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CPGA
Crisis Preparedness Gap Analysis

BHUTAN CRISIS PREPAREDNESS GAP ANALYSIS

TECHNICAL REPORT

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Layout and design: ULTRA Designs, Inc.
Editors: Susi Victor, Priya Susan Thomas, and Tabrez Altaf Ahmed

ACKNOWLEDGEMENTS

The World Bank team includes Naho Shibuya (Task Team Leader and Senior Disaster Risk Management Specialist, ISARF), Dechen Tshering (Disaster Risk Management Specialist Consultant), Khyati Rathore (Climate Change Consultant), Pema (Disaster Risk Management Consultant), and Balaji Singh Chowhan (Disaster Risk Management Consultant). The team is grateful for extensive inputs provided by Joachim Vandercasteelen (Economist, SSAA1), Phillippe George Leite (Senior Social Protection Economist, HLCSP), Ashiq Aziz (Senior Human Development Specialist, HSASP), and Mamata Ghimire (Economist, HSAHP).

The team thanks the following World Bank colleagues for extensive consultations: Joachim Vandercasteelen (Agriculture Economist, SSAA1), Ashiq Aziz (Senior Human Development Specialist, HSASP), Sangeeta Carol Pinto (Senior Operations Officer, LCC3C), Sheu Salau (Senior Agriculture Economist, SSAA1), Mamata Ghimire (Economist, HSAHP), Sunil Kumar Khosla (Lead Energy Specialist, ISAE1), Kristoffer Welsien (Senior Water Supply and Sanitation Specialist, SSAW1), Alvin Etang Ndip (Senior Economist, ESAPV), Savinay Grover (Senior Financial Management Specialist, ESAG1), Md. Kamruzzaman (Senior Procurement Specialist, ESARU), Luis Alton (Senior Financial Sector Specialist, EFNRF), Shruti Vijayakumar (Senior Transport Specialist, ISAT1), Md. Mokaddesul Hoque (Transport Specialist, ISAT1), Ingrid Bjerke (Senior Education Specialist, HSAE2), and T. M. Asaduzzaman (Senior Education Specialist, HSAE2).

The team gratefully acknowledges the support and guidance provided by Abdoulaye Seck (Country Director, SACBB), Abhas K. Jha (Practice Manager, ISARF), Adama Coulibaly (Resident Representative, SACBT), Dorji Drakpa (Team Assistant, SACBT), Marie Florence Elvie (Program Assistant, ISARF), Angela Chisha Mazimba (Consultant, GTFS1), Ruvimbo Muchenje (Consultant, GTFS1), Sara Karimbhoy (ET Consultant, GTFS1), and Bianca Adam (Senior Financial Sector Specialist, EFNRF). The team is grateful for valuable comments and feedback from the following peer reviewers: Makiko Watanabe (Program Leader, SAEDR), Jyoti Maya Pandey (Senior Social Protection Specialist, HSASP), Andre L. Carletto (Senior Health Economist, HAWH3), Zacharey Austin Carmichael (Senior Agriculture Economist, SAGGL), and Hanane Ahmed (Senior Agriculture Economist, SAEA3).

The team is grateful for the Royal Government of Bhutan, Civil Society Organization, and the private sector entities for extensive consultations (see Annex 3). The team thanks the following development partners for consultations: Mr. Krishna Subba (Chief Program Officer, Japan International Cooperation Agency (JICA)), Ms. Sachiko Mano (Representative, JICA), Ms. Dechen Yangzom (Emergency Preparedness Response Officer, World Food Programme (WFP)), Mr. Binai Lama (Head, Food System and Resilience, WFP), Mr. Declan F. Magee (Economist, Asian Development Bank), Mr. Chadho Tenzin (Assistant Representative (Programme), Food and Agriculture Organization Country Office Bhutan), Mr. Alper Aras (Economist, United Nations Office for Disaster Risk Reduction), Mr. Khurshid Alam (Deputy Resident Representative, United Nations Development Programme (UNDP)), and Mr. Sangay Chophel (Program Management Specialist, UNDP).

This report was prepared with financial support from the Global Facility for Disaster Reduction and Recovery.

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ACRONYMS AND ABBREVIATIONS

AAL	Average Annual Loss
ACCESS	Accelerating Transport and Trade Connectivity in Eastern South Asia
ADB	Asian Development Bank
ADSS	Agromet Decision Support System
ATC	Applied Technology Council
BCP	Business Continuity Plan
BCTA	Bhutan Construction and Transport Authority
BPCL	Bhutan Power Corporation Limited
BPPRP	Bhutan Pandemic Preparedness and Response Plan
Cat DDO	Catastrophe Deferred Drawdown Option
CBDRM	Community-Based Disaster Risk Management
CBFFMG	Community-Based Forest Fire Management Group
CDD	Communicable Diseases Division
CPGA	Crisis Preparedness Gap Analysis
CSA	Climate Smart Agriculture
CSI	Cottage and Small Industry
DAMC	Department of Agricultural Marketing and Cooperatives
DDMC	Dzongkhag Disaster Management Committee
DGM	Department of Geology and Mines
DGRK	Druk Gyalpo's Relief Kidu
DLGDM	Department of Local Government and Disaster Management
DM	Disaster Management
DMC	Disaster Management Committee
DMCP	Disaster Management and Contingency Plan
DoA	Department of Agriculture
DoAT	Department of Air Transport
DoFPS	Department of Forests and Park Services
DoID	Department of Infrastructure Development
DoPH	Department of Public Health
DoST	Department of Surface Transport
DPF	Development Policy Financing
DRCP	Disaster Response and Coordination Process
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
DSS	Decision Support System
e-GP	Electronic Government Procurement
EiE	Education in Emergency
EOC	Emergency Operation Center
EWS	Early Warning System
FAO	Food and Agriculture Organization
FCBL	Food Corporation of Bhutan Limited
FCS	Fragile and Conflict-Affected Situations
FMS	Fiber Monitoring System
FNS	Food and Nutrition Security
FYP	Five-Year Plan
GDC	Government Data Center
GDP	Gross Domestic Product
GHS	Global Health Security
GIS	Geographic Information System
GLOF	Glacial Lake Outburst Flood
GNHC	Gross National Happiness Commission
GP	Global Practice
GPS	Global Positioning System
HEDCP	Health Emergency and Disaster Contingency Plan
HF	High Frequency
HQ	Headquarters
HR	Human Resources
IAFFCG	Inter-Agency Forest Fire Coordination Group
ICIMOD	International Centre for Integrated Mountain Development
ICS	Incident Command System
ICT	Information and Communication Technology
ICTO	Information and Communication Technology Officer
IDA	International Development Association
IHR	International Health Regulations
ILO	International Labour Organization
IMT	Incident Management Team

IMTF	Inter-ministerial Task Force
IVS	International Valuation Standards
JEE	Joint External Evaluation
JICA	Japan International Cooperation Agency
ISPS	Interoperable Social Protection System
LEO	Low Earth Orbit
LMS	Learning Management System
M&E	Monitoring and Evaluation
MoAL	Ministry of Agriculture and Livestock
MoENR	Ministry of Energy and Natural Resources
MoESD	Ministry of Education and Skills Development
MoF	Ministry of Finance
MoH	Ministry of Health
MoHA	Ministry of Home Affairs
MoICE	Ministry of Industry, Commerce and Employment
MoIT	Ministry of Infrastructure and Transport
MoU	Memorandum of Understanding
NAP	National Adaptation Plan
NCD	Noncommunicable Disease
NCHM	National Center for Hydrology and Meteorology
NDMA	National Disaster Management Authority
NDMCP	National Disaster Management and Contingency Plan
NDRCC	National Disaster Response Coordination Committee
NEOC	National Emergency Operation Center
NES	National Emergency Services
NIPPRP	National Influenza Pandemic Preparedness and Response Plan
NLCS	National Land Commission Secretariat
NPRP	National Preparedness and Response Plan
NRW	Nonrevenue Water
NSDI	National Spatial Data Infrastructure
O&M	Operations and Maintenance
PDNA	Post-Disaster Damage and Needs Assessment
PFM	Public Financial Management
PRR	Procurement Rules and Regulations
R&D	Research and Development
R&R	Rules and Regulation
RAA	Royal Audit Authority
RBP	Royal Bhutan Police
RCC	Reinforced Cement Concrete
RCCE	Risk Communication and Community Engagement
RCDC	Royal Centre for Disease Control
RCP	Representative Concentration Pathway
RCSC	Royal Civil Service Commission
RGoB	Royal Government of Bhutan
RICBL	Royal Insurance Corporation of Bhutan Limited
RUB	Royal University of Bhutan
SAR	Search and Rescue
SOP	Standard Operating Procedure
SPAR	States Parties Self-Assessment Annual Reporting
SSB	Single Sideband
T&D	Transmission and Distribution
TSP	Telecom Service Provider
UN	United Nations
UNDP	United Nations Development Programme
UNDRR	United Nations Office for Disaster Risk Reduction
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
VSAT	Very Small Aperture Terminal
WASH	Water, Sanitation, and Hygiene
WFP	World Food Programme
WHO	World Health Organization
WMO	World Meteorological Organization

EXECUTIVE SUMMARY

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1. **Crisis preparedness requires a comprehensive and cross-sectoral approach to risk management with targeted interventions across a range of different sectors.** While the scope and effectiveness of preparedness activities are heavily dependent on context—including exposure to hazards and the nature of underlying drivers of vulnerability—there are some elements of preparedness that are generally considered relevant in most country contexts.

2. **To provide a holistic assessment of preparedness, the Crisis Preparedness Gap Analysis (CPGA)[1] isolates five core components of crisis preparedness.** These include Legal and Institutional Foundations, Understanding and Monitoring of Risks, Financial Preparedness, Primary Response, and Social and Livelihood Support. Components correspond to foundational elements of crisis preparedness consistent with the World Bank's mandate, building on sector-specific frameworks and operational engagements in this space. Each component is further broken down into subcomponents and indicators, resulting in a three-tiered system with 'maturity levels' assigned to each (see Table 3). Levels of maturity range from *unmet* (essentially little to nothing has been done to actively promote crisis preparedness) to *advanced* (typically reflecting a regional leader in crisis preparedness, with a comprehensive and multi-sectoral approach with significant resources and capacity). The framework does not evaluate past performance or attempt to predict how a country might fare in the event of a crisis. It focuses on identifying entry points for targeted technical and financial support to strengthen crisis preparedness across its five components.

3. **The CPGA builds on and supplements a range of sector- and crisis-specific diagnostic tools.** It does not replace or duplicate the in-depth assessments. Rather, it offers users a holistic, high-level perspective of key country systems that contribute to crisis preparedness for different types of shocks and across sectors. These sector-specific diagnostics constitute the starting point of the CPGA in countries where they exists, with inputs and guiding questions in the CPGA matched directly with those used in the established sectoral framework. In countries where other diagnostic tools have yet to be deployed, the CPGA can serve as an entry point for country teams to conduct more in-depth analyses.

4. **This Technical Report presents gaps and opportunities to strengthen the capacity of the Royal Government of Bhutan (RGoB) to prepare for crisis events in an effective and timely manner.** It accompanies the CPGA Bhutan Briefing Note, providing further details on findings and entry points across the five components of crisis preparedness. The note is intended to inform policymakers to integrate crisis preparedness across different sectors.

OVERVIEW OF CROSS-SECTORAL CHALLENGES IN PROMOTING CRISIS PREPAREDNESS

5. **The country's small population size and a recent surge in emigration is amplifying the challenges in the enforcement and implementation of existing crisis preparedness-related policies and plans due to human resource shortage across sectors** including disaster risk management (DRM), infrastructure, hydrometeorology, finance, and agriculture. The State of the Nation Report 2024 states that around 64,000 Bhutanese or 9 percent of the population have moved overseas since 2015. This has led to a significant shortage of human resources and a brain drain including the mass resignation of mid-level professionals across public and private sectors in the country with a population of approximately 735,600 as of 2017, amplifying the existing shortage of technical capacity for crisis preparedness and response across sectors and from the national to local levels.

[1] Crisis Risk Preparedness Analysis, World Bank, https://thedocs.worldbank.org/en/doc/f20312bad480bafdd7d87e4c24982f74-0090082023/related/CPGA-overview.pdf.

6. **While Bhutan has coped relatively well with frequent and less severe disasters, the country is not prepared for more severe disasters such as earthquakes and glacial lake outburst floods (GLOFs).** The RGoB has been responding to frequent and localized disasters such as landslides and floods during the monsoon season in an ad hoc and reactive manner due to a lack of Standard Operating Procedures (SOPs), challenges in coordination, and limited simulation exercises to test the response plans. With highly scattered population in remote areas and relatively dense population in urban centres, Bhutan has coped relatively well with less severe disasters which are more frequent in remote areas.

7. **Due to the lack of nationwide multi-hazard risk information and fiscal constraints, evidence-based crisis preparedness and response plans have not been prepared and implemented across sectors and government levels.** At present, the RGoB's capacity for scientific risk assessments is constrained by limited data, technical capacity, financing, and sectoral coordination as well as unclarity in the roles and responsibilities of government agencies in generating and regularly updating risk information. Furthermore, there is no systematic registry of vulnerable populations. The Disaster Management and Contingency Plans (DMCPs) of the 20 *dzongkhags* (districts) and 4 *thromdes* (municipalities) are not informed by scientific risk assessments, and DRM measures are not targeted for specific needs of vulnerable groups. While the Ministry of Home Affairs (MoHA) has formulated the National Disaster Management and Contingency Plan (NDMCP) in 2023, adopting a whole-of-government approach, not all the sectoral government agencies have prepared their detailed DMCPs. In addition, there is a critical need to allocate adequate budget to implement the DMCPs and put in place a monitoring and evaluation (M&E) mechanism.

8. **The country's high dependence on small-scale external aid, without adequate budgets allocated from the Ministry of Finance (MoF) for the DRM sector, has led to a piecemeal approach leading to ad hoc implementation of activities and difficulty in sustaining efforts.** Across sectors and government levels, Bhutan faces fiscal constraints and a lack of adequate infrastructure and systems for crisis preparedness and response. Inadequately equipped and capacitated early warning systems (EWSs) for weather and hazards, including disease outbreaks, adversely affect the timely dissemination of critical information. Additionally, the lack of a geographic information system (GIS)-based asset management system for critical infrastructure such as transport, water, and energy makes it challenging to prioritize risk-based operations and maintenance (O&M) and resource allocation during crises. Lastly, the limited capacity of the Emergency Operation Centers (EOCs) at all government levels adds to the overall challenges faced by Bhutan in its efforts to enhance crisis preparedness and response capabilities.

KEY ENTRY POINTS FOR STRENGTHENING THE COUNTRY'S CRISIS PREPAREDNESS

9. **The Bhutan CPGA underscores the critical need for a multifaceted approach to enhance the country's resilience and readiness in facing crises.** It identifies strategic entry points and recommendations across five core components and cross-sectoral challenges as summarized in Table 1 to bolster Bhutan's disaster management (DM) and response capabilities. Implementing these comprehensive recommendations requires concerted efforts from the government, civil society, and international partners. By fostering cross-sectoral collaboration and allocating adequate resources, Bhutan can significantly enhance its crisis preparedness, building a more resilient nation capable of effectively responding to and recovering from various crises. Table 1 presents a list of entry points for strengthening crisis preparedness in Bhutan, along with timeline—short-term (S, under 12 months), medium-term (M, 1–2 years), and long-term (L, 3–5 years). Notably, some of the activities recommended here are already being initiated. Detailed entry points are provided in Annex D.

