a disaster event. Such training should include key information distilled from the State Disaster Management Plan and relevant district disaster management plans, descriptions of specific roles of key staff members, information and skills required to perform such roles during an emergency, how supplies and equipment are obtained during disasters, and back-up communication systems used during disaster emergencies. A training program should be established by the SDMA with support from academic institutions to provide effective training in command and control of response efforts to officers within the Medical Health and Family Welfare Department. This training should be based on the State Disaster Management Plan and District Disaster Management Plans, descriptions of specific roles of key staff members, skills required to perform such roles, how supplies and equipment are obtained during disasters and back-up communication systems used during disaster emergencies. 	<p>Consultancy fees (150 days): 90,000</p> <p>Training and Capacity Building: 40,000</p> <p>Travel of experts to the state: 20,000</p> <p>Total: 150,000</p>
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Project	Project Description	Cost Estimate (USD)
	<ul style="list-style-type: none"> This training should be delivered in a series of workshops for all concerned personnel with refresher training conducted bi-annually and a training of trainers system created within the department to ensure the diffusion of such knowledge 	
Improved training and capacity building of response departments	<p>Within all departments</p> <p>Support should be provided by the World Bank through a technical assistance project to assist departments in capacity building efforts, creating the structures necessary to guide continual growth across the EP&R system. Within this project:</p> <ul style="list-style-type: none"> Currently, rosters of trained and experienced personnel are not maintained in a systematic manner within a consolidated database both within and between departments, limiting the ability of central command to direct an efficient response effort. A standardised digital database across departments should thus be created containing detailed rosters of trained and experienced personnel within each department. This system should be interoperable across departments to allow for tracking of capacity, highlight any potential areas in need of improvement and allow for the rapid retrieval of information during a disaster event. This database should also include functionality to be included within the IMS and associated DSS operated under the SDMA. The World Bank should assist the departments on an individual basis to mature dedicated teams of personnel and structures tasked with capacity growth through the identification of training needs, monitoring of training delivery, creation of rosters of training personnel have received, develop agreements for the sharing of emergency personnel between 	<p>Consultancy fees (480 working days): 290,000</p> <p>Capacity Building workshops: 60,000</p> <p>Expert travel to state: 50,000</p> <p>Total: 400,000</p>

Project	Project Description	Cost Estimate (USD)
	<p>departments, monitor performance targets, monitor the quality of training delivery and ensure training and associated materials are evaluated on best practice.</p> <p>SDMA</p> <ul style="list-style-type: none"> • Within the SDMA this team should conduct a training needs assessment specific to individual technical teams through discussions with such personnel and subsequently introduce an annual training calendar specific to individual needs to ensure the continual capacity building, learning and growth of the institution. This should be a continual process with the need for refresher training incorporated and training officers incorporating best practice examples developed elsewhere in India and internationally. <p>SDRF</p> <ul style="list-style-type: none"> • Within the SDRF, this team of dedicated training management personnel should conduct a training needs assessment specific to individual technical teams through discussions with such personnel. Subsequently introduce an annual training calendar specific to individual needs to ensure the continual capacity building, learning and growth of the institution. This should be a continual process with the need for refresher training incorporated and training officers incorporating best practice examples developed elsewhere in India and internationally. • Strategies should be developed to improve upon the lack of refresher training currently undertaken within the department. • The annual training calendar should be reviewed with incorporation of heli-rescue training and high-altitude training given that procurement processes are currently 	

Project	Project Description	Cost Estimate (USD)
	<p>ongoing for the SDRF to procure a fleet of helicopters.</p> <p>The Fire and Emergency Services</p> <ul style="list-style-type: none"> • Within the Fire and Emergency Services, this team of dedicated training management personnel should conduct a training needs assessment specific to individual technical teams through discussions with such personnel. Subsequently introduce an annual training calendar specific to individual needs to ensure the continual capacity building, learning and growth of the institution. This should be a continual process with the need for refresher training incorporated and training officers incorporating best practice examples developed elsewhere in India and internationally. • Training calendars for personnel should be developed in accordance with SFAC guidelines, best practices from the National Fire Service College and include specialised training in elements such as medical response, flood rescue, chemical disaster, earthquake disaster response, hazardous material emergency, collapsed structure and emergency response to rail accidents. • This training calendar should also include improved incorporation of international support coordination with international courses identified which personnel would benefit from attending and allow integration of international best practice within the capacity of the department. • A training of trainers system should be established within the department to ensure continued improvement, education and capacity growth. <p>The Forest Department</p>	

