

Prevention and Mitigation

As per the outcome of HVCRA conducted in Chapter 02 of this District Plan the major Hazards identified with High Risk are taken into consideration for identification of mitigation measures to reduce the risk of Disaster in District Kangra. The details are provided in the table below

4.1 Prevention

Prevention can be defined as “an action taken to avoid an incident or stopping an incident from occurring”. It basically includes deterrence operations and surveillance. Whereas, “Mitigation refers to measures that prevent an emergency, reduce the chance of an emergency happening, or reduce the damaging effects of unavoidable emergencies”.

Preventive actions have to be taken before a disaster to reduce the likelihood of a disaster (risk reduction) or the level of damage (vulnerability reduction) expected from a possible hazard. Vulnerability reduction is given priority over a risk reduction. The district can avail itself of four mechanisms (singularly or together) to reduce risk and vulnerability;

4.2 Mitigation

Mitigation Measures

Mitigation measures are two types -. Structural measure and non-structural measures.

1. **Structural mitigation** refers to any physical construction to reduce or avoid possible impacts of hazards, which include engineering measures and construction of hazard-resistant and protective structures and infrastructure like building codes, retrofitting of buildings, lifelines and infrastructure to withstand any hazard, relocation etc.

2. **Nonstructural mitigation** refers to measures that emphasis on policies, regulatory measures, knowledge development, land-use planning programs for sustaining awareness, dissemination of information material on do’s and don’ts, behavioral modification etc.

Mitigation efforts are also undertaken at the personal levels by involving assessment of possible risks to personal / family health and property. Thus, adverse effects of disasters can be minimized if mitigation policies, plans, and projects undertaken are implemented with risk perception and strong political will.

Hazard-specific Structural & Non-Structural Measures

Following are some of the measures with regards to some major Hazards as per Chapter 2.

A. Structural Mitigation

Hazards	Measures	Responsible Department	Remarks
Earthquake	Rapid visual screening to be done at Sub Divisions levels for identification of Vulnerable Public Infrastructure Specially, Schools, Hospitals, Administrative buildings.	HPPWD Kangra, T&CP, Revenue Department.	In Case of Roads & Bridges fall in jurisdiction of National Highways Responsibility will go to NH – Shahpur for District Kangra
	Retrofitting of Public Infrastructure	HPPWD Kangra, T&CP, Revenue Department. Municipal Corporation	Only Government structures will be covered.
	Enforcement of NBC/ earthquake-resistant building Byelaws	Municipal Corporation, Revenue, HPPWD	Through special schemes and during loans
Landslide	Enforcement of NBC/ building Byelaws for construction in landslide prone area.	HPPWD, Municipal Corporation, Revenue	
	Rock fall control measures comprising of grass plantation, vegetated dry masonry wall,	Forest Department, HPPWD, Revenue	
	Drainage measures, which include surface drainage, sub-surface drainage	HPPWD, Municipal Corporation.	
	Afforestation	Forest Department, PRI	
	Construction of Retaining walls	HPPWD, Municipal Corporation.	
	Installation of Early warning devices	HPPWD, DDMA	
Flood	Erosion control measures consisting of Bamboo check dams, terracing, Jute and coir netting	I&PH and PWD	
	Strengthening/ construction of embankments, flood walls and flood levees	I&PH, PWD, Revenue	
	Proper desilting/ dredging of rivers in order to keep the rise of the river beds minimum	I&PH,	
	Installation of Flood warning dissemination system	I&PH	
	Diversion of flood water in order to lower water levels in the rivers	I&PH	
	Catchment area treatment/ afforestation, building up of check dams/ detention basins in order to reduce the flood peaks and control the suddenness of the runoff	Forest department, I&PH	
Road Accidents	Construction of all-weather roads	PWD, MC, NH	
	Clearing of Debris and projected mountain sides along roads and National Highways,	PWD, MC, NH	