Table 1. Summary of Entry Points and Timelines

SUMMARY OF ENTRY POINTS	TIMELINE
Legal and Institutional Foundations	
Amend and enforce the DM Act and the DM R&R, and allocate adequate budget to address the implementation bottlenecks and define the scope more explicitly to include climate change impacts and disease outbreaks and be read as all-encompassing except for the specifically excluded ones. The amendments could include the following (ongoing): • Department of Local Governance and Disaster Management (DLGDM) to define the conditions for activating NDMA and DMCs to enable an objective activation. • DLGDM to redefine Type I–III disasters to incorporate the scale of loss and damage to make an objective declaration. • DLGDM and MOF to link the declaration of Type I–III disasters with the level of financial and technical assistance from the central government to the affected local governments. • DLGDM to propose to NDMA to mandate the adoption of NDRCC and DRCP for all hazard types, including disease outbreaks. • DLGDM to review and amend the DM R&R to elaborate provisions on the clauses in the DM Act, with clear definition of responsibilities and processes. • MOF to allocate dedicated resources for implementation of priority activities in the NDMCP	Medium Term
Understanding Risks	
RISK ASSESSMENTS	
Strengthen a more integrated approach to risk assessments, bringing together different sectors and hazard types to improve the utilization of assessments in planning and response (ongoing): • DLGDM to develop a geospatial DSS. • DLGDM to develop Risk Information Guidelines and NLCS to amend the Geo-Information Policy 2018 to define the roles and responsibilities of relevant government agencies in generating and maintaining risk information including data standards and sharing protocols.	Medium Term
RISK MONITORING AND EARLY WARNINGS	
The National Center for Hydrology and Meteorology (NCHM) to build its capacity for medium-term weather forecasting (ongoing)**, impact-based forecasting, flood forecasting, and sector-specific services**, including the establishment of the new NCHM HQ, National Weather, and Flood Warning Centre to modernize the equipment. Formulate the Hydromet Act and its R&R.	Long Term
The Department of Forests and Park Services (DoFPS) to develop a near real-time forest fire surveillance system that integrates a forest fire danger rating system, a forest fire simulation/ prediction model, and a forest fire monitoring system, which is currently hosted by ICIMOD, leveraging satellite technologies.	Long Term
The Ministry of Health (MoH) to strengthen monitoring of communicable and vector-borne diseases through enhanced technical and human resources capacity of the National Disease Surveillance and Epidemiology Unit of RCDC and expanding training for health care professionals.	Medium Term
The Department of Geology and Mines (DGM) and Department of Surface Transport (DoST) to enhance seismic and landslide hazard mapping (ongoing) **and pilot a landslide EWS** in critical landslide hot spots.	Long Term

Table 1. Summary of Entry Points and Timelines (cont.)

SUMMARY OF ENTRY POINTS	TIMELINE
Financial Preparedness	
CRISIS RISK FINANCING	
MoF and DLGDM to develop a Disaster Risk Financing and Insurance Strategy for risk retention and transfer mechanisms to reduce the financial impact of disasters, including health emergencies. • Revise the Operational Guidelines for Disaster Financing 2017 for more transparent and efficient budget allocation and utilization for DM, including clear procedures for accessing and deploying the General Reserves in emergencies. • Access a contingent line of credit through the Second Cat DDO under preparation, including a Climate Resilient Debt Clause (CRDC), which offers countries in an eligible event the option of deferring principal and/or interest repayments for up to two years. • Consider establishing a dedicated contingency fund for health emergency management. • Consider a sovereign risk transfer mechanism such as a Cat Bond and accessing international markets (for example, Green Bonds) in the long term after exhausting the use of concessional funding from International Development Association (IDA) and other donors and upon confirmation of its fiscal viability. • Pilot crop and livestock insurance schemes (ongoing).	Short Term
MoF and NLCS to improve property and land valuation profession and services for accurate disaster risk insurance (ongoing): • Establish the Property Valuation Division in the MoF. • Establish national valuation standards adhering to IVS and designate an agency as a regulatory body for property valuation. • Provide access to an educational program on valuation at postgraduate diploma and master's levels. • Establish professional standards, code of conduct, accreditation, and oversight for valuation profession.	Medium-Long Term
PUBLIC FINANCIAL MANAGEMENT (PFM)	
MoF to conduct a comprehensive assessment of the public procurement system for emergencies using the internationally recognized Methodology for Assessing Procurement Systems tool	
Primary Response	
PUBLIC HEALTH SYSTEMS	
Strengthen emergency public health services through the following: • MoH to update the HEDCP to streamline, integrate, and incorporate lessons learned from the COVID-19 response and the BPPRP (ongoing). • MoH to strengthen diagnostic capabilities to cater to emerging needs such as health pandemics, including climate-induced health threats. • MoH to develop an HR management plan for health care workforce, including retention strategies.	Short-Medium Term
CRITICAL INFRASTRUCTURE AND SERVICES	
Strengthen the legal and regulatory foundations for mandating a resilient built environment (ongoing)**:** • RGoB to formulate the National Construction and Surface Transport Act and its R&R to enforce strict quality standards and mandate the resilience of critical infrastructure services, including timely emergency preparedness and response planning. • MoIT to revise the Building Code 2018 to strengthen the regulatory framework for ensuring the resilience and safety of all buildings in the country. • MoENR to formulate the National Energy Policy and revise the Hydropower Dam Design Guidelines to promote integrated dam safety and geohazard management of hydropower plants.	Medium-Long Term

Table 1. Summary of Entry Points and Timelines (cont.)

SUMMARY OF ENTRY POINTS	TIMELINE
RGoB to develop geographic information system (GIS) based asset management systems for critical infrastructure to enable risk-based O&M planning and ensure service continuity, leveraging the NSDI and the Multi-hazard Risk DSS that are under development. Integrate resilience into the proposed RAMS under the ACCESS project.	Long Term
MoIT to develop and implement a retrofitting investment plan for critical buildings and infrastructure based on detailed multi-hazard vulnerability assessments. • Prioritize infrastructure assets built before the introduction of the new seismic codes in the early 2000s, including 315 schools. • Enhance the resilience and efficiency in water infrastructure, focusing on NRW losses through strategic investments and capacity-building measures.	Long Term
MOIT to conduct a freight network vulnerability assessment to determine the critical freight network and identify a suitable adaptation and resilience approach for critical assets.	Short Term
GovTech to conduct a comprehensive assessment focusing on digital connectivity resilience and recovery as well as data infrastructure resilience and recovery options, with a particular emphasis on exploring technical options for diversifying network infrastructure, including considerations for alternative technologies such as Low Earth Orbit (LEO) satellite technology, among others, to enhance international connectivity beyond existing links through India and strengthen domestic connectivity.	Medium-Long Term
DoAT to improve emergency preparedness and flight safety of PIA: • DoAT to continue with GARD program and strengthen the Aircraft Accident and Incident Investigation Unit, and develop the National Airport Infrastructure Plan. • NCHM to enhance aviation met services and establish a Quality Management System in compliance with the International Civil Aviation Organization requirements.	Medium Term
CIVIL PROTECTION AND EMERGENCY MANAGEMENT SYSTEM	
Strengthen emergency response systems across all sectors, with clear action plans and resource allocation. • DLGDM to facilitate RBP and Desuups to strengthen SAR equipment, develop SOPs for its timely mobilization, and train the responders to build their capacity especially for severe and high-altitude disasters. • DLGDM to improve coordination for delivery of emergency services between health service providers and emergency responders such as RBP SAR teams, emergency medical responders, and Desuups to deliver essential services efficiently to the affected communities. • DLGDM, in coordination with local governments, to establish and operationalize EOCs at all government levels and institutionalize the ICS. • DLGDM to enhance community-based preparedness and response initiatives, including local training and engagement programs to build resilience.	Medium Term
Social and Livelihood Support	
COVERAGE AND SCALABILITY OF SOCIAL PROTECTION	

Table 1. Summary of Entry Points and Timelines (cont.)

SUMMARY OF ENTRY POINTS	TIMELINE
Improve social protection coverage and strengthen governance with well-established data and information. • The Cabinet Secretariat in collaboration with Ministry of Industry, Commerce and Employment (MoICE) and other relevant ministries to formulate the Social Protection Policy, Social Protection Act, and Social Protection R&R to protect, prevent and promote resilience and mitigate vulnerabilities in order to promote economic growth of those population and mitigate the worst effects of a disaster on socially and economically vulnerable households.	Long Term
• The Cabinet Secretariat in collaboration with the MoICE to develop an expanded data system strategy that contains information on population pre and post shock and relies on an ISPS encompassing interoperable and dynamic social registries and interoperable beneficiary registries, benefiting from robust National Identification Systems.	Medium Term
FOOD SECURITY AND LIVELIHOODS	
The Ministry of Agriculture and Livestock (MoAL) to develop its DMCP and finalize the Agri-Food Sector Strategy 2030 as strategies for improving food security and sustainable livelihoods, particularly in disaster-prone areas, to reduce the impact on the most vulnerable. • Finalize the Agri-Food Sector Strategy 2030 to guide the implementation of the FNS Policy 2023 and sectoral programs in the 13th FYP. • Develop adequate storage and distribution infrastructure and facilities and capacity building of MoAL and FCBL. • Review the supply chain of food import, export, and internal consumption during emergencies and use the to-be-developed national farm registry to identify and track vulnerable farm population. • Enhance resilience in agricultural systems at the farm level with the operationalization of agromet advisories to manage risks from extreme weather conditions, pests, and diseases. • Promote investment in modern technologies, improved agronomic knowledge, climate-smart agriculture, market information systems and animal and plant health systems would further strengthen agricultural resilience at farm level and sustainable value addition throughout the agrifood value chain. • Assess the need and feasibility of an early warning system for food and nutrition security, seeking guidance of the World Bank's expertise in establishing high frequency food and nutrition security risk monitoring	Medium Term
The MoAL to finalize the Agriculture Bill to simplify some of the legal and regulatory issues to the modernization and resilience building in the agricultural sector.	Medium Term
MoAL to de-risk the agrifood sector by reviewing and assessing the potential and cost-effectiveness of national agricultural insurance products • Based on the ongoing pilots to introduce index-based insurance in Bhutan, assess its potential and cost-effectiveness of national agricultural insurance products in the longer term. In the short term, consider alternative risk mitigation measures such as financial incentives to invest in climate smart agriculture technologies and build farmers financial literacy.	Long Term
CONTINUED ACCESS TO EDUCATION	
The Ministry of Education and Skills Development (MoESD) to review and update existing DMCPs for the education sector addressing multi-hazard risks. • Sustain and expand the use of technology in delivering school education curriculum and services in times of crisis.	Short Term

Table 1. Summary of Entry Points and Timelines (cont.)

SUMMARY OF ENTRY POINTS	TIMELINE
CRISIS-INDUCED DISPLACEMENT	
RGoB to develop a policy and strengthen governance structure for providing financial support on housing reconstruction in case of protracted displacement, raise public awareness about GLOF EWS and the location of temporary relocation zones, and develop a system for recording and tracking crisis-induced displacement.	Short Term
Cross-Sectoral Challenges	
Improve cross-cutting aspects to enhance preparedness and response. • Strengthen coordination and collaboration among all stakeholders involved in DM, including government agencies, civil society, development partners, and the private sector. • DLGDM to strengthen M&E mechanisms to assess the effectiveness of preparedness and response measures planned and implemented by local governments and sectoral agencies, with clear key performance indicators and regular reporting. • RGoB to enhance mechanisms for information sharing and public communication, ensuring that risk information and warnings are disseminated effectively and reach all population segments.	Medium-Long Term

1.

BHUTAN: COUNTRY RISK PROFILE

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1. **The following country risk profile contextualizes the Crisis Preparedness Gap Analysis (CPGA).** It draws on insights from national risk assessments and information from relevant multi-hazard risk repositories.

Table 2. Summary Statistics Related to Key Risks and Vulnerabilities in Bhutan

Natural hazards[2]	River flood	High risk
	Urban flood	High risk
	Landslide	High risk
	Extreme heat	High risk
	Wildfire	High risk
	Earthquake	Medium risk
	Water scarcity	Medium risk
	Cyclone	Low risk
Food	Value of food imports in total merchandise exports (2019–2021 average)[3]	24 percent
	Prevalence of insufficient, poor, and borderline food consumption score (percent of population) (World Food Programme [WFP])[4]	29.14 percent
	Percentage of children under 5 years of age who are stunted[5]	22.7 percent
	Share of the population who cannot afford a healthy diet (percent) (World Bank)[6]	7.5 percent
Health	Current expenditure on health, as a percentage of gross domestic product (GDP)[7]	4 percent
	Physicians density (per 10,000 people)[8]	5.6
	Nursing and midwifery personnel density (per 10,000 people)[9]	22.1
	Malaria incidence (per 1,000 people at risk)[10]	0.01
Macro-fiscal[11]	GDP	US$2.77 billion
	GDP growth rate	4.4 percent
	Central government debt, total (percent of GDP)	111 percent

[2] ThinkHazard! 2020. Bhutan. https://www.thinkhazard.org/en/report/31-bhutan.
[3] Food and Agriculture Organization (FAO): Suite of Food Security Indicators. https://www.fao.org/faostat/en/#data/FS.
[4] Global Food and Nutrition Security Dashboard. https://www.gafs.info/country-profiles/?state=Advice&country=BTN&indicator=FCSP.
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[8] WHO. 2021. "Density of Doctors (per 10,000 people) - Bhutan." https://data.who.int/indicators/i/217795A.
[9] WHO. 2021. "Nursing and Midwifery Personnel Density (per 10,000 Population) – Bhutan." https://data.who.int/indicators/i/5C8435F.
[10] WHO. 2021. "Malaria Cases - Bhutan." https://data.who.int/indicators/i/442CEA8.
[11] World Bank Group. 2024. Data Bank. Country indicators. https://data.worldbank.org/country/bhutan.

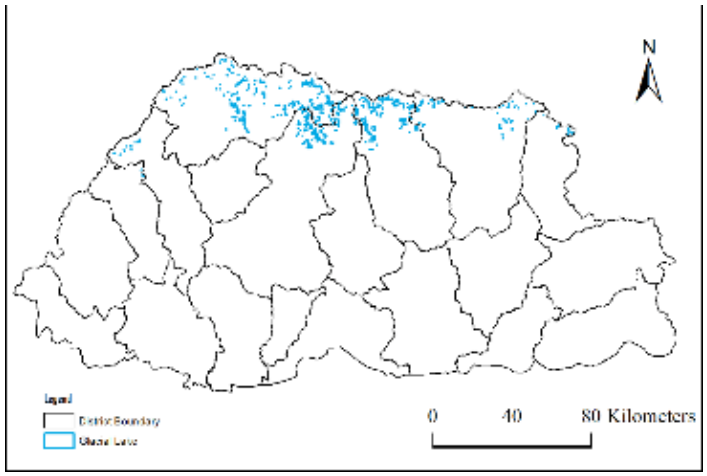
Table 2. Summary Statistics Related to Key Risks and Vulnerabilities in Bhutan

Socioeconomic vulnerability	Poverty rate[12]	12.4 percent
	Human Development Index rank[13]	127/191
	Human Capital Index score[14]	0.66
	Population covered by at least one social protection benefit (2020)[15]	8.8 percent
	Vulnerable persons covered by social assistance (2020)[16]	5 percent
Fragility, conflict. and violence[17]	Fragile and conflict-affected situations (FCS) status	Not on FCS list

2. **Bhutan is exposed to floods, landslides, cloudbursts, windstorms, cyclones, river erosion, earthquakes, glacial lake outburst flood (GLOF), wildfire, and droughts.** Between 1992 and 2021, around 87,900 people were affected and approximately 320 died due to natural disasters.[18] Projected increases in heavy precipitation increase the risk of flooding and impact runoff, erosion, and river discharge rates. Most of the country's infrastructure is located along drainage basins that are highly vulnerable to flooding caused by heavy monsoon rains and glacial melt. The urban areas in the south are vulnerable to extreme heat. Risks of local dry spells are expected to increase for large parts of the country, while extreme rainfall events would heighten flood and landslide risks.[19] Climate change is expected to affect water resources through loss of storage in the form of ice and changes in precipitation and flow patterns, causing more floods and droughts. The risk of potential disasters induced by GLOF is pronounced, as the country is home to 700 glaciers and 567 glacial lakes, of which 17 are expected to pose medium to high risks (Figure 1). Bhutan is exposed to an earthquake of more than 8 on the Richter scale. In 2009 and 2011, two high-magnitude earthquakes caused damage and loss of US$52.6 million[20] (4.3 percent of GDP) and US$24.5 million[21] (1.4 percent of GDP), respectively. A study estimates 9,000 fatalities with 10,000 serious injuries and 40,000 people displaced throughout the country in the worst-case seismic scenario.[22] More than 7,000 ha of forest were burnt every year during 1994–2020.[23] Both flame length and rate of fire spread will increase as climate becomes more extreme (Figure 2).