Project	Project Description	Cost Estimate (USD)
	<ul style="list-style-type: none"> • Within the Forest Department, this team of dedicated training management personnel should conduct a training needs assessment specific to individual technical teams through discussions with such personnel. Subsequently introduce an annual training calendar specific to individual needs to ensure the continual capacity building, learning and growth of the institution. This should be a continual process with the need for refresher training incorporated and training officers incorporating best practice examples developed elsewhere in India and internationally. • Focus should be placed on developing the competencies of existing staff to allow them to progress to high levels of management and incident control. This should ensure those in command have practical hands-on knowledge of field operations and assist in the accumulation of knowledge within the department. <p>The Home Guards and Civil Defence</p> <ul style="list-style-type: none"> • Within the Home Guards and Civil Defence, this team of dedicated training management personnel should conduct a training needs assessment specific to individual technical teams through discussions with such personnel. Subsequently introduce an annual training calendar specific to individual needs to ensure the continual capacity building, learning and growth of the institution. This should be a continual process with the need for refresher training incorporated and training officers incorporating best practice examples developed elsewhere in India and internationally. <p>The Medical Health and Family Welfare</p>	

Project	Project Description	Cost Estimate (USD)
	<ul style="list-style-type: none"> • Within the Medical Health and Family Welfare Department, this team of dedicated training management personnel should conduct a training needs assessment specific to individual technical teams through discussions with such personnel. Subsequently introduce an annual training calendar specific to individual needs to ensure the continual capacity building, learning and growth of the institution. This should be a continual process with the need for refresher training incorporated and training officers incorporating best practice examples developed elsewhere in India and internationally. • Focus should be placed on training field personnel on the protocols of response were a disaster to occur to ensure practical understanding prior to the onset of an emergency. • Training needs assessments should be conducted with immediate urgency within the hillside districts, to identify current gaps in capacity of available personnel and strengthen capacity building in these remote areas. 	

Project	Project Description	Cost Estimate (USD)
<p>Strengthening of the exercises and drills program</p>	<ul style="list-style-type: none"> • A platform should be developed for an improved system for exercising and drills with the ability to deliver live simulation exercises. This platform should be delivered to the SDMA and DDMA with associated training capacity workshops delivered. The external consultancy should also provide support to the conductance of three such drills, with associated training delivered prior to the exercise on aims, objectives, procedures and refinement of operational lessons learnt to hazard specific response departments. This should seek to expand upon the current program in place which is focused on table-top exercises carried out to a comprehensive live exercise based on realistic scenarios and incorporating both primary and secondary impact hazards which will require a multi-stakeholder response. • Training should be delivered prior to an initial exercise designed to enhance coordination practices between stakeholders with an additional session conducted following the exercise to distil lessons learned and potential areas of improvement, providing a demonstratable system which can be carried on by the DDMA and SDMA in the future. 	<p>Consultancy fees (280 days): 170,000</p> <p>Training and capacity building workshops: 40,000</p> <p>Expert travel to state: 30,000</p> <p>Total: 240,000</p>

9 Investment plan

In the following Table 9-1, a collation of the suggested projects identified as capable of improving EP&R capacities in the state of Himachal Pradesh are presented. The activities included in this investment plan have a total cost of 12,478,000 USD.

Table 9-1: Suggested projects for investments in Himachal Pradesh

No.	Project	Cost Estimate (USD)
1	Support improved understanding of disaster risk management planning, multi-stakeholder collaboration and the creation of departmental DRM plans and associated operational SOPs	220,000
2	Support the increased use of social media within EP&R departments	48,000
3	Support increased DRM training courses for governance officials	140,000
4	Support capacity growth to monitor and forecast hydro-meteorological disasters within the SDMA	240,000
5	Creation of an interoperable resource tracking database between departments and strengthening of the IMS	1,426,000
6	Support the creation of a dedicated State Emergency Operations Centre (SEOC)	1,500,000
7	Support the strengthening of disaster risk management capacities within the Medical Health and Family Welfare Department through the creation of a dedicated command-and-control room and the conductance of an in-depth critical infrastructure assessment.	1,010,000
8	Support the strengthening of the HP-SDRF through the creation of a command-and-control room and the provision of dedicated response stations and storage facilities	2,500,000
9	Support the strengthening of the Fire Service through the creation of a command-and-control room and the conductance of an in-depth critical assessment of available response stations	1,010,000
10	Support strengthening of the Forest Department through the creation of a command-and-control room, improved storage facilities and the provision of mobile support facilities	2,090,000
11	Support strengthening of the shelter system	150,000