	Construction of Parapets and crash barriers along the roads	PWD, MC, NH	
	Inspection and Maintenance of Road Tunnels	PWD, MC, NH	
Fire & Forest Fire	Building fire lines for forest fire	Fire Department, Home Guards, Forest Department	
	Building Water hydrant tanks/ Water bodies in villages prone for Forest fire	I&PH, Forest Depart	
	Enforcement of Fires Safety rules and regulations	Fire Department, and Electrical department	
	Establishment of fire stations for improving outreach of fire services	Fire Department, PRI's	
	Enforcement of fire approvals as per the provisions contained in National Building Code (NBC), 2005 (Part IV- Life & Fire Safety) for new constructions	Fire Department, DRDA, Municipal Corporation	
Drought	Make use of the frontier techniques like remote sensing and GIS.	Horticulture & Agriculture Department & I&PH, DRDA	
	Creating Seed Banks for the Farmers		
Stampede	Installation of Video surveillance systems at places of Mass gathering.	DDMA, Revenue	
	Barricades for crowd control	Police	
	Use of modern technology to disseminate the alerts/ warnings	Fire Home guards, DIO	
	Planning and Enforcement of site plan and Evacuation plan of the Mela/ Temple areas	Police, Fire, Home Guards	
Chemical & Industrial Accidents	Enforcement of NBC and Industry based rules and regulations for plants and preparation of Off-site and On-site plans.	GDIC	
	Enforcement of applicable licensing and certification rules and regulations for companies	GDIC	

B. Non Structural Mitigation Measure

Hazards	Measures	Responsible Department	Remarks
Earthquake	Masonry and Engineers certification / Technical Training	NIIT Hamirpur, IIT Mandi, DDMA	
	Public Awareness for Earthquake resistant Construction by IEC material	DDMA	
	Preliminary Vulnerability Assessment of Public Infrastructure.	Concerned Department, HPPWD	
	Regular conduction of Fire Safety Audits and Electrical Safety Audits	Fire services, Electricity board,	
	Training of trainers in professional and technical institutions	NIIT Hamirpur, IIT Mandi, DDMA	
	Risk transfer instruments by collaborating with insurance companies and financial institutions	Revenue Department	
Landslide	Zoning of landslide areas for regulating land use.	Forest department, Revenue	
	Public Awareness Campaigns	DDMA	
	Training of community members in landslide early warning	DDMA, PWD,	
	Cleaning and Maintenance of rain water drains	HPPWD, Forest, Municipal Corporation, PRI	
Flood	Proper regulation of lakes, dams and other water storage reservoirs	&PH, Hydro Power Projects,	
	Generating awareness to the type of water borne diseases that can result in the aftermath of floods	I&PH, DDMA, DRDA	
	Water resources planning, implementation of action plans, day-today water resources management	I&PH, Hydro Power Projects, MC, DRDA	
	Developing evacuation plans & implementation	DDMA,	
Road Accidents	Awareness with regards to road safety	DDMA & RTO	
	Installing Signage and Illuminators and other road Safety Measure such as Speed Breakers, Crash Barriers	RTO, PWD, MC	
	Regulation and regular check on driving licenses	Traffic Police, RTO	
	Checking of alcohol level of drivers including tourist and private vehicles.	Traffic Police, RTO	

Fire & Forest Fire	Regular fire hazard evaluation / audit and Electrical Safety Audit of all types of public and private buildings	Fire Department, and Electrical department	
	Annual Cleaning for forest floor.	PRI's, Forest Department	
	Training and awareness through distribution of IEC materials / evacuation drills/ mock drills in industrial plants/ government buildings / schools and critical infrastructure like hospitals, etc.	DDMA, Home Guards/ Fire Services	
Drought	Preparation of Drought management plans	Horticulture & Agriculture Department & I&PH, DRDA	
	Weekly monitoring of the ground water levels	Forest Department.	
	Creating Awareness on resistant crop varieties	Horticulture & Agriculture Department	
	Generating awareness on crops insurance among farmers.	Horticulture & Agriculture Department	
Stampede	Putting of banners/ posters for the public awareness	DDMA, DPRO	
	Arrangement for cordoning out important personalities and VIP's	Police, Fire, Home Guards	
Chemical & Industrial Accidents	Audits of On-site & Off-site Emergency plans at regular intervals	GDIC, Director of Health and Safety	
	Awareness generation among community regarding HAZMAT	GDIC/ DDMA	
	Training on specialized Medical First Aid Response.	NDRF/ GDIC/ Health	

4.3 Mainstreaming DRR in Development Plans

The Disaster Management Act mandated us to take measures for prevention/mitigation of disasters and to ensure that appropriate preparedness measures for integration of disaster management into development plans and projects are taken and further allocation of funds for prevention, mitigation, preparedness for disaster and capacity building are also made available. Since disaster management is not a function of DM department alone but of all departments hence mitigation concern must be addressed by the respective departments in all aspects of development.

Mainstreaming has three purposes:-

- To make certain that all the development programmes and projects that originate from or funded by Government are designated with evident consideration for potential disaster risks to resist hazard impact.
- To make certain that all the development programmes and projects that originate from or are funded by Government do not in advertently increase vulnerability to disaster in all sectors: social, physical, economic and environment.