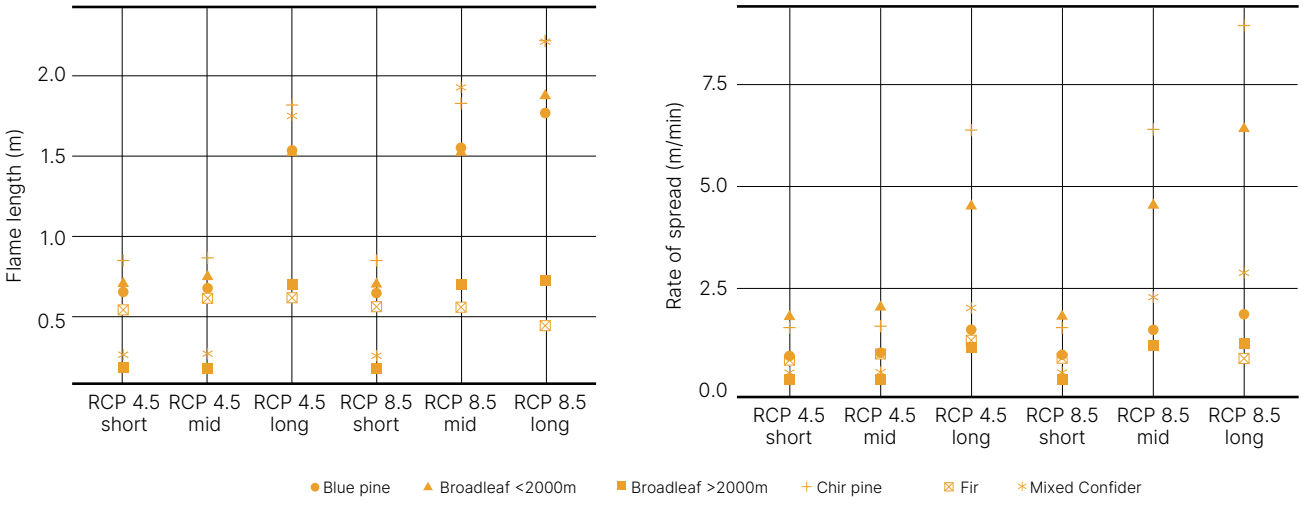
[12] World Bank. 2023. "Poverty Mapping in Bhutan, Small Area Estimation: Gewog and Town Level Results 2023."
[13] UNDP (United Nations Development Programme). 2021. https://hdr.undp.org/data-center/specific-country-data#/countries/BTN.
[14] Ibid.
[15] ILO (International Labour Organization). 2020. https://www.social-protection.org/gimi/WSPDB.action?id=19
[16] Ibid.
[17] World Bank. 2022. "Classification of Fragile and Conflict-Affected Situations." https://www.worldbank.org/en/topic/fragilityconflictviolence/brief/harmonized-list-of-fragile-situations.
[18] Emergency Events Database (EM-DAT), Centre for Research on the Epidemiology of Disasters (CRED)/University of Louvain (UCLouvain), Brussels, Belgium. https://www.emdat.be.
[19] Assessment of Climate Risks on Water Resources for the National Adaptation Plan (NAP) in Bhutan (2021).
[20] RGoB, World Bank, and UN (United Nations). 2009. *Bhutan Earthquake September 21, 2009: Joint Rapid Assessment for Recovery, Reconstruction and Risk Reduction.*
[21] RGoB, World Bank, and UN. 2011. *Bhutan Earthquake September 18, 2011: Joint Rapid Assessment for Recovery, Reconstruction and Risk Reduction.*
[22] Newcastle University, Durham University, and WFP. 2020. "Bhutan Earthquake Impact Planning (EquIP)."
[23] National Forest Inventory 2023.

Figure 1. Distribution of Glacial Lakes in Bhutan



Source: NCHM (National Center for Hydrology and Meteorology). 2021. Bhutan Glacial Lake Inventory.

Figure 2. Predicted Flame Length and 'Rate of Spread' under Representative Concentration Pathway (RCP) 4.5 and 8.5



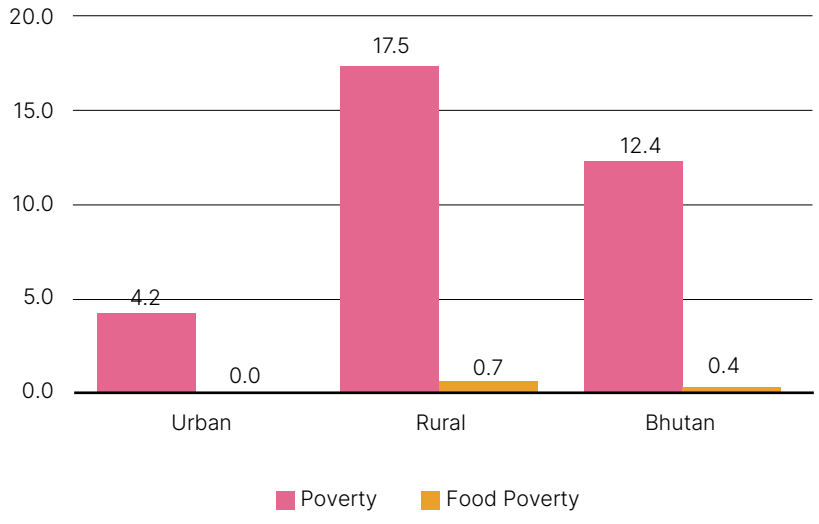
Source: NEC (National Evaluation Capacity)/UNDP. 2021. Assessment of Climate Risks on Forests and Biodiversity for NAP Formulation Process in Bhutan.

3. **Bhutan's economy is highly dependent on climate-sensitive sectors such as agriculture and hydropower.** Half of the country's workforce is in agriculture, which is highly vulnerable given its concentration in rain-fed dryland and wetland farming. The rainfall in October 2021 affected 17 *dzongkhags* (districts) and resulted in significant crop loss. Bhutan's economy is shaped by hydropower development including the sale of electricity to India. While its abundant water resources created ideal conditions for hydropower development, the sector is also vulnerable to climate change, including changes in rainfall patterns, melting glaciers, and increasing occurrence of weather events.

4. **Climate change can reduce the income of the poorest 40 percent by more than 6.5 percent by 2030.**[24] Rapid economic growth has substantially reduced poverty over the last two decades, but vulnerability to poverty and spatial inequality remains high. Bhutan's economy grew at an average annual rate of 7.2 percent between 2000 and 2019, and its per capita income increased threefold in purchasing power parity terms over the same period. As a result, extreme poverty was nearly eliminated by 2022. In 2022, the poverty rate for Bhutan was 12.4 percent; however, poverty is not evenly distributed across areas: while the poverty rate reaches 17.5 percent in rural areas, it plummets to 4.2 percent in urban areas (Figure 3).[25] The COVID-19 pandemic disrupted economic activity and affected production, livelihoods, and worker earnings, resulting in a higher poverty incidence. While national inequality is lower than the regional average in the South Asia Region, spatial inequality across districts remains an issue.[26]

5. **Bhutan faces significant risks with poor nutrition and malnutrition, in addition to food insecurity.** The country is facing a growing challenge in providing its population with safe, healthy, diverse, and nutritious food, especially in terms of low consumption of vegetables and fruit. Even before COVID-19, there were significant variations in food and nutrition security across different districts in Bhutan. The most recent household census data indicates that only 2.9 percent of Bhutanese people experienced food shortages in 2017, but certain districts such as Dagana (60 percent), Sarpang (40 percent), and Gasa (28 percent) have high levels of undernourished individuals. Bhutanese are experiencing the triple burden of malnutrition, including undernutrition, overnutrition, and micronutrient deficiencies. While the prevalence of children under 5 years who are subject to stunting decreased from 34 percent to 23 percent between 2010 and 2015, it still remains high compared to global standards. Stunting impairs cognitive and physical growth and predisposing the child to metabolic diseases later in life. It is estimated that 34.95 percent of children 6–59 months of age and 43.8 percent of women of reproductive age are anemic or iron deficient.[27] The high level of malnutrition is linked to inadequate diversity in food consumption, such as overconsumption of cereals and processed foods and underconsumption

Figure 3. Poverty incidence by area (percentage)



Source: World Bank

[24] Jafino, B. A., B. Walsh, J. Rozenberg, and S. Hallegatte. 2020. "Revised Estimates of the Impact of Climate Change on Extreme Poverty by 2030." Policy Research Working Paper WPS 9417, World Bank, Washington, DC.
[25] World Bank. 2023. "Poverty Mapping in Bhutan, Small Area Estimation: Gewog and Town Level Results 2023."
[26] The Gini index that measures inequality is recorded at 0.29 in 2022 in Bhutan.
[27] National Nutrition Survey, 2015.

of fruits, vegetables, and plant proteins. These poor dietary habits reflect the lack of knowledge and skills among most Bhutanese in adopting improved nutrition practices.

6. **The poor food and nutrition security is related to the weak fundamentals of the Bhutan's agrifood system and a heavy dependence on the import of food items.** The agriculture sector in Bhutan faces various challenges including labor shortage, feminization of agriculture and aging farming population, human-wildlife conflict, fallow land and land fragmentation, low usage of modern agriculture and livestock inputs and technologies, predominantly subsistence farming, weak value chain and marketing logistics, poor private sector engagement, climate change, inadequate biosecurity, loss of valuable traditional crops and native animal genetic resources, and increasing soil loss.[28] In addition, climate change and disaster impacts and inadequate pre-harvest and post-harvest measures result in high proportions of food losses and waste. Changes in precipitation patterns further stress biodiversity, making them more vulnerable to diseases and pests.[29] With no safety nets such as crop insurance, the farmers face a significant risk of losing their income and food security. As a result, the country relies heavily on the import of basic staples and food items from India. The import volume and value of the key imported commodities and cereals increased from 124,898 tons in 2013 to 210,267 tons in 2017.

7. **Bhutan is highly vulnerable to health emergencies, precipitated by climate variability and change.** It faces risks of increased geographical range and incidences of vector-borne diseases, particularly malaria and dengue, and waterborne diseases due to drying up of water sources or contamination from flooding.[30] Climate conditions are projected to become significantly more favorable for transmitting the most virulent infectious, vector-borne, and tropical disease outbreaks, including the emergence and reemergence of different bacterial and viral diseases. The porous border in the south and proximity to livestock and wildlife increases the risks of pandemics triggered by zoonoses. Bhutan is also facing a demographic transition with a significantly aging population and a changing disease burden with a sharp increase in noncommunicable diseases (NCDs).

8. **Bhutan's exposure to multiple weather- and water-induced disasters and earthquakes increases the compound risks, which pandemics can amplify.** For example, the regional offices of the Department of Surface Transport (DoST) under the Ministry of Infrastructure and Transport (MoIT) faced severe challenges in clearing roadblocks during the monsoon when movement restrictions were at their peak during the COVID-19 lockdowns in 2021. The DoST's field officers had to seek approval from the Incident Commanders of respective districts, delaying the road restoration works. In addition, while the Building Code and Building Regulation include structural fire safety and protection provisions, these are not rigorously implemented, and no clear guidelines exist for rural buildings. This could trigger widespread structural fires in case of a major earthquake.

[28] RGoB. 2023. *Food and Nutrition Security Policy of Bhutan 2023*.
[29] World Bank and Asian Development Bank (ADB) Climate Risk Country Profile: Bhutan (2021).
[30] National Environment Commission. 2021. "Assessment of Climate Risks on Health for NAP Formulation Process in Bhutan."

2.
FINDINGS FROM THE CPGA COUNTRY ASSESSMENT

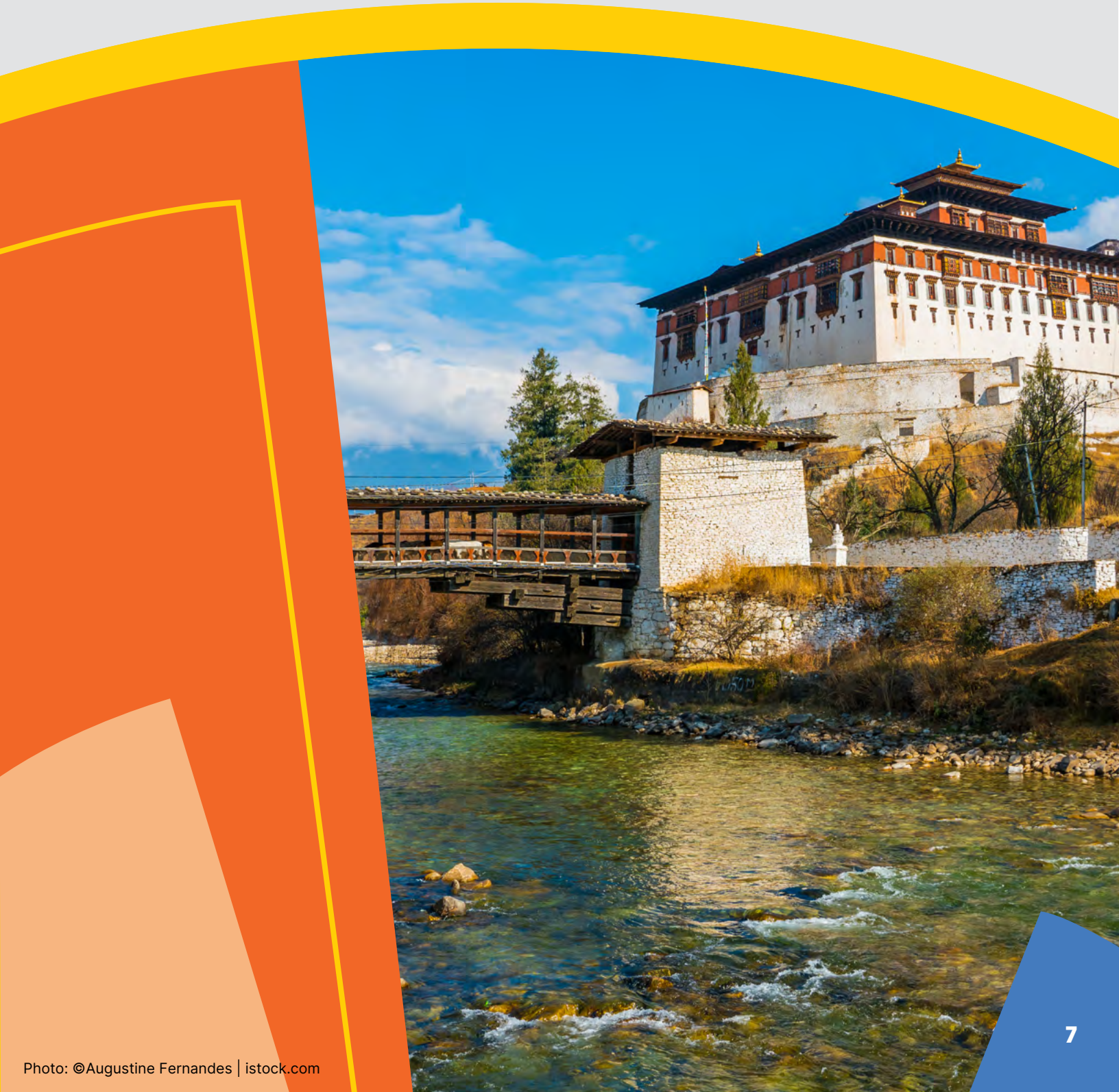


Photo: ©Augustine Fernandes | istock.com

Figure 4. Crisis Preparedness Maturity Levels for Components and Subcomponents of the CPGA in Bhutan

9. **Findings from the CPGA shed light on the barriers and opportunities for promoting crisis preparedness in Bhutan.** Insights are based on information gathered from a desk review and extensive interviews with sector experts across a range of relevant stakeholders from Bhutan and the World Bank Global Practices (GPs) (see Appendix 3 for a list of stakeholders consulted). Below, we present technical insights from the CPGA exercise in Bhutan—both with regard to cross-cutting and sector-specific issues—that complete those provided in the Bhutan CPGA Briefing Note. The CPGA categorizes the maturity levels of the five preparedness components and their subcomponents by evaluating the number and variety of positive responses to the relevant guiding questions: unmet, nascent, basic, good, and advanced (see Appendix 1). A description of steps taken in data collection can be found in Appendix 2.