No.	Project	Cost Estimate (USD)
12	Support the provision of a wireless communication system for the Forest Department	130,000
13	Support an in-depth critical assessment of equipment levels within the Forest Department	210,000
14	Support an in-depth critical assessment of equipment levels within the HP-SDRF	210,000
15	Support an in-depth critical assessment of equipment levels within the Fire Service	210,000
16	Support an in-depth critical assessment of the Fire Hydrant System operationalised by the Fire Service	210,000
17	Strengthen the operational personnel structure of the SDMA	120,000
18	Strengthen the operational personnel structure of the Fire Service	120,000
19	Support improved training and capacity building within the HP-SDRF	144,000
20	Improved training programs for disaster risk management within the Medical Health and Family Welfare Department	150,000
21	Improved training and capacity building of response departments	400,000
22	Strengthening of the exercises and drills program	240,000
Total:		12,478,000

9.1 Investment priorities

The suggested projects for Himachal Pradesh have been grouped into investment priorities, designed to produce a step-change in EP&R capabilities (Table 9-2).

The investment prioritisation follows the central logic of the R2R diagnostic in which the legal and institutional framework component is viewed to be a fundamental pre-requisite of EP&R system capacity. Improvements in the legal framework, accountabilities and coordination mechanisms are thus a precondition for effective and sustainable capacity building of EP&R actors.

The total cost of activities in each priority grouping is:

- Priority 1: 9,694,000(USD)
- Priority 2: 2,784,000 (USD)

9.1.1 Priority 1 activities

- Projects within the legal and institutional frameworks are understood to be an entry point for change. Therefore, initial priority should be given to laying the foundation for future developments, with Priority 1 investment activities focused on initial gains realised from improved coordination abilities and capacities of the EP&R system which will in turn support longer-term system strengthening.
- Following the same logic, the need to improve disaster risk management understanding amongst government officials is included within the first prioritisation given their key responsibilities in coordination during a disaster event.
- Additional suggested projects included in the first prioritisation also include the need to provide command-and-control centres within each of the departments to produce a coordinated and risk-informed approach to response operations. Such improvements are also a pre-requisite to suggested projects contained in the second prioritisation, including the strengthening of the IMS system.
- Work to improve the resource tracking of equipment levels within the departments is also contained within the first prioritisation owing to a lack of well-developed understanding which is required to identify gaps within the current provision and provide subsequent recommendations.
- Personnel improvements within the SDMA, Fire Service and SDRF have also been prioritised as a critical improvement given the need for such expertise to implement suggested projects contained within the second priority investments and provide critical service delivery within the EP&R system.

9.1.2 Priority 2 activities

- The second prioritisation grouping focuses on the information and personnel components of the R2R diagnostic. These investments are intended to build capacities within the departments. However, they are often dependent on the first tier of projects being realised.
- For example, the implementation of a strengthened IMS is dependent on the creation of effective command-and-control within the response departments produced by the provision of such facilities.
- Similarly, capacity growth to monitor and forecast hydro-meteorological disasters within the SDMA is dependent upon the enhanced provision of technical knowledge for forecasting and remote sensing within the department.
- As such, the largest return-of-investment is expected when the full investment plan is followed, projects are programmatically connected, and a process of institutional capacity development is undertaken. Only then will the program results be greater than the sum of the isolated elements.

9.1.3 Advisory activities

Simultaneous to investments in development projects, the government is advised to structurally grow its personnel budget and hire and train new personnel. This is required to be able to instigate, manage and maintain new projects, facility creation, data management and other tasks associated with the maturing EP&R system. The government is also advised to budget for maintenance and replacement of equipment and facilities at the end of their expected life spans.