- To make certain that all the disaster relief and rehabilitation programmes and projects that originate or are funded by Government are designed to contribute to development aims and to reduce future disaster risk.

Table: Mainstreaming DRR in Development Plans

SN	Name of The Programme	Central/ State Share	Purpose/ Objective	Proposed Strategies for DRR Integration into the Flagship Programme	Budget In Rs.	Time Frame
1	Mahatma Gandhi National Rural Employment Guarantee Scheme	Central	To provide 100 days employment for rural and development activity as per self-appraiser by the Gram Sabha under MGNREGA Act, 2005	<ul style="list-style-type: none"> • Utilization of MGNREGS funds to reduce the vulnerability of Panchayat vis a vis natural hazards such as landslide, drought, forest fire, cloud burst, flash floods, earthquake etc. • Building and cleaning of Storm Drains and maintenance at landslide prone area • Cleaning of Forest floor to mitigate the risk of forest fire. • Land development for agriculture and horticulture produce. • Construction of Pits. Artificial water storage bodies to mitigate the risk of forest fire. • It offer continuous employment opportunities in the event of disasters to ensure livelihood security in the event of disasters. • Building of Roads for places which are not connected to other parts of the district. • Construction of check dams and embankments and drainage systems to prevent flooding of those areas. • Water conservation and water harvesting; • Afforestation and special plantation to control Soil Erosion. 		
2	Indira Awaas Yojna (IAY) now entitled as Pradhan Mantri Gramin Awaas	Central	For the construction of houses under BPL category family	<ul style="list-style-type: none"> • Inclusion of such measures like application of Hazard resistant design in construction of new houses • Upgrading fair weather roads on a priority basis. • Provision for cross drainage, slope stabilization, protection works to be included, in multi-hazard and especially flood and landslide prone areas. • Training of engineers, masons and construction workers in multi- hazard-resistant construction particularly 		

	Yojana (PMGAY)			<p>addressing risk of earthquake and Landslide and fire.</p> <ul style="list-style-type: none"> Capacity Building Programmes for DRDA officials on Disaster Risk Reduction issues for implementation awareness 		
3	Sawatch Bharat Mission (SBM)	State	For creating awareness regarding health and hygiene in the society and also to provide the sanitation facility like toilets etc.	<ul style="list-style-type: none"> Design and promoting mass toilet models and sanitation infrastructure in Identified Shelters suited to local geo-climatic conditions Provide proper maintenance in schools and community centres identified as Shelter. Develop community-managed solid and liquid waste management for overall cleanliness in villages. Involve community-level staff such as teachers, ASHA and Anganwadi workers to motivate the community to adopt sanitation facilities Develop appropriate sanitation strategies for disaster situations and include this in the Village/Gram Panchayat Disaster Management Plan. 		
4	Sarva Siksha Abhiyaan	Central	It seeks to attain Universal Elementary Education (UEE) by ensuring that all children complete five years of primary schooling and eight years of elementary schooling of satisfactory quality	<ul style="list-style-type: none"> Development of a Policy and Plan for school safety. Developing model structurally safe designs for schools. Introducing School Safety in the Teacher's Training Curriculum. Training of Rural Engineers appointed under SSA Scheme as well as the SSA State Coordinators. Training of masons in rural areas. Construction of Technology Demonstration Units. Community Awareness. Use of low cost and environment friendly construction material that is locally available Undertake annual mock drill on fire, flood, and earthquake safety. 		
5	Jawaharlal Lal Nehru Urban Renewal Mission	State		<ul style="list-style-type: none"> Strengthening of the compliance in case of infrastructure projects as well housing scheme to ensure structural safety. Emphasis on disaster risk audit at the stage of preparation 		

				<ul style="list-style-type: none"> • Inclusion of amending of building byelaws to ensure structural safety as a mandatory reform in the Mission cities to ensure safe habitat development. (Both structural safety and fire safety norms). • Inclusion of disaster management as a function of the Urban Local Bodies and allocate resources. • Inclusion of strategies for disaster management in the City Development Plans. • Training and Capacity Building Programmes for municipal officers on disaster risk reduction. 		
7	National Rural Health Mission	Central		<ul style="list-style-type: none"> • Ensure that the village Health Plan and the District health plan explicitly addresses the disaster risk reduction concerns in the vulnerable habitations and the vulnerable districts and the disaster management plan as per DM Act 2005 takes links itself to the District and Village Health plans. • Provide training and allocation of resources to the ASHA workers on disaster health preparedness and response. • Ensuring structural safety of the CHC/PHC and other health care service delivery centres in rural areas. • Training of doctors and hospital staff on mass casualty management and emergency medicine. • Community awareness on disaster management. 		
8	Himachal Pradesh State Rural Livelihood Mission	state	To create efficient and effective institution platform of the rural poor, enabling than the increasing household income through sustainable livelihood enhancements and improved access to financial service	<ul style="list-style-type: none"> • Promotion and planning of Regional Self - Employment options. • Trainings and Certification program on skill development. • The scheme help in building the coping capacity of the people which will further help the community in the situation of disaster. • The targeted SHG's can be used to disseminate information about disaster management to the marginalized community. 		
11	Integrated	Central	The main objective	<ul style="list-style-type: none"> • The program works to improve the condition of the 		