10. **The findings from the CPGA are expected to facilitate a dialogue between the RGoB and the World Bank in utilizing the World Bank's *Crisis Preparedness and Response Toolkit*.** The toolkit is aimed at helping developing countries to better prepare for and respond to crisis through more flexible funding reallocation from World Bank projects, substantially scaled up access to contingent resources and immediate crisis response financing, expanded catastrophe risk transfer solutions, and climate-resilient debt clauses for small states during a crisis.

LEGAL AND INSTITUTIONAL FOUNDATIONS – AGGREGATED SCORE: 2.0 (BASIC)

COMPONENT	SUBCOMPONENT	INDICATOR	MATURITY LEVEL
1. LEGAL AND INSTITUTIONAL FOUNDATIONS	1.1 Legislative frameworks, strategic plans and policies	1.1.1 Dedicated crisis preparedness laws and regulations are in place and well enforced, with preparedness plans mainstreamed into policy frameworks	BASIC
	1.2 Governance and institutions	1.2.1 Governance and institutional arrangements are in place, with defined mandates, roles and responsibilities	BASIC
		1.2.2 Preparedness activities are coordinated across sectors and levels within government and external stakeholders	BASIC

11. **The RGoB has put in place the Disaster Management (DM) Act of 2013 and its Rules and Regulation (R&R) of 2014 as the overarching legal and regulatory foundation for disaster risk management (DRM) in the country.** The DM Act 2013 emphasizes both ex ante and ex post activities, expressed as functions and mandates of the institutions to be set up at various levels in the government. It emphasizes the role of the National Disaster Management Authority (NDMA), the highest decision-making body for DM chaired by the Prime Minister, in approving hazard and vulnerability maps and guidelines and Standard Operating Procedures (SOPs) for DM and directing agencies to mainstream disaster risk reduction (DRR) and allocate resources. The Inter-ministerial Task Force (IMTF) is responsible for reviewing hazard zonation and vulnerability maps; DRR and DM activities; and national standards, guidelines, and SOPs for DM. In addition, the Ministry of Home Affairs (MoHA) has approved the DM R&R 2014 for the establishment of governance and institutional mechanism and the implementation of DRM in the country. The act mandates the establishment of Disaster Management Committees (DMCs) at the *dzongkhag* (district) level and DM Subcommittees at the *thromde* (municipality), *gewog* (a group of villages), and *dungkhag* (subdistrict) levels.

12. **However, the Royal Government of Bhutan (RGoB) has not implemented the following mechanisms defined in the act and R&R due to the lack of enforcement, awareness across sectors and government levels, and political leadership**:

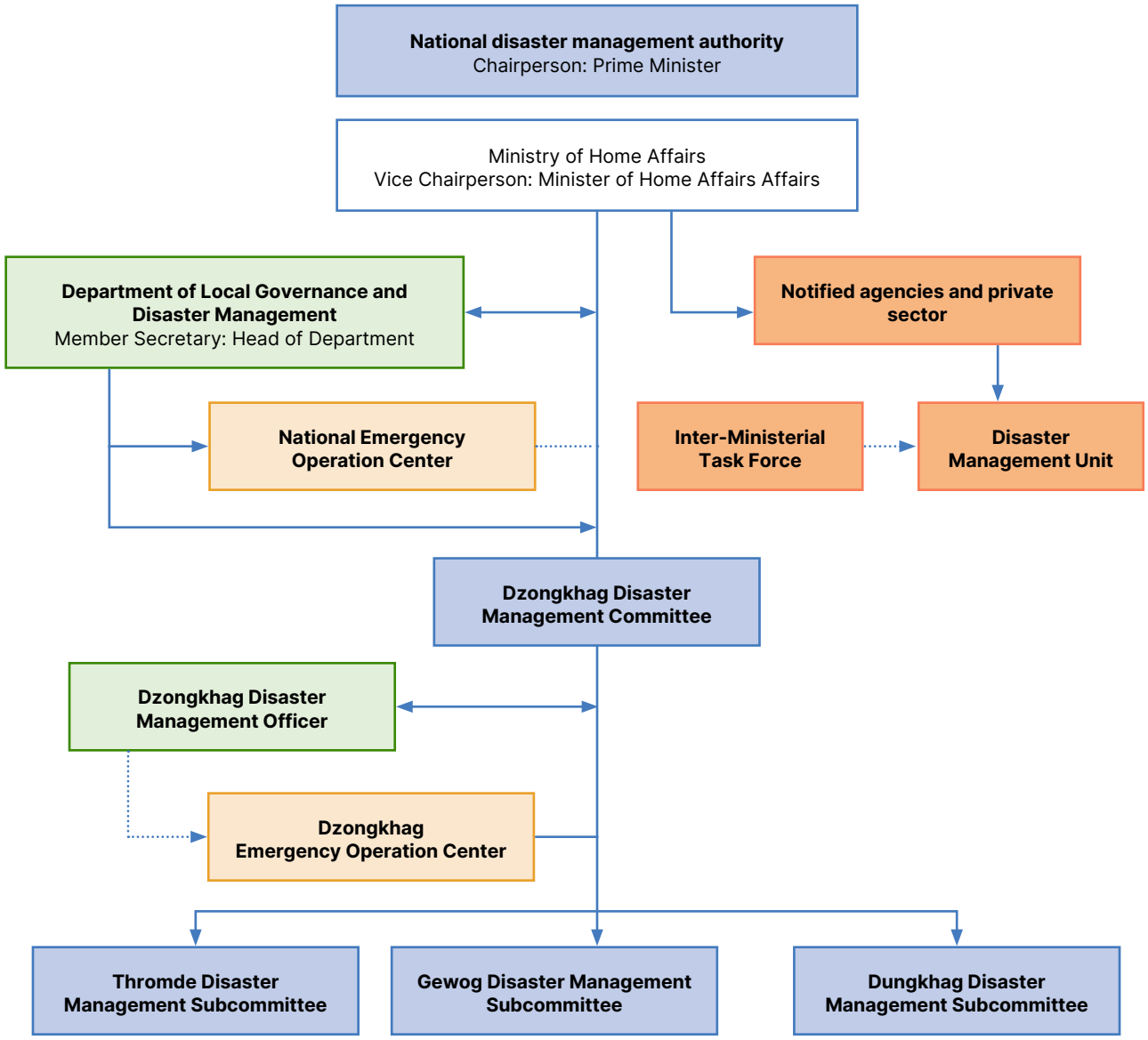
- **Declaration of Type I–III disasters.** The DM Act includes the provision to declare a Type III (national-level) public emergency or calamity by the Druk Gyalpo (His Majesty) on the written advice of the Prime Minister. It also includes the provision to declare Type I (*thromde* and *gewog* level) and II (*dzongkhag* level) disaster by the Chairperson of the Dzongkhag Disaster Management Committee (DDMC) upon approval by the NDMA. However, Type I–III disasters have never been declared due to the lack of awareness, enforcement of the act, clear evaluation criteria for the degree of a disaster, and SOPs.

- **NDMA and DMCs at the local levels.** The NDMA and DMCs though central to DM are not systematically activated when there is a disaster event. Instead, the NDMA is activated by decision of the Prime Minister and the local DMCs by decision of the local government heads. The NDMA met about three times during the beginning of COVID-19 pandemic but later was not the main decision-making body and was not active. As they are not activated as per the act to manage floods and landslides during the monsoon season, there are limited opportunities for the NDMA and local DMCs to test, review, and improve their functions

and emergency communication protocols, in the absence of regular training and disaster simulations. This poses a significant concern to their capacity to effectively respond to severe disasters such as earthquake and GLOFs.

- **IMTF.** The first meeting of the IMTF was held in 2018. However, it has not held any meetings since then to fulfill its roles and responsibilities in the absence of SOPs and clear leadership from the MoHA in convening the IMTF regularly.

Figure 5. Bhutan's Institutional Structure for DRM



13. **The National Disaster Response Coordination Committee (NDRCC), approved in 2017, stands ready to be activated by the RGoB in the event of Type III disasters**. The NDMA approved the Disaster Response and Coordination Process (DRCP) including the NDRCC via a Government Order in 2017 to ensure effective and efficient emergency response. The DRCP defines structures, roles, responsibilities, and coordination of response across national and *dzongkhag* levels based on the Incident Command System (ICS). Further, the DRCP defines the roles and responsibilities of the NDRCC, which is activated during a Type III disaster, and the Incident Management Team (IMT),[31] which is activated during a disaster at the *dzongkhag*, *thromde*, or *gewog* levels. The NDRCC has eight desks led by government secretaries and the Chief of Police and supported by various government and nongovernment agencies. However, as Type III disasters have never been declared in the past, the NDRCC has never been activated. Consequently, there is no evidence from experience to understand the effectiveness of the NDRCC.

14. **The RGoB did not activate the DRCP or the NDRCC during the COVID-19 pandemic.** The Cabinet and the Ministry of Health (MoH) have instead established a separate emergency management mechanism for COVID-19, including the National COVID-19 Incident Command Structure that is similar to the NDRCC but specific to the pandemic. As COVID-19 was considered only as a health emergency, a separate command system was established because health emergencies were dealt separately till date. Also, the activation of NDRCC depends on political leadership.

15. **In the absence of major disasters since its enactment in 2013, the lack of DM Act enforcement has not had any material effect on the country's emergency response and recovery.** The local governments have received financial and technical assistance from the central government during disasters regardless of the declaration of disaster. The local governments have been coordinating the response to local disasters with support from the Department of Local Government and Disaster Management (DLGDM) when needed, and financing support from the government is provided based on the Amended Operational Guidelines for Disaster Financing 2017. However, some agencies expressed that declaring a disaster would be beneficial to garner support from the central government and development partners in a timely manner and make more systematic emergency response. As disasters have never been declared, the functionality and operationality of the plans and institutions in place have not been tested.

16. **In addition, the DLGDM under the MoHA is yet to be fully empowered with adequate technical staff and financial resources.** The DLGDM is the designated secretariat and executive arm of the NDMA and is responsible for instituting a robust coordination platform for DRM initiatives and enhancing awareness and understanding about DM. However, the DLGDM is yet to be fully empowered with adequate technical staff as well as the National Emergency Operation Center (NEOC) with adequate equipment and financial resources to undertake its mandates and enforce various mechanisms related to DRM.

17. **The MoHA approved the National Disaster Management and Contingency Plan (NDMCP) in 2023, demonstrating their commitment to disaster preparedness and management.** The DLGDM prepared the NDMCP with financial and technical assistance from the World Bank, fulfilling the provision of the DM Act. It adopts a whole-of-government approach to multi-hazard preparedness and response. The NDMCP defines the roles and responsibilities ex ante, during, and post disaster of 35 government agencies for the first time in the country, as well as a mechanism for coordinating interagency responses to disasters. The plan lays out a series of priority actions by sector and department, with clear targets for the next five years and means of verifying whether the targets have been met. In addition, it predefines a trigger mechanism to activate the contingency plans in response to an extreme weather event or public health emergency. It will be reviewed and updated regularly to ensure its effectiveness and relevance. Although the NDMCP includes a priority action plan for 2023–2028, it is not costed and resourced due to funding constraints.

[31] A rostered group of ICS-qualified personnel consisting of an incident commander, command and general staff, and personnel assigned to other key ICS positions.

18. **The sectoral and local Disaster Management and Contingency Plans (DMCPs) need to be reviewed and updated using scientific multi-hazard risk information and made relevant to the institutional changes and capacities.** Although all 20 *dzongkhag* and 4 *thromde* administrations have prepared and published DMCPs with support from the DLGDM about a decade ago, they are predominantly prepared based on qualitative disaster risk assessments, including visual and consultative assessments and historical information rather than quantitative assessment. The plans need to be updated based on up-to-date climate and disaster risk information with a stronger emphasis on ex ante measures. Furthermore, key sectors such as telecommunication, power, and water supply do not have sectoral DMCPs in place. In addition, these DMCPs have yet to be implemented due to resource and capacity constraints. In addition, there is no mechanism to monitor and evaluate the implementation.

19. **Although there is a general consideration of vulnerable groups in the legislation and policy frameworks, these documents do not address the specific impacts on these groups.** While the need to emphasize vulnerable populations is considered in the DM Act, the NDMCP and local DMCPs do not specify the impacts of key hazards on these groups. The DLGDM is planning to conduct a nationwide socioeconomic vulnerability assessment through a World Bank-supported project on Strengthening Risk Information for Disaster Resilience to better understand the impacts of key hazards on the vulnerable groups and inform provision of targeted support to these groups. Additionally, it is essential to incorporate climate and disaster resilience considerations into the development of the Social Protection Policy, Social Protection Act, and Social Protection R&R aimed to lessen the severe impact on socially and economically vulnerable households.

20. **The DLGDM is planning to incorporate lessons learned from COVID-19 and past disasters by amending the DM Act 2013 and DM R&R, with technical and financial assistance from the World Bank.** The amendments to the Act shall define the conditions for activating the NDMA and DMCs, revisit the definition of Type I–III disasters to incorporate the scale of loss and damage, link the declaration of Type I–III disasters with the level of financial and technical assistance from the central government to the affected local governments, and mandate the adoption of National Disaster Response and Coordination Process for all hazards. Other recommendations involve incorporating provisions on enhancing understanding of risk with focus on data, hazard assessments, climate change projections and scenario building, risk and vulnerability assessments for current and future hazard profiles, sectoral applications (land-use planning, agriculture, water, and so on), and enhanced coordination between public health and DM. In the R&R, it is recommended to define protocols for sharing risk information, details on how agencies (including the private sector) are identified to be notified and what the notification process entails, clarity on non-state actors' involvement, M&E of DMCPs, and process of rehabilitation.

SUMMARY OF ENTRY POINTS	TIMELINE
Legal and Institutional Foundations	
Amend and enforce the DM Act and the DM R&R, and allocate adequate budget to address the implementation bottlenecks and define the scope more explicitly to include climate change impacts and disease outbreaks and be read as all-encompassing except for the specifically excluded ones. The amendments could include the following (ongoing): • DLGDM to define the conditions for activating NDMA and DMCs to enable an objective activation. • DLGDM to redefine Type I–III disasters to incorporate the scale of loss and damage to make an objective declaration. • DLGDM and MOF to link the declaration of Type I–III disasters with the level of financial and technical assistance from the central government to the affected local governments. • DLGDM to propose to NDMA to mandate the adoption of NDRCC and DRCP for all hazard types, including disease outbreaks. • DLGDM to review and amend the DM R&R to elaborate provisions on the clauses in the DM Act, with clear definition of responsibilities and processes. • MOF to allocate dedicated resources for implementation of priority activities in the NDMCP	Medium Term

UNDERSTANDING AND MONITORING RISKS - AGGREGATED SCORE: 2.0 (BASIC)

COMPONENT	SUBCOMPONENT	INDICATOR	MATURITY LEVEL
2. UNDERSTANDING & MONITORING RISKS	2.1 Risk assessment	2.1.1 National cross-sectoral and sector-specific risk assessments have been carried out, using current and historical datasets	BASIC
		2.1.2 Government is able to identify vulnerable people without discrimination	BASIC
	2.2 Risk monitoring and early warnings	2.2.1 Government has the capacity to monitor and analyze active threats in real-time to inform national and subnational-level decision-making	BASIC
		2.2.2 Risk information is communicated in accessible and relevant formats to all relevant groups	BASIC

Risk Assessments, Monitoring, and Early Warnings

21. **While nationwide impact-based risk assessments are limited, sectoral and subnational risk assessments for specific purposes have been conducted.** As part of preparing the National Adaptation Plan (NAP), an assessment of climate risks on agriculture, forests and biodiversity, health, and water resources was conducted. There are ongoing hazard mapping and risk assessments for floods, landslides, and earthquake. However, the quantification of disaster risk has not been conducted, and risk information is available for some areas but not nationwide. Data sets are generally spatially fragmented and with inconsistent methodological approaches, leading to duplication of

efforts and limited potential for future use and integration. Although some risk assessments for specific purposes have been conducted, no agency has yet conducted a truly probabilistic risk assessment for earthquakes or floods across a range of infrastructure classes and economic sectors. Therefore, prioritization of investments even based on deterministic scenarios is limited.