Table 9-2: Investment priorities

Priority	Suggested Project	Target Institution	Component	Cost estimate (USD)
Priority 1	Support improved understanding of disaster risk management planning, multi-stakeholder collaboration and the creation of departmental DRM plans and associated operational SOPs	The State Disaster Management Authority (SDMA), the State Disaster Response Force (SDRF), the Fire Service, the Forest Department, the Medical Health and Family Welfare Department, the Home Guards and Civil Defence	Legal and institutional frameworks	220,000
	Support increased DRM training courses for governance officials	The State Disaster Management Authority (SDMA) and Governance officials within the state and district government	Information	140,000
	Support the creation of a dedicated State Emergency Operations Centre (SEOC)	The State Disaster Management Authority (SDMA)	Facilities	1,500,000
	Support the strengthening of disaster risk management capacities within the Medical Health and Family Welfare	The Medical Health and Family Welfare Department	Facilities	1,010,000

Priority	Suggested Project	Target Institution	Component	Cost estimate (USD)
	Department through the creation of a dedicated command-and-control room and the conductance of an in-depth critical infrastructure assessment.			
	Support the strengthening of the HP-SDRF through the creation of a command-and-control room and the provision of dedicated response stations and storage facilities	The State Disaster Response Force (SDRF)	Facilities	2,500,000
	Support the strengthening of the Fire Service through the creation of a command-and-control room and the conductance of an in-depth critical assessment of available response stations	The Fire Service	Facilities	1,010,000
	Support strengthening of the Forest Department through the creation of a command-and-control room, improved storage facilities and the provision of mobile support facilities	The Forest Department	Facilities	2,090,000
	Support an in-depth critical assessment of equipment levels within the Forest Department	The Forest Department	Equipment	210,000

Priority	Suggested Project	Target Institution	Component	Cost estimate (USD)
	Support an in-depth critical assessment of equipment levels within the HP-SDRF	The State Disaster Response Force (SDRF)	Equipment	210,000
	Support an in-depth critical assessment of equipment levels within the Fire Service	The Fire Service	Equipment	210,000
	Support an in-depth critical assessment of the Fire Hydrant System operationalised by the Fire Service	The Fire Service	Equipment	210,000
	Strengthen the operational personnel structure of the SDMA	The State Disaster Management Authority (SDMA)	Personnel	120,000
	Strengthen the operational personnel structure of the Fire Service	The Fire Service	Personnel	120,000
	Support improved training and capacity building within the HP-SDRF	The State Disaster Response Force (SDRF)	Personnel	144,000
Priority 1 total:				9,694,000
Priority 2	Support the increased use of social media within EP&R departments	The State Disaster Management Authority (SDMA), the State Disaster Response Force (SDRF), the Fire Service, the Forest Department, the Medical Health and Family Welfare Department, the	Information	48,000

Priority	Suggested Project	Target Institution	Component	Cost estimate (USD)
		Home Guards and Civil Defence		
	Support capacity growth to monitor and forecast hydro-meteorological disasters within the SDMA	The State Disaster Management Authority (SDMA)	Information	240,000
	Creation of an interoperable resource tracking database between departments and strengthening of the IMS	The State Disaster Management Authority (SDMA), the State Disaster Response Force (SDRF), the Fire Service, the Forest Department, the Medical Health and Family Welfare Department, the Home Guards and Civil Defence	Information	1,426,000
	Support strengthening of the shelter system	The State Disaster Management Authority (SDMA)	Facilities	150,000
	Support the provision of a wireless communication system for the Forest Department	The Forest Department	Equipment	130,000
	Improved training programs for disaster risk management within the Medical Health and Family Welfare Department	The Medical Health and Family Welfare Department	Personnel	150,000
	Improved training and capacity building of response departments	The State Disaster Management Authority (SDMA), State Disaster	Personnel	400,000

Priority	Suggested Project	Target Institution	Component	Cost estimate (USD)
		Response Force (SDRF), the Fire Service, the Forest Department, the Home Guards and Civil Defence, the Medical Health and Family Welfare department		
	Strengthening of the exercises and drills program	The State Disaster Management Authority (SDMA)	Personnel	240,000
Priority 2 total:				2,784,000

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