	Watershed Management programme (IWMP)		of IWMP are to restore the ecological balance harassing, conserving and developing degraded nature resources such as soil, vegetative cover and water	places where drought exists. <ul style="list-style-type: none"> The scheme could also include risk assessment of certain areas which are more prone to disaster and then the implementation of the schemes can be done at those places. 		
12	Pradhan Mantri Fasal Bima Yojna	Central	The scheme already has a component of DRR, as it works in providing support to the farmers for their losses due to a disaster situation	<ul style="list-style-type: none"> The scheme provides comprehensive risks insurance against yield losses viz. drought, hailstorm, floods and pests disease etc. Prevented Sowing /Planting Risk: Insured area prevented from sowing / planting due to deficit rainfall or adverse seasonal condition. Standing Crop Sowing to Harvesting: Comprehensive risk insurance is provided to cover yield losses due to non-preventable risks viz. Drought, Dry Spell, Flood, Inundation, Pests and Diseases, Land Slides, Natural Fire and Lightening, Storm, Hailstorm, Cyclone, Typhoon, Tempest, Hurricane and Tornado etc. Post- Harvest Losses: Coverage is available only upto a maximum period of two weeks from Harvesting for those crops which are allowed to dry in cut and spread condition in the field after harvesting against specific perils of cyclone and cyclonic rains and unseasonal rains. Localized Calamities: Loss/ damage resulting from occurrence of isolated farms in the notified area. 		

Table: 4.3 Brief summarization of above mentioned above important mitigation measures

SN	Strategies	Actions involved	Suggested Institutions involved
1.	Retrofitting of buildings	<p>Prioritization of buildings according to their importance during emergency. First priority buildings are:</p> <ul style="list-style-type: none"> • District administration office building, all police and fire stations • Nodal • All Schools (Government, SDMC and Public) • Residences of District Magistrate (Revenue), District Magistrate of Police <p>Second priority buildings are:</p> <ul style="list-style-type: none"> • Hospitals and clinics • Community centres • Residences of other key officials • Office buildings of SDMC, PWD, CD & HG and DDA <p>Third Priority buildings are Remaining Government Buildings and colonies</p>	Municipal Corporation/ PWD/ TCP
2.	Enforcement of Building codes	Review and updation of building codes	BIS
		Implementation of codes in new engineered and non-engineered constructions	DDMC
3.	Community Awareness	Large-scale information dissemination about basics of new constructions and retrofitting of existing buildings and encouraging fire-fighting arrangements in the building	DDMC, PWD, District Administration
		Information dissemination about dos" and don'ts at the time of earthquake event and fire-outbreak	District administration, Fire and police department, NGO's
4.	Capacity Building	Priority-wise training to the engineers, architects, and masons for disaster resistance. These people may further utilized for providing assistance in retrofitting and reconstruction exercises.	District administration, DDMC, PWD and DDA
5.	Insurance	Identification of hazardous areas in the district	DC Office, DDMC
		Provisions of insurance according to building bye laws, codes and hazard proneness	Insurance companies, DDMC

4.4. Conclusion

- District consists of weak and illegal constructions which compounds its vulnerability to earthquake and fires.

- Buildings constructed through good design are not necessarily built with earthquake safe design.
- There is a need of an urgent mitigation planning under which new constructions should come up as per building-byelaws and standard codes.
- Retrofitting techniques are very much important to re-strengthen old and weak constructions which needs to be taken up by DDMA, DDMC and district administration
- Fire safety assessments and fire-fighting arrangements shall be promoted in multi-storeyed buildings and residential communities.
- Insurance of buildings according to their hazard proneness is important to promote in the district under the supervision of local administration.

Life-line buildings like Major Hospitals, District Magistrate Office, residences of key officials, schools, community spaces, police and fire stations etc. shall be retrofit on priority basis.