22. **While the need for disaster risk assessments is well recognized, the roles and responsibilities of government agencies for risk assessments are not clearly defined.** Risk assessment is a relatively new concept in Bhutan. Past and ongoing engagements demonstrate that relevant agencies are willing to collaborate and share information but lack procedures and tools to facilitate data sharing. The DLGDM plans to develop Risk Information Guidelines under the Strengthening Risk Information for Resilience Project (P175081), which will specify the roles and responsibilities of agencies involved in generating risk information, standards for multi-hazard risk assessment, and protocols for information sharing. The guidelines will be integrated into the planned revision of the Geo-Information Policy and the development of Geo-Information R&R planned by the National Land Commission Secretariat (NLCS) under the 13th Five-Year Plan (FYP).

23. **While the Department of Geology and Mines (DGM) under the Ministry of Energy and Natural Resources (MoENR) is responsible for seismic monitoring of the country, there is no earthquake early warning system (EWS) in place.** There are 14 earthquake source monitoring stations and 221 earthquake intensity meters across the country. All the information from these stations is received at the central monitoring system for seismic activities hosted at the DGM, which was established in 2016. The department faces challenges in maintaining the source monitoring stations, especially in the southern parts of the country due to the lack of dedicated funding and human resources. Similar maintenance challenges also persist for intensity meters which are in the *gewog* and *dzongkhag* offices, as these get damaged frequently in areas prone to lightning. As a result, there is disruption in data transfer to the central monitoring system.

24. **The country's efforts to develop a landslide inventory are ongoing, but landslide risk assessments are significantly limited, and there is no landslide EWS in place.** The DGM conducts landslide hazard mapping while the DoST under the MoIT has just embarked on landslide risk assessments along national highways. The DGM is mandated to develop an inventory of landslides nationwide and conduct susceptibility mapping. There is an urgent need to conduct landslide deformation mapping and continue refining susceptibility maps. However, the DGM is constrained with both technical capacity and financial resources. Although the DGM is mandated to map landslide hazards across the country and the DoST is mandated to conduct landslide risk assessments along road corridors, there is no official collaboration mechanism to share information between the two departments. At present, this collaboration is being pursued through the Technical Working Group for multi-hazard risk assessment established under the World Bank-financed Strengthening Risk Information for Resilience project.

25. **As the designated 'Hydromet Hazard Early Warning Service Provider', the NCHM provides qualitative extreme weather advisories and flood and GLOF early warning but no lightning warning.** It currently produces qualitative weather forecasts for three days ahead. These forecasts are prepared at the district level and therefore adequately represent local areas, especially higher elevations and remote areas where there is difficulty in locating, installing, and maintaining stations. Based on a qualitative analysis, flood warning stations are located mainly along major rivers, and the network is sparse in smaller rivers. The NCHM does not operate a lightning detection network, and it does not subscribe to lightning data services from a service provider. There are no global atmospheric watch stations operating in Bhutan.

26. **Since the GLOF EWS is currently based on flood detection and issues warnings as a result of an outburst, NCHM is planning to integrate flood forecasting into the EWS to gain more lead time.** The NCHM carries out an annual program of monitoring the snow and glaciers including glacier mass balance calculation for three benchmark glaciers[32] and

[32] Thana glacier at the source of Chamkharchhu, Ganjula glacier at the source of Phochhu, and Shodug glacier at the source of Thimphuchhu.

bathymetry surveys of glacial lakes at the source of Chamkhar Chhu and Lunana regions every two years or whenever it is needed. Comprehensive, real-time, and routine monitoring of snow and glaciers is not currently conducted by the NCHM due to the limited human capacity with only three glaciologists and an inadequate budget. The GLOF EWS along the Punatsangchu and Chamkhar-Mangde basins does not use any models for quantification but relies mostly on measured water levels using automatic instruments and telemetry. The NCHM aims to extend the GLOF/rainstorm flood EWS to all river basins.

27. **All 80 automatic weather station installations are prone to frequent interruptions of service mainly due to challenges in communication and network connectivity.** These challenges make identifying alternative communication channels a necessity, especially for flood EWS.

28. **The NCHM does not conduct regional climate research or operational climate forecasting due to limited capacity and resources.** Seasonal forecasts are issued for the summer and winter monsoons, based on the consensus statement from the South Asian Seasonal Climate Outlook Forums. The NCHM provides climate information services, including monthly and annual climate monitoring reports, seasonal forecasts, and annual statistical information and analysis of the climate extremes. In addition, as mandated by the Climate Change Policy, the NCHM has been working on the climate projections for Bhutan and monitors climate change and climate variability. However, no regional climate downscaling and regional or subregional climate research is conducted by the center. Similarly, no operational climate forecasting (for example, monthly and seasonal) services exist due to insufficient capacity and resources.

29. **There is no forest fire monitoring and EWS in place due to limited technical capacity and financial constraints.** The Forest and Nature Conservation R&R of 2023 mandates the Department of Forests and Park Services (DoFPS) under the MoENR to prevent and protect forests from fire including provisions on early detection of fires. Despite several initiatives to establish a forest fire monitoring system in Bhutan, they have been unsuccessful. For instance, the installation of surveillance cameras in the Thimphu District was discontinued due to expensive technical maintenance and financial challenges. The DoFPS has partnered with the International Centre for Integrated Mountain Development (ICIMOD) to utilize a forest fire monitoring system[33] that provides automatic email alerts to responsible officers and responders. Additionally, an online portal system is used to provide information on forest fire incidents and statistics, utilizing satellite data and a coordinate system. However, the effectiveness and reliability of this system remain questionable due to frequent technical glitches and its main server being based in Nepal. There is a need to establish a robust forest fire monitoring system leveraging remote sensing and cutting-edge technologies and based on research on fuel load data in Bhutan. Additionally, surveillance of wildlife is inadequate or absent, despite the heightened risk of spillovers.

30. **The National Disease Surveillance and Epidemiology Unit of the Royal Centre for Disease Control (RCDC) under the MoH monitors and notifies the spread of diseases/syndromes; however, capacity constraints persist.** The National Early Warning Alert and Response Surveillance System is a web-based system that incorporates real-time mobile SMS reporting, enabling the detection and monitoring of public health events with rapid response capabilities at all levels. The unit's capacity extends to providing epidemiological support to stakeholders in disease surveillance and outbreak investigations, monitoring trends in notifiable diseases and health threats, analyzing and disseminating surveillance and outbreak data, assessing and offering recommendations on event reports, and training health care professionals in National Notifiable Diseases outbreak investigations. Ongoing activities include Indicator-Based National Notifiable Disease Surveillance, Immediate Reportable National Notifiable Disease Surveillance, and Event-Based Surveillance. Indicator-based surveillance involves periodic reporting, while event-based surveillance involves ad hoc reporting. Although a communicable disease monitoring and warning system is in place, the RCDC faces a lack of adequate human and technical resources. Furthermore, for new diseases and due to capacity constraints for certain diagnostic tests, Bhutan needs

[33] https://geoapps.icimod.org/BhutanForestFire/.

to send samples to neighboring countries. For zoonotic disease, the Veterinary Information System is in place for risk monitoring; however, there is a lack of systematic reporting for effective surveillance.

31. **Screening processes at the entry points to the country are put in place when there is a need, such as during the COVID-19 pandemic; however, there is an opportunity to establish a formal cross-border information sharing mechanism.** During the COVID-19 pandemic, health officials were stationed at all the entry points to the country, including airports and land points to screen people when entering the country. The districts in the southern border face a high risk from vector-borne diseases, both from within as well as from neighboring states in India. India and Bhutan have informal mechanisms for sharing information on the detection of vector-borne diseases. For preventive measures such as spraying to be effective, collaboration at borders needs to be formalized and strengthened for the benefit of both sides.

32. **Although Bhutan has a monitoring system for malnutrition, there is no EWS for food security in place.** The MoH regularly collects incidence and prevalence of malnutrition, including stunting among children under 5 years and anemia among women of reproductive age in Bhutan. National-level surveys, for instance, National Nutrition Surveys, also provide information on nutritional status. The NDMCP mandates the Department of Agriculture (DoA) under the Ministry of Agriculture and Livestock (MoAL) to develop systematic baseline and pre-crisis food security information for conducting regular food security monitoring, needs assessment, and rapid food security assessments for food assistance. However, these are not in place yet.

33. **There is presently no robust, 'fit-for-purpose' online portal for intra-government and public sharing of up-to-date geospatial data and information on hazards, exposure, and vulnerability.** While some information regarding risk in various sectors such as health, roads, floods, and earthquakes is available, this information is not systematic or standardized. As a result, there is no platform for sector-specific risk assessments that is linked to national risk assessment. In consequence, these risk assessments do not provide a thorough understanding of the geographical distribution of risk in the country. The development of a multi-hazard risk decision support system (DSS) and a nationwide multi-hazard risk assessment focused on earthquakes, floods, and landslides along highways is being conducted under the World Bank-financed Strengthening Risk Information for Resilience project. The DSS under development will provide a common platform for all risk assessments and is expected to improve the coordination and exchange of relevant risk data sets among agencies for risk-informed decision-making. In addition, it is expected to revamp and integrate the Disaster Management Information System, which was developed by the DLGDM but not operationalized yet due to its poor user interface and lack of scalability and connectivity with other systems.

34. **Comprehensive risk communication on various hazards is limited mainly due to the scarcity of reliable risk assessments and lack of targeted communication.** Although some kinds of risk communication about earthquakes, GLOFs, and floods are conducted by the DLGDM and NCHM, there is no location-specific and targeted risk communication. There are EWSs in the form of advisories for the public regarding extreme weather events. However, the warnings tend to be more scientific than simple and actionable for the public with expected impacts. Risk information is usually disseminated through television, mainly in Dzongkha and English. People in rural areas typically prefer and understand better in local dialect, which is limited. In addition, there is no consolidated national risk communication system where people can look for alerts and warnings.

SUMMARY OF ENTRY POINTS	TIMELINE
Understanding Risks	
RISK ASSESSMENTS	
Strengthen a more integrated approach to risk assessments, bringing together different sectors and hazard types to improve the utilization of assessments in planning and response (ongoing): • DLGDM to develop a geospatial DSS. • DLGDM to develop Risk Information Guidelines and NLCS to amend the Geo-Information Policy 2018 to define the roles and responsibilities of relevant government agencies in generating and maintaining risk information including data standards and sharing protocols.	Medium Term
RISK MONITORING AND EARLY WARNINGS	
NCHM to build its capacity for medium-term weather forecasting (ongoing)**, impact-based forecasting, flood forecasting, and sector-specific services**, including the establishment of the new NCHM HQ, National Weather, and Flood Warning Centre to modernize the equipment. Formulate the Hydromet Act and its R&R.	Long Term
DoFPS to develop a near real-time forest fire surveillance system that integrates a forest fire danger rating system, a forest fire simulation/prediction model, and a forest fire monitoring system, which is currently hosted by ICIMOD, leveraging satellite technologies.	Long Term
MoH to strengthen monitoring of communicable and vector-borne diseases through enhanced technical and human resources capacity of the National Disease Surveillance and Epidemiology Unit of RCDC and expanding training for health care professionals.	Medium Term
DGM and DoST to enhance seismic and landslide hazard mapping (ongoing) **and pilot a landslide EWS** in critical landslide hot spots.	Long Term

FINANCIAL PREPAREDNESS - AGGREGATED SCORE: 2.3 (BASIC)

COMPONENT	SUBCOMPONENT	INDICATOR	MATURITY LEVEL
3. FINANCIAL PREPAREDNESS	3.1 Crisis risk financing	3.1.1 Government has put in place a dedicated strategy for the delivery of crisis and disaster risk financing	NASCENT
		3.1.2 Government has access to a range of sovereign financing instruments	NASCENT
		3.1.3 Government ensures an enabling environment for insurance and other risk finance instruments	BASIC
	3.2 Public Financial Management	3.2.1 Government has put in place crisis-related budget execution rules and procedures	ADVANCED
		3.2.2 Anti-corruption mechanisms are in place to ensure transparency, efficiency, and accountability in the provision of emergency services and financing at national and sub-national levels	ADVANCED
		3.2.3 Coordination and close engagement takes place with international development and humanitarian stakeholders, including the management of post-crisis inflow of resources	BASIC

35. **The country's estimated average annual loss (AAL) from disasters (droughts, floods, earthquakes, and biological) is US$169.3 million (approximately 6.9 percent of current GDP)**.[34] In 2009 and 2011, two strong earthquakes caused damage and loss of US$52.6 million [35] (4.3 percent of GDP) and US$24.5 million [36] (1.4 percent of GDP), respectively. In terms of AAL as a percentage of GDP under current, moderate (RCP 4.5), and worst-case (RCP 8.5) climate change scenarios, Bhutan is one of the most vulnerable countries in the region.[37]

36. **Bhutan has a legislation in place for financing emergency response, restoration, and reconstruction as a risk retention measure.** The Public Finance Act of 2007 allows the MoF to authorize the use of public funds for urgent needs during an emergency. In line with the Public Finance Act and DM Act, the MoF sets aside a General Reserve within the annual budgets. The DM Act directs the DMCs to allocate funds to be used for disaster response and relief aligned to the guidelines provided by the NDMA. The act gives authority to the NDMA to approve the reimbursement of the expenses incurred by the DDMCs toward disaster response, recovery, and rehabilitation. It also provides for a separate budget for capacity-building activities of the DLGDM, establishing critical facilities and purchase of equipment or for any other activity which could strengthen disaster preparedness in Bhutan.

37. **Bhutan's crisis risk financing is limited to the General Reserves as a risk retention measure, and there is currently no risk transfer mechanism in place.** There is no comprehensive disaster risk financing strategy or policy for mitigating the financial impact of different types of disasters occurring at different frequency and with different degrees of severity. The country has been mainly using General Reserves for regular monsoon restoration works and emergency reliefs. Figure 4 presents the financial instruments currently available in Bhutan.

38. **In accordance with the Operational Guidelines for Disaster Financing 2017, the General Reserve funds are used for financing (a) emergency response and relief, (b) immediate restoration of essential public infrastructure and services, and (c) recovery and reconstruction.** For immediate restoration of essential public infrastructure and service centers (for example, schools, hospitals, *gewog* offices, rural water supply schemes, bridges, and highways) to continue providing undisrupted services to the community, the DMCs must assess, verify, and submit detailed damage report along with work plan, cost estimate, and pictorial evidence to the MoF within 45 days of the disaster event. Upon review, the budget is allocated from the General Reserve for Disaster Relief to the respective agency. The cumulative total expenditure on disaster relief between FY20 and FY23 was BTN 4.96 billion (US$60.1 million) with an average annual expenditure of BTN 1.2 billion (US$14.5 million),[38] which represents an increase of more than 15-fold compared to FY15–19, mainly due to COVID-19. The cumulative expenditure on monsoon restoration works between FY20 and FY23 was BTN 755.9 million (US$9.2 million) with an average annual expenditure of BTN 189 million (US$2.3 million). Regarding financing for recovery and reconstruction activities, the RGoB agencies conduct a damage assessment, and the budget requirement for the recovery and reconstruction shall align with the normal planning and annual budgeting process. Although this guideline was already in place when the COVID-19 pandemic started, there was confusion among government agencies about resource mobilization and access to funds. Furthermore, the guidelines lack procedures to request funds from development partners, hindering efficient resource mobilization during an emergency.

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[34] Economic and Social Commission for Asia and the Pacific (ESCAP), Risk and Resilience Portal, https://rrp.unescap.org/country-profile/btn

[35] RGoB, World Bank, and UN. 2009. *Bhutan Earthquake September 21, 2009: Joint Rapid Assessment for Recovery, Reconstruction and Risk Reduction.*

[36] RGoB, World Bank, and UN. 2011. *Bhutan Earthquake September 18, 2011: Joint Rapid Assessment for Recovery, Reconstruction and Risk Reduction*.

[37] UNESCAP (United Nations Economic and Social Commission for Asia and the Pacific). 2021. *Asia Pacific Disaster Report*.

[38] Data received from the MoF on August 15, 2023.

Figure 6. Overview of Disaster Risk Financing Instruments in Bhutan

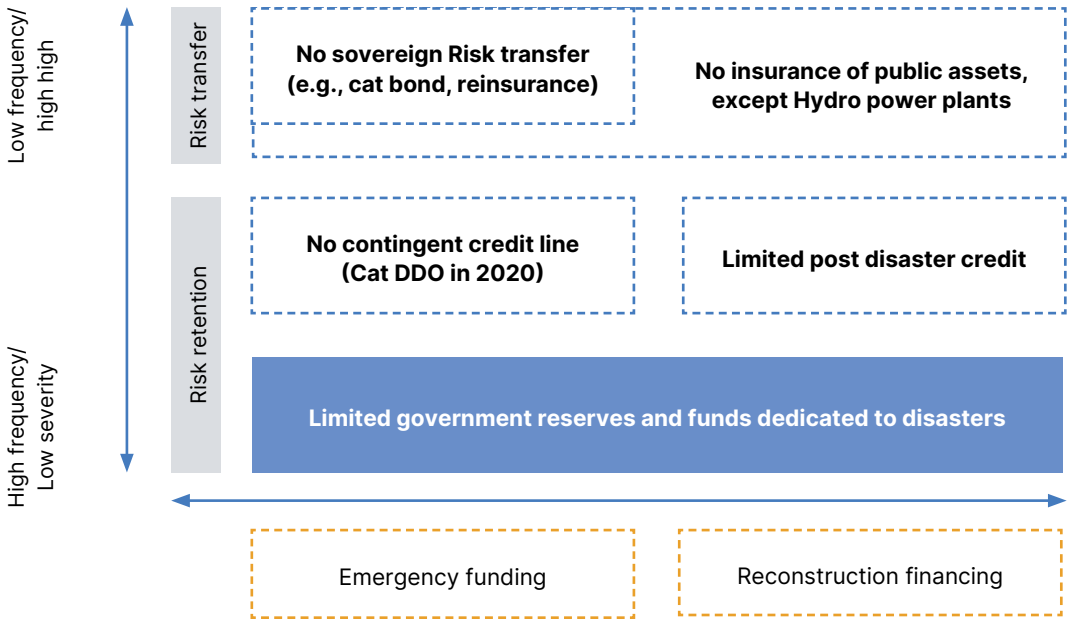

Photo: ©Andrew Peacock | istock.com

39. **The Bhutanese health care system, predominantly government driven, is likely to face challenges to ensuring adequate financing for emerging health care challenges.** It is grounded in the principles of Universal Health Coverage. However, concerns have arisen regarding the system's sustainability due to the escalating costs of health care, rising public expectations, and the emergence of more complex and expensive NCDs. The RGoB has already seen the decline in preparedness-related allocation from 70 percent in FY21 to 60 percent in FY23. This is likely the result of various factors, including slow economic growth following the COVID-19 pandemic. To address these challenges, there is a pressing need to diversify health care financing sources, with a gradual integration of the private sector.

40. **The MoH is finalizing a health emergency financing strategy and aiming to establish a dedicated contingency fund for health emergency management upon approval from the MoF.** The MoH has been awarded the Pandemic Fund Grant in January 2024, which will be implemented by the WHO and the FAO. The grant aims to strengthen preparedness and response through improved surveillance and early warning, laboratory systems, human resources, and workforce toward the preparedness and response agenda. The MoH plans to allocate US$20,000 from the Pandemic Fund as seed money to supplement the proposed contingency fund.

41. **Bhutan had access to a contingent line of credit for initial COVID-19 emergency response in 2020 and is preparing the second Catastrophe Deferred Drawdown Option (Cat DDO).** The Development Policy Financing with a Cat DDO, which closed in June 2023, provided the RGoB access to immediate liquidity amounting to US$15 million and a grant financing of approximately US$1 million from the Pandemic Emergency Financing Facility in response to the initial COVID-19 outbreaks. The World Bank is currently preparing the Climate and Disaster Resilience Development Policy Credit with a Cat DDO of US$40 million to strengthen the technical and institutional capacity of the RGoB in managing climate and disaster risks.

42. **Although Bhutan issued its first sovereign domestic bond during the COVID-19 pandemic, non-concessional financing from international markets may not be a fiscally and financially viable option for the country in the short term.** Following the approval of the R&R for Issuance of Government Bonds, Bhutan issued a three-year sovereign domestic bond of US$41 million in 2020 with technical assistance from the UNESCAP. However, the funds were not directly used for COVID-19 response. The MoF is preparing a Sustainable Financing Framework and green taxonomy for issuing sovereign Green Bonds in international markets. However, an inaugural 10-year bond in US dollar would cost at least 7 percent per year which is significantly higher than the cost of concessional financing provided by multilateral development banks. In addition, any international bond issuance requires a sovereign rating by at least one credit agency with a recurrent annual fee. Until market-based instruments are financially and fiscally viable, the RGoB may prioritize other risk transfer mechanisms such as insurance to minimize the financial impact of a less-frequent and severe disaster event.

43. **Only 18 percent of households have insured their properties and assets, while no public buildings and infrastructure, except hydropower plants, are insured.** The insurance business in Bhutan derives its legislative framework from the Financial Services Act 2011 and detailed in the R&R for Insurance and Reinsurance Companies and the R&R for Licensing of Insurance Companies in Bhutan 2018. Except the hydropower plants constructed and operated by the Druk Green Power Corporation, critical infrastructure such as hospitals, schools, roads, bridges, airports, government offices, and fire departments are not insured. The WFP is planning to pilot index-based crop insurance in four districts during 2024–2029. The insurance industry conducts awareness-raising programs on insurance benefits; however, public acceptance has been limited.

44. **The government has implemented a subsidy program to promote rural house insurance.** The Rural House Insurance Scheme provides protection to rural homes against possible risks from fire, flood, landslides, rainfall, windstorms, hailstorms, lightning, and earthquake. The insured's share ranges from BTN

100/year for Category IV[39] homeowners to BTN 975/year for Category I[40] homeowners, which is 0.04 percent to 0.35 percent of the average rural household income, respectively. For both rural and urban buildings, purchasing insurance is a requirement for obtaining loan for construction.

45. **While R&R for Insurance and Reinsurance Companies requires the valuation of assets in accordance with the Bhutan Accounting Standards, land and property valuation in the country is not based on international valuation standards (IVS).** The core challenge for valuation is the poor real property market transparency. Land transaction prices are commonly underdeclared, and land leases are not registered in a public record. There are no reliable sources available for verifying market values. The public sector and financial institutions' valuations are interlinked and circulate same valuation by and large, and both are based on poor data. The building valuation practices perform better but may not reflect adequately the locational impacts to building values. Also, it is exceptional that there is no regulated valuation profession in the country, and standards and methods applied to private sector commercial valuation vary. Such a weak valuation infrastructure has negative impacts to financial system resilience and insurances.

46. **Bhutan's public procurement is being modernized through the Electronic Government Procurement (e-GP) system.** As part of continued reforms over the years, Phase 2 of the e-GP system was launched in 2020, supporting government-wide procurement through an online platform. Government agencies are already using the e-GP system, facilitating the procurement during the COVID-19 pandemic. Further enhancements have been developed in Phase 3.

47. **The government introduced flexibilities in the Procurement Rules and Regulations (PRR) in March 2020 and issued Simplified Procurement Rules and Regulation in 2021.** The PRR 2020 was issued to address emergency needs and expedite the implementation of the COVID-19 emergency response. The Simplified PRR, applicable to all public procurement, has streamlined processes, including reduced the time for advertising and increased the thresholds for the use of simplified procurement methods.

48. **The PRR 2023 allows for direct contracting or single source selection for contracts of any value during emergencies.** It authorizes exceptions to follow routine procurement procedures during an emergency. It also allows the use of UN Agencies' rates during emergencies. In addition, as per the DM Act 2013, during an emergency, the NDMA may direct the use of emergency procurement upon the prior approval from the MoF to ensure a direct and least time-consuming method to procure goods and services and exempt specific supply of goods and services from the standard procurement procedure specified in the PRR. There are registered specialized disaster supplies, and several agencies have Financing Agreements with these suppliers.

49. **The DM Act mandates the concerned agency to submit the accounts of the response and relief expenditure to the MoF as per the Financial R&R.** There is a clear line of accountability within an agency for any emergency procurement, reinforced with an annual post-audit by the Royal Audit Authority (RAA). The RAA conducts financial audits at two tiers: the consolidated annual financial statements of the RGoB at the national level and at the individual agency level. The report contains the result of the audit of the government's annual financial statements and recommendations to improve the economy, efficiency, and effectiveness of the government. The latest RAA audit report is unqualified, and the RAA also conducts the financial audits of the donor-assisted projects and performance audits.

[39] Modern houses with reinforced cement concrete (RCC) walls and RCC roof structures.
[40] Traditional houses with stone masonry walls and wooden roof.

SUMMARY OF ENTRY POINTS	TIMELINE
Financial Preparedness	
CRISIS RISK FINANCING	
• **MoF and DLGDM to develop a Disaster Risk Financing and Insurance Strategy** for risk retention and transfer mechanisms to reduce the financial impact of disasters, including health emergencies. • Revise the Operational Guidelines for Disaster Financing 2017 for more transparent and efficient budget allocation and utilization for DM, including clear procedures for accessing and deploying the General Reserves in emergencies. • Access a contingent line of credit through the Second Cat DDO under preparation, including a Climate Resilient Debt Clause (CRDC), which offers countries in an eligible event the option of deferring principal and/or interest repayments for up to two years. • Consider establishing a dedicated contingency fund for health emergency management. • Consider a sovereign risk transfer mechanism such as a Cat Bond and accessing international markets (for example, Green Bonds) in the long term after exhausting the use of concessional funding from International Development Association (IDA) and other donors and upon confirmation of its fiscal viability. • Pilot crop and livestock insurance schemes (ongoing).	Short Term
MoF and NLCS to improve property and land valuation profession and services for accurate disaster risk insurance (ongoing): • Establish the Property Valuation Division in the MoF. • Establish national valuation standards adhering to IVS and designate an agency as a regulatory body for property valuation. • Provide access to an educational program on valuation at postgraduate diploma and master's levels. • Establish professional standards, code of conduct, accreditation, and oversight for valuation profession.	Medium-Long Term
PUBLIC FINANCIAL MANAGEMENT	
MoF to conduct a comprehensive assessment of the public procurement system for emergencies using the internationally recognized Methodology for Assessing Procurement Systems tool.	Short-Medium Term

Photo: ©wanderluster | istock.com

PRIMARY RESPONSE - AGGREGATED SCORE: 1.8 (NASCENT)

COMPONENT	SUBCOMPONENT	INDICATOR	MATURITY LEVEL
4. Primary response	4.1 Public health systems	4.1.1 The public health system has the capacity and resources to respond to key health threats and to function fully during crises	BASIC
		4.1.2 Government has capacity to detect and carry out surveillance of emergent and ongoing health threats in real time	BASIC
	4.2 Critical infrastructure	4.2.1 Government maintains an inventory of critical assets and infrastructure	NASCENT
		4.2.2 Systems are in place to ensure infrastructure operation, maintenance, and post-incident response across infrastructure types	BASIC
	4.3 Civil protection and Emergency Management Systems	4.3.1 Emergency management legislation and related policy instruments exist, allowing the emergency management services to function at the national and sub-national levels	BASIC
		4.3.2 Emergency service systems are well resourced, maintained, and sufficient in responding to major threats	BASIC

Public Health Systems

50. **The 2021 Global Health Security (GHS) Index gave Bhutan an overall score of 39.8, ranking the country at 78 of 195 participating countries and second in the region after India.** The country carried out a Joint External Evaluation (JEE) to assess its technical core capacities to detect, assess, notify, and respond under the International Health Regulations (IHR) 2005 in 2017. The JEE IHR assessment concluded that the RGoB's commitment to building and maintaining core capacities to address major public health events is evident.[41] The GHS Index concluded that Bhutan has room for improvements in the prevention, detection, and response pillars. As per the 2023 IHR States Parties Self-Assessment Annual Reporting (SPAR) on the status of IHR capacity, Bhutan scored an average of 63 percent in comparison to the regional average[42] of 68 percent and the global average of 66 percent in 2023.[43] Bhutan scored exceptionally well (scores 80 percent or above) in 4 out of 15 IHR capacities (surveillance, health emergency management, health services provision, and zoonotic diseases) but needs to strengthen the remaining, including financing, infection prevention and control, risk communication and community engagement (RCCE), human resources, and laboratories.

51. **The National Health Policy 2012 mandates the development and resourcing of national emergency preparedness and response plans for all levels of health facilities** for rapid and effective response during emergencies, disasters, epidemics, and outbreaks. The DM Act 2013 mandates the MoH as responsible for delivering medical services, especially "during and after the occurrence of natural and man-made disasters and emergencies." The act prescribed the development of a Health Emergency and Disaster Contingency Plan (HEDCP) 2016, which defined institutional mechanisms, roles and responsibilities, and SOPs for the response, management of human and financial resources, coordination, and communication

[41] https://ghsindex.org/country/bhutan/.
[42] WHO South-East Asia Region. Countries include Indonesia, Bangladesh, Myanmar, Maldives, Thailand, Sri Lanka, Bhutan, India, Nepal, and Timor-Leste.
[43] WHO. 2023. Electronic IHR States Parties Self-Assessment Annual Reporting Tool. https://extranet.who.int/e-spar/#capacity-score.

in anticipation of a health emergency. The draft 13th FYP commits to the accessibility and affordability of essential medical items at all times. The Bhutan National Action Plan for Health Security (2018–23), the Bhutan One Health Strategic Plan (2018–23), and the National Action Plan for Anti-microbial Resistance (2018–22) support preparedness from an integrated animal-human-environment health perspective.

52. **The RGoB prepared the National Preparedness and Response Plan (NPRP) for Outbreak of Novel Coronavirus and the Bhutan Pandemic Preparedness and Response Plan (BPPRP) 2020**. The NPRP was developed to detect, control and prevent, respond to, investigate, and recover from a COVID-19 outbreak in the country. It is aligned to the HEDCP 2016. The comprehensive BPPRP 2020 and its SOPs were developed as a whole-of-government measure for preparedness and response to a pandemic, updating the National Influenza Pandemic Preparedness Plan 2011 for human health with the learnings from the H1N1 2009 response. The MoH, in coordination with the DLGDM and local governments, conducted simulations and mock drill exercises in line with the BPPRP and related SOPs during the COVID-19 pandemic, which were a results indicator of the first Cat DDO. Although the roles of most of the agencies identified in the BPPRP are similar to that of the NDRCC, there is no mention of the NDRCC in the BPPRP. While the lead agency may change depending on the type of crisis, establishing different institutional systems for different disasters may hinder coordination in the future.

53. **The Department of Public Health (DoPH) has been reorganized to consolidate its mandate and to promote a people-centric, gender-sensitive, resilient, and sustainable health system in line with the IHR**. The COVID-19 pandemic highlighted the weaknesses of the health system, including the fragmented approach to addressing health emergencies. Catalyzed by the Civil Service Reform Act 2022, the institutional transformation includes the establishment of

- Communicable Diseases Division (CDD) responsible for (a) infectious disease programs, (b) surveillance and epidemiology critical for management of zoonotic diseases and compliance with the IHR following a One Health Approach, (c) vector-borne and climate-sensitive diseases, and (d) vaccine-preventable diseases;
- Health Promotion Division responsible for health education and advocacy;
- Non-Communicable Diseases Division responsible for (a) lifestyle-related disease program, (b) nutrition, (c) family health program, and (d) occupational health program; and
- The RCDC which is elevated to the national reference laboratory and oversees the Center for Emerging Infectious Disease and the Food, Drug and Environment Center.

54. **Bhutan has a national laboratory system that is capable of detecting most priority diseases and conducting core tests and has provisions for sample referral for tests not currently available in the country.** Bhutan operates three national laboratories, namely the RCDC, the National Centre for Animal Health, and the National Food Testing Lab. While all national reference labs engage in external quality assessment, this practice is neither obligatory nor strictly enforced.[44] Additionally, there are identified disease-specific international reference laboratories, and a referral system is in place for tests unavailable within the country, supported by SOPs and memorandums of understanding (MoUs).

55. **The RGoB has implemented mechanisms to mitigate epidemic risks arising from the convergence of animals, humans, and the environment; however, there are limitations in human resources capacity and collaboration with the environment sector.** The One Health Strategic Plan establishes a formal framework for information and technology exchange between the human and animal health sectors. Its primary objective is the early detection of zoonotic diseases, facilitating rapid response and mitigation. To oversee this initiative, the Inter-Ministerial Committee of One Health was established in 2019, with alternating leadership from the Secretaries of the Ministries

[44] Joint external evaluation of IHR core capacities of the Kingdom of Bhutan (2017), https://www.who.int/publications/i/item/WHO-WHE-CPI-REP-2018.7.

of Health and Agriculture and Livestock. Although the One Health Secretariat Office has been established, the Secretariat is yet to be fully functional due to capacity issues, especially around human resources. While the Department of Environment and Climate Change is involved, there are limitations in collaboration at the operational level within the environment sector. While the Inter-Ministerial Committee of One Health facilitates coordination across the three sectors, the data systems are not integrated to facilitate effective information sharing. Through support from the Pandemic Fund, the RGoB aims to strengthen the effectiveness of the surveillance systems by making the parallel systems in animal, human, and environmental health interoperable.

56. **Bhutan's Health Systems Transformation Note 2022 highlights human resources challenges for health care service delivery**, encompassing both quantity and skill levels, including a shortage of specialized and highly specialized health care professionals and general practitioners exacerbated by the emigration trends in the country. The Human Resources for Health Master Plan (2013–2023) projects a requirement for more than 10,000 staff members, as opposed to 4,000 current staff. During COVID-19, the health system faced severe challenges with a shortage of medical staff. Students from the medical university were on-boarded to support; however, efficient delivery of emergency services was challenging as they were new to the system. Prioritizing the development and retention of the remaining health care workforce is critical, especially in the context of ongoing emigration trends. To address this gap, the Health Transformation Note has identified the need to formulate a National Strategic Plan for Human Resources for Health.

57. **Especially, technical capacity and human resources for RCCE need to be strengthened.** Mechanisms for the coordination of RCCE functions and resources, including plans, SOPs, and formal government arrangements, are developed and being implemented at the national level. RCCE is integrated into the HEDCP 2016, the Risk Communication Guideline for the Health Sector was published in 2019, and a core team on Media & Risk Communication was established under the Health Emergency Management Committee. However, due to the shortage in the health care workforce, there is a need to strengthen human resources capacity to conduct RCCE effectively, particularly during health emergencies.

58. **Despite an efficient health emergency response service center, challenges persist for adequate provision due to constrained capacity and resources**, including a shortage of trained personnel, inadequate equipment, and financial constraints. Bhutan's Health Help Center operates a vital toll-free service. This central hub manages three critical applications: the Health Emergency Response Center System, AVAYA - Call Center, and Vehicles Tracking System, which employs global positioning system (GPS) to monitor ambulance locations for nationwide emergency responses. Despite its efficiency, the health care system faces significant challenges, including limited hospital capacity, inadequate equipment, and a shortage of trained personnel. There is also a pressing need for a review of emergency health facilities' design and layout, given the shortage of equipment and the aging ambulance fleet. Most of the ambulance fleet will require replacement in the near future; however, financial constraints pose a significant challenge. The single helicopter for emergency air service, provided by Druk Air through an MoU with the MoH, sometimes faces availability issues. To address these systemic issues, an urgent assessment of referral and district hospital capacity and integration into DMCPs is required. Additionally, systematic coordination between emergency medical responders and other emergency response teams, such as search and rescue (SAR) teams and Desuups,[45] is lacking, as are SOPs for rapid response teams, highlighting the need for improved coordination in the country's emergency health care system. Further, heavy reliance on imports for medical equipment, coupled with the absence of in-country maintenance service providers, results in delays in health care services when machines require repair or maintenance.

59. **Further, the suboptimal patient referral system has elevated concerns regarding service quality, increased wait times, and heightened societal burden, particularly during crises.** The Health System

[45] Guardians of Peace or a volunteer group.

Transformation Note highlights that despite the abundance of anecdotal evidence of diverse patient challenges encountered during visits to referral hospitals, there is an absence of a disaggregated patient record repository specifically for those referred to such facilities. Additionally, there is a lack of a systematic mechanism designed to guarantee the timely provision of appropriate treatment for referred patients. The inadequacies in the patient referral system exacerbate vulnerabilities in crisis preparedness and response, as efficient and timely referrals are essential for effectively managing surges in health care demand during emergencies.

Critical Infrastructure and Services

60. **While an inventory of most of critical infrastructures[46] is maintained by responsible government agencies, it does not function as a risk-based asset management system.** Although the MoIT and local governments maintain inventories of infrastructure in Excel format, they are not used for risk-based operations and maintenance (O&M) or for emergency preparedness, response, and restoration. Sectoral inventories lack comprehensiveness across the asset life cycle as they fail to capture infrastructure and asset values, replacement costs, current conditions, and maintenance history. Thus, there is a pressing need to introduce a life cycle cost approach for infrastructures and develop a risk-informed asset management system for each critical infrastructure sector. With support from Japan International Cooperation Agency (JICA), the NLCS is developing the National Spatial Data Infrastructure (NSDI), which could be utilized to map critical infrastructure assets.

61. **There are no backup systems for critical infrastructure in place.** The NDMCP 2023 emphasizes the importance of ensuring the continuity of key public services through various funding mechanisms. At present, there are no adequate backup infrastructure systems in place, and there is no alternative source of water and energy or an alternative mode of transportation in the country. For the road infrastructure, the DoST is preparing a Road Infrastructure Master Plan with ADB's assistance, which may include redundant road networks. For critical infrastructure such as hospitals, the energy backup system is insufficient as it depends on diesel generators, which may not last for more than three hours.

62. **Furthermore, there is a need to revise the 2018 Building Code to strengthen the resilience of all engineered buildings in the country against the potential damage from fire, floods, landslides, and earthquakes.** The current building code of Bhutan directly adopts the relevant Indian Standards from the National Building Code of India, which are not tailored to the unique geophysical conditions and seismic risks of Bhutan. In line with the Building Regulation, revised in 2023 with technical assistance from the World Bank, the code should be updated based on probabilistic seismic hazard assessment and mapping and a detailed energy and water use model in the building sector to promote a low-carbon and resilient built environment in urban areas.

63. **The MoIT plans to formulate the Construction and Transport Act to enforce strict quality standards and ensure the resilience of critical infrastructure services.** Critical measures such as licensing engineers and applying a construction quality compliance mechanism by the Bhutan Construction and Transport Authority across all civil works in Bhutan cannot be mandated without legislation in place. Therefore, the country urgently needs to formulate the act as well as its R&R to establish the legal and regulatory foundations toward a green and resilient built environment.

Transport

64. **Bhutan's roads,[47] the primary mode of inland transport, are highly vulnerable to landslides and floods, leaving many parts of the country disconnected during the monsoon.** Many far-flung communities are challenged with accessibility due to damaged roads disrupting transportation and limiting their access to health care, education, and economic opportunities. The only international airport that connects Bhutan with neighboring countries beyond India is known to

[46] Critical infrastructure typically refers to energy, transport, water, information and communication technology (ICT), and health.
[47] Bhutan has over 18,000 km of motorable roads of various categories out of which about 2,800 km are national highways, 2,000 km are *dzongkhag* (district) roads, and over 11,000 km are farm roads.

be one of the most dangerous airports in the world, making accessibility to Bhutan limited as there are only a few pilots certified to land at the airport under visual meteorological flying conditions because of the difficult terrain and capacity of the airport. Although there are three domestic airports, domestic flight operations are commonly affected by severe weather conditions, posing challenges in terms of access and reliability. Hence, it is critical to strengthen the resilience of the airports in the country while planning for future expansion of the aviation network.

65. **The DoST under the MoIT is conducting a landslide risk assessment along national highways and planning to develop a road asset management system.** It maintains a registry of primary and secondary national highways overseen by itself, while urban roads fall under *thromdes*' jurisdiction, and district roads are managed by respective districts. However, districts do not have the capacity to maintain road registry. Recognizing the necessity for a consolidated data repository system covering all road infrastructure, discussions are ongoing to establish a centralized database and a road asset management system (RAMS) under the proposed Accelerating Transport and Trade Connectivity in Eastern South Asia (ACCESS) – Bhutan project. The aim is to incorporate road and bridge conditions across all road categories, facilitating streamlined data management and cohesive infrastructure planning and maintenance efforts. Further, it would be useful to incorporate resilience aspects into the proposed RAMS, for example, by including a network vulnerability assessment for the critical road corridors in Bhutan. Under the Strengthening Risk Information for Resilience Project, the DoST is mapping landslide hot spots along the national highways and conducting landslide risk assessments in selected pilot areas. The data sets are being incorporated into the Master Plan for National Highways Connectivity, which is being formulated with assistance from the ADB. It is recommended to pilot a landslide EWS along the priority road networks based on the findings of the risk assessment.

66. **The MoIT could further conduct a freight network vulnerability assessment to determine the critical freight network and identify a suitable adaptation and resilience approach for critical assets.** The assessment will inform key actions necessary to ensure that the specific links and nodes within the freight network can rebound quickly in the event of hazards (with specific attention to food supply and trade).

67. **Although the DoST receives routine, periodic, and monsoon restoration funds from the MoF as part of the annual budget scheme, these funds do not meet its entire financial requirements, necessitating prioritization of O&M works based on budget availability.** In the 12th FYP, the DoST received a budget for routine repair and maintenance of the roads based on the category of road[48] and approximately BTN 180 million for monsoon restoration. With budget constraints, the DoST's regional offices prioritize repair and maintenance works for road segments that are critical for maintaining traffic flow, using the inhouse manpower and equipment. As the priority is to keep the roads accessible for transportation, the quality and design specifications of the roads may be compromised.

68. **The DoST is piloting contracting of private contractors for routine restoration and immediate emergency construction and restoration of roads and bridges.** For the first time in FY24, it has contracted the restoration work to a private contractor, covering one district (Dagana). The contractor will carry out all restoration works based on a work order from the DoST.

69. **Furthermore, the DoST is developing a road-sector-specific DMCP and considering developing a Road Development Fund.** It has prepared a road-sector-specific DMCP and submitted a draft to the DLGDM for review. A review of the Road Sector Master Plan (2007–2027) underscores the critical need to establish a Road Development Fund. However, there is uncertainty in securing the necessary funding, especially if it relies on the government reserve funds.

70. **Bhutan's only international airport, Paro International Airport (PIA), faces operation and capacity limitations due to the airport's geographical characteristics and operation window**

[48] BTN 115,000/km for primary national roads, BTN 109,000/km for secondary national roads, and BTN 44,000/km for gewog roads

as flights operate under the Visually Flight Route. Furthermore, there are only 15 or 16 certified pilots who can operate flights due to the dangerous geographical characteristics of the airport. To improve the emergency preparedness capacity of the PIA, a Get Airport Ready for Disaster (GARD) program was conducted by UNDP and WFP at PIA in December 2023. Furthermore, there is a need to enhance aviation meteorological services for flight safety and efficiency of flight operations and monitoring aerodrome weather conditions. Although human resource for emergency preparedness is limited, including that for emergency helicopter services, it has been manageable to-date due to the size of the past disasters and there is no formal cooperation framework with other countries such as India.

Water Supply

71. **Although with the highest per capita availability of water in the world, Bhutan still faces drinking and irrigation water shortages, which would be exacerbated by climate change.**[49] Risks of local dry spells at *gewog* level are expected to increase under climate change for large parts in the country, leading to the drying of water sources that are already clearly visible to date. Climate change exacerbates existing challenges in drinking and irrigation water supply especially during the winter season by causing more unpredictable rainfall, higher temperatures, and prolonged droughts. These issues compound ongoing problems such as inefficient water resource management, limited access to water, a lack of skilled workers, and insufficient water infrastructure. Constraints at the local government level include (a) inadequate technical capacities, leading to reliance on central agencies for technical support; (b) lack of adequate finances; and (c) the low water tariffs that do not cover operational cost recovery of water supply provision.[50] A nonrevenue water (NRW) assessment for Thimphu, Gelephu, and Phuentsholing *Thromdes* conducted by the World Bank in 2021 shows extreme NRW losses, ranging between 1,230 and 1,900 L of average water loss per house connection per day. The financial losses are a major component of NRW, ranging between 40 and 60 percent of the NRW. Losses in revenue affect funding for essential maintenance, repairs, and replacements. The physical losses, such as leakages, may increase to drastic levels if *thromdes* move from the current intermittent supply to the planned full supply (24 hours per day) without first addressing NRW. The Department of Infrastructure Development under the MoIT manages a Water and Sanitation Information System; however, the assets are not geo-referenced, and the system is not used for risk-based O&M and business continuity planning.

Energy

72. **Incorporating integrated geohazard assessment into the planning process through the revision of the Guidelines for Development of Hydropower Projects is essential to ensure the resilience of hydropower systems.** The current design guidelines emphasize the importance of detailed project reports preparation that includes robust environmental and social impact assessments, technical feasibility studies, and economic and financial viability analyses. The Department of Energy mandates the Druk Green Power Corporation, which is responsible for the design, construction, and O&M of all hydropower plants in Bhutan, adhere to guidelines aimed at increasing the resilience of hydropower plants against threats such as GLOFs, with the overarching goal of protecting infrastructure amid climate change and encouraging sustainable development. While these guidelines are directed toward safeguarding against climate-related threats, the planned revision to the guidelines will incorporate comprehensive risk management strategies that address multi-hazard scenarios, including earthquakes, floods, cloudbursts, and landslides, which may be exacerbated by climate change. The planned revision would also offer detailed SOPs for emergency preparedness and response to ensure dam safety. Improving these aspects is crucial for supporting the resilience of hydropower projects in the context of climate change.

73. **The Bhutan Power Corporation Limited (BPCL) has prepared a DMCP 2023–2028 and recognizes**

[49] Department of Water and UNDP. 2023. *Assessment of Climate Risks on Water Resources for the National Adaptation Plan (NAP) in Bhutan*.
[50] World Bank. 2023. *Bhutan Water Status Assessment Report*.

the urgent need to conduct a seismic vulnerability assessment and retrofitting of transmission and distribution (T&D) lines in Thimphu. It explicitly outlines the role of the BPCL in identifying, assessing, and addressing emerging threats to critical T&D infrastructure to ensure its resilience against existing and emerging risks, including climate change. The BPCL is responsible for providing technical advice on the rehabilitation of T&D infrastructure, carrying out damage assessments, prioritizing energy supply for critical public facilities (for example, EOC and hospitals), and preparing a post-disaster recovery/reconstruction plan. During COVID-19, the BPCL prepared a contingency plan for power supply reliability, which incorporates business continuity planning aspects. There is a need to conduct an exposure and vulnerability assessment, a system and service impact assessment for scenario earthquakes, and recommendations for resilience-building actions.

Telecommunication and Digital Connectivity

74. **At present, both Bhutan's internet gateways come through the same Mumbai-Siliguri link, with no redundancy in case of disruption; therefore, a third gateway providing redundancy is essential for Bhutan's internet connection robustness.** Bhutan's internet connectivity relies on connectivity in Siliguri, India, making it a cause of concern as any issue in the Siliguri region could disrupt connection within Bhutan. Bhutan currently has two international internet gateways—one from Phuntsholing and the other from Gelephu. Both Phuentsholing and Gelephu internet gateways fall under the same Mumbai-Siliguri link, which, if disrupted, will lead to a failure of internet services in Bhutan. Bhutan faced severe internet connectivity issues due to damaged links in India during Cyclone Amphan, which damaged several power and internet cables in Kolkata. Even in 2023, Bhutan faced similar issues due to damaged links in India. Discussions have advanced for establishing the third international internet gateway connecting Gelephu, Bhutan, to Agartala, India, and extending to Comilla, Bangladesh-Kuakata, Singapore, which is expected to provide a redundant international internet connectivity. However, further work is needed to assess technical and policy options to improve redundancy, both cross-border and domestic (for example, alternative routes and new technologies, including Low Earth Orbit [LEO]); resilience; and reliability of Bhutan's internet connectivity.

75. **Bhutan's critical government data and services remain vulnerable to natural disasters.** There is a government data center (GDC) in the Thimphu Tech Park that stores all critical government data and a backup data center in Bumthang; however, the security and disaster recovery capabilities are extremely weak. There is a need to strengthen the data infrastructure, under energy-efficient principles, to ensure minimal service interruptions and data loss in the event of natural disasters and other exogenous shocks. The proposed ACCESS project aims to enhance the GDC and strengthen its disaster recovery capabilities, and the RGoB is exploring additional options to strengthen data infrastructure resilience.

76. **GovTech plans to update the SOP for Telecommunication Services during Disasters 2019 based on lessons learned from COVID-19, with technical assistance from the World Bank.** The SOP mandates telecom service providers (TSPs), internet service providers, and BPCL to develop business continuity plans (BCPs) for disaster; however, there are no such BCPs in place. It also mandates the TSPs to provide disaster response task force for immediately providing emergency communication and restoration of communication services in affected areas. Initial review findings include the need to assess the High Frequency (HF)/ Single Sideband (SSB) network. In parallel to this HF/SSB network, another radio communication network, called Digital Mobile Radio TIER III (trunked) simulcast, should be set up for the whole country with a proper national frequency plan to be shared with all the public agencies taking part in DM. Also, a thorough review of the ICS to incorporate the necessary emergency management services is needed. Apart from the DM communications network, there is a fault-finding system in the optical fiber network, called fiber monitoring system (FMS), operated by BPCL; however, FMS and other systems defined in the SOP have not been tested for major disasters.

77. **The network distribution system requires the introduction of redundancy to prepare for Type III disasters.** Within Bhutan, the internal transmission network boasts redundancy to withstand small-scale disasters. In the current practice for a localized disaster,

mobile services may only be disrupted, and in such cases, cellular units mounted on mobile trucks can be deployed to the affected areas. Bhutan Telecom maintains landline telephone lines and prioritizes maintaining the mobile network for voice and SMS during emergencies.

78. **In addition, 81 out of 205** gewogs **are provided with the very small aperture terminal (VSAT)[51] facilities to strengthen emergency communication during disasters especially to remote locations.** To ensure all weather communication especially in remote locations, it is recommended to undertake a feasibility study to identify different options such as satellite phones and VSAT. These measures should be supplemented by nonstructural measures such as formation of communication services groups and their response plans, incorporated into the planned revision of the SOP for Telecommunication Services during Disasters 2019.

Health Infrastructure

79. **There is an urgent need to conduct a detailed structural vulnerability assessment of hospitals and invest in retrofitting, especially those built before the introduction of the current seismic codes in early 2000s**. The Department of Clinical Services and National Emergency Services (NES) recognize that it is imperative to reassess the infrastructure planning aspects in alignment with the operational functioning needs of the emergency services provided. Although a vulnerability assessment of the national referral hospital was conducted, the structural retrofitting measures have not been implemented due to the lack of funding. Considering the financial constraints, it is important to prioritize selected hospitals for retrofitting and rehabilitation works, based on strategic locations and mapping carried out by the NES.

Education

80. **More than half of the schools in the country urgently require multi-hazard vulnerability assessments and retrofitting of vulnerable structures to protect children as they were constructed before the new seismic codes were introduced.** According to recent data from the Ministry of Education and Skills Development (MoESD), there are approximately 569 schools across the country. Within these schools' premises, there are approximately 3,500 buildings with a variety of structural types including reinforced concrete, masonry, and light gauge steel-framed structures, among others. Notably, around 720 of these buildings in 315 schools were constructed before the 2000s. Therefore, it is imperative to conduct structural vulnerability assessments to determine the structures that require retrofitting for enhanced safety and resilience. Such assessments shall focus on ensuring that the buildings can withstand medium-level earthquakes and facilitate safe student evacuation during large seismic events. These assessments must also consider the risk of floods, wildfires, landslides, rock falls, and GLOFs. Concurrently, the escalating disasters driven by climate change highlight the necessity for climate-resilient schools, especially in high-altitude regions prone to extreme weather. Addressing this requires a dual approach: constructing new schools with resilient designs and technologies to counter adverse seismic and climatic conditions and comprehensively retrofitting, replacing, or relocating old or vulnerable school buildings with seismic and climate-resilient designs. This two-pronged strategy is crucial to adapt to the challenges of climate change and maintain uninterrupted education for all.

Civil Protection and Emergency Management Systems

81. **The absence of well-equipped national and local EOCs hinders the functioning and operation of crisis management.** Although the DLGDM has designated an office space to be used as the NEOC with some equipment, it is far from adequate. There are significant gaps related to ICT infrastructure, human resources, and the technical capacity of the DLGDM in operating the existing and required equipment. The DLGDM has prioritized the establishment of the NEOC infrastructure in the 13th FYP and secured a land for this purpose. Once established, the NEOC will serve as the command-and-control center and play a major role in providing a central coordination point for emergency response and humanitarian assistance. Except Punakha Dzongkhag and Phuentsholing Thromde, all

[51] A two-way ground station that transmits and receives data from satellites,

local governments do not have EOCs but have designated an office space to be used as EOC when needed. There is a significant need to train the local government officials to operationalize the local EOCs.

82. **The government emergency services do not possess specialized equipment and staff necessary to respond to severe disasters, especially in high altitudes and other situations where advanced SAR is required.** Some of the staff of the Royal Bhutan Police (RBP) and Desuung[52] are trained in basic SAR. Desuung does not have any equipment and depends on the equipment owned by other agencies. RBP has some basic SAR equipment, while the DoST under the MoIT has equipment for clearing roadblocks along national highways in the event of a landslide with a track record of clearing roadblocks within a few days. During the consultations, a need for more specialized equipment was identified, including equipment for rubble clearance, advanced scaffolding equipment, life detector, thermal imaging camera, diamond chainsaw, inflatable lighting tower, cordless hammer drill, and high-altitude SAR equipment. There is a need for training for operating the existing and advanced equipment including communications. Also, basic level of emergency response capacity at local communities is limited.

83. **Although the DRCP defines the roles and responsibility for the deployment and maintenance of SAR equipment, it has not been operationalized in the absence of SOPs.** The NDRCC comprises eight functional desks for planning, SAR, medical services, logistics, information, communication, transportation, and international assistance. The lead agency for SAR is responsible for maintaining an inventory of SAR teams, firefighters, and available equipment and conducting regular drills to handle and maintain SAR equipment. It is also responsible for maintaining a roster of SAR for timely deployment. However, capabilities for quick deployment would also depend on the availability of trained responders, SOPs for timely procurement and mobilization of equipment, and continuous training to operate the equipment. In addition, there is a need to ensure budgetary allocations and plans for timely maintenance and procurement of the consumables and tools.

84. **While the NDRCC endorsed by the NDMA adopts the ICS, there is still a need to institutionalize it through capacity building.** The RGoB has established IMT at the *dzongkhag* level. For systematic implementation of the ICS, there is an urgent need to train government officials and responders on the ICS.

85. **Multiple emergency helplines could hinder prompt emergency services.** Bhutan has different emergency numbers for medical, fire, police, and electricity. While each of these is well established and used by the public, having multiple helplines sometimes leads to longer response times and inefficient coordination between different emergency services, as one incident usually requires more than one emergency service (for example, fire and medical services). A technical assessment to understand the feasibility of setting up a single emergency helpline, including the potential system overload, is recommended.

86. **The absence of standard post-disaster damage and needs assessment (PDNA) methodologies and protocols poses a significant challenge to timely and effective disaster response and recovery efforts.** Although the DLGDM is responsible for coordination as per the DM Act, local governments often lead and coordinate with line agencies with support from the DLGDM to conduct post-disaster damage assessments. Except in the aftermath of the earthquakes in 2009 and 2011, no formal PDNAs have been prepared for the past disasters. There are no clear SOPs and roles and responsibilities of key government agencies such as the DLGDM, NCHM, and MoIT in PDNAs. This results in duplication of efforts, which was observed during the damage assessment of the Lhuntshe floods in July 2023. Furthermore, there is a need to establish a centralized database that enables quick access to reliable data and build capacity of relevant agencies for PDNAs.

87. **A field manual titled 'Post-Earthquake Safety Evaluation of Buildings' was developed by the**

[52] Desuung, meaning 'Guardians of Peace', is an Integrated Training Program that fosters active citizenship and community engagement by instilling values of volunteerism, integrity, and civic responsibility among participants, contributing to their personal development and their role in nation-building efforts.

Applied Technology Council (ATC) in collaboration with the MoIT; however, this manual is not endorsed by the NDMA. An ATC-20-1 Bhutan Field Manual for Post-Earthquake Safety Evaluation of Buildings was published in 2014, and engineers from all districts, *thromdes*, and agencies were trained to use this manual accordingly. However, since this manual is not endorsed by the NDMA, there is no institutionalization of deploying engineers for post-earthquake safety evaluation. Furthermore, no refresher training courses have been provided for this purpose. Therefore, there is a critical need to build the capacity of the infrastructure engineers and develop SOPs to deploy qualified engineers from the public and private sectors to conduct this assessment.

88. **Although Bhutan is a member country, it has never activated the International Charter on Space and Major Disasters to access satellite data for a rapid post-disaster damage assessment.** The charter is a worldwide collaboration, through which satellite data are made available free of charge to help with disaster relief and emergency response efforts. By combining Earth observation assets from different space agencies, the RGoB could receive satellite data of affected areas within a matter of hours or days, depending on the type of the disaster and available satellite resources. A clear SOP for activating the charter needs to be in place in coordination between the DLGDM, NCHM, GovTech, and other relevant government agencies such as the MoIT.

89. **Bhutan currently lacks established humanitarian staging areas nationwide.** While the country has faced only moderate levels of disasters thus far, most of its critical infrastructure has remained intact, ensuring continuity of mobility and accessibility. However, to prepare for future disasters, Bhutan should conduct a needs assessment to determine strategic locations for humanitarian staging areas, ensuring readiness and effective response capabilities in the event of disruptions to infrastructure in case of high-magnitude disasters.

90. **The Forest and Nature Conservation R&R of 2023 mandates the coordination between the DoFPS, the Inter-Agency Forest Fire Coordination Group (IAFFCG), and Community-Based Forest Fire Management Group (CBFFMG) for the prevention and suppression of forest fire.** The revised R&R introduced a new fine and compensation system for offenses related to forest fires expanding its scope to State Land (not only State Reserved Forest Land) and setting the fine and restoration costs based on the magnitude of the damage rather than a fixed amount. The IAFFCG and CBFFMG are responsible for immediately activating forest fire suppression, upon receipt of the information of forest fire, in coordination with the DoFPS. There are SOPs established for the IAFFCG, which have proven effective in coordinating responses during forest fire incidents. Similarly, there exists a management plan for CBFFMG to guide its response to forest fires. Both forest fire managers and firefighters receive comprehensive training on fire behavior, suppression strategies, and the utilization of advanced equipment and fire analytics tools through capacity development programs. However, there is a shortage of firefighting equipment.

91. **Due to the challenges posed by geographical remoteness and limited accessibility, it is critical for Bhutan to enhance community-based disaster risk management (CBDRM).** The *dzongkhag* DMCPs are developed using the CBDRM approach involving the local leaders and district officers. However, there is a need to engage local communities in formulating these plans and conducting training and simulations to strengthen CBDRM.

SUMMARY OF ENTRY POINTS	TIMELINE
Primary Response	
PUBLIC HEALTH SYSTEMS	
Strengthen emergency public health services through the following: • MoH to update the HEDCP to streamline, integrate, and incorporate lessons learned from the COVID-19 response and the BPPRP (ongoing). • MoH to strengthen diagnostic capabilities to cater to emerging needs such as health pandemics, including climate-induced health threats. • MoH to develop an HR management plan for health care workforce, including retention strategies.	Short-Medium Term
CRITICAL INFRASTRUCTURE AND SERVICES	
Strengthen the legal and regulatory foundations for mandating a resilient built environment (ongoing)**.** • RGoB to formulate the National Construction and Surface Transport Act and its R&R to enforce strict quality standards and mandate the resilience of critical infrastructure services, including timely emergency preparedness and response planning. • MoIT to revise the Building Code 2018 to strengthen the regulatory framework for ensuring the resilience and safety of all buildings in the country. • MoENR to formulate the National Energy Policy and revise the Hydropower Dam Design Guidelines to promote integrated dam safety and geohazard management of hydropower plants.	Medium-Long Term
RGoB to develop geographic information system (GIS) based asset management systems for critical infrastructure to enable risk-based O&M planning and ensure service continuity, leveraging the NSDI and the Multi-hazard Risk DSS that are under development. Integrate resilience into the proposed RAMS under the ACCESS project.	Long Term
MoIT to develop and implement a retrofitting investment plan for critical buildings and infrastructure based on detailed multi-hazard vulnerability assessments. • Prioritize infrastructure assets built before the introduction of the new seismic codes in the early 2000s, including 315 schools. • Enhance the resilience and efficiency in water infrastructure, focusing on NRW losses through strategic investments and capacity-building measures.	Long Term
MOIT to conduct a freight network vulnerability assessment to determine the critical freight network and identify a suitable adaptation and resilience approach for critical assets.	Short Term
GovTech to conduct a comprehensive assessment focusing on digital connectivity resilience and recovery as well as data infrastructure resilience and recovery options, with a particular emphasis on exploring technical options such as LEO satellite technology to enhance international connectivity beyond existing links through India.	Medium-Long Term
DoAT to improve emergency preparedness and flight safety of PIA: • DoAT to continue with GARD program and strengthen the Aircraft Accident and Incident Investigation Unit, and develop the National Airport Infrastructure Plan. • NCHM to enhance aviation met services and establish a Quality Management System in compliance with the International Civil Aviation Organization requirements.	Medium Term

SUMMARY OF ENTRY POINTS	TIMELINE
CIVIL PROTECTION AND EMERGENCY MANAGEMENT SYSTEM	
Strengthen emergency response systems across all sectors, with clear action plans and resource allocation. • DLGDM to facilitate RBP and Desuups to strengthen SAR equipment, develop SOPs for its timely mobilization, and train the responders to build their capacity especially for severe and high-altitude disasters. • DLGDM to improve coordination for delivery of emergency services between health service providers and emergency responders such as RBP SAR teams, emergency medical responders, and Desuups to deliver essential services efficiently to the affected communities. • DLGDM, in coordination with local governments, to establish and operationalize EOCs at all government levels and institutionalize the ICS. • DLGDM to enhance community-based preparedness and response initiatives, including local training and engagement programs to build resilience.	Medium Term

SOCIAL AND LIVELIHOOD SUPPORT - AGGREGATED SCORE: 0.8 (UNMET)

COMPONENT	SUBCOMPONENT	INDICATOR	MATURITY LEVEL
5. Social and livelihood support	5.1 Coverage and scalability of social protection	5.1.1 An adaptive social protection policy or strategy is in place with adequate financial commitments, clearly defined roles and responsibilities, and coordination between social protectionand DRM for crisis response.	UNMET
		5.1.2 Social protection programs and systems are in place, with adaptive design features to scale up and/or out timely and effectively during and after crisis events.	UNMET
	5.2 Food security and livelihoods	5.2.1 The government has the capacity to safeguard the availability of food through comprehensive policies/plans alongside effective monitoring and forecasting of food-related outcomes.	UNMET
		5.2.2 The government has the capacity to ensure access to food supplies through the operationalization of policies and coordination mechanisms.	BASIC
	5.3 Continued access to education	5.3.1. Educational resources, infrastructure, and learning outcomes are safeguarded during crises.	BASIC
	5.4 Crisis-induced displacement	5.4.1 The needs of existing and newly internally displaced populations are taken into consideration in planning and responses.	UNMET
		5.4.2 Refugees and asylum-seekers are included in crisis preparedness plans and responses.	UNMET

Coverage and Scalability of Social Protection

92. **Social protection efforts in the country are fragmented and have low coverage, with limited capacity to respond to crises.** Despite having several noncontributory cash or in-kind transfer programs across all sectors in Bhutan, programs are small and not designed to build resilience of the poor and vulnerable households or respond to shocks. The majority of social protection program expenditure goes to free health and education accounts. Excluding the budget allocated to free health and education programs, social protection programs in Bhutan account for only 0.7 percent of the aggregate GDP, of which 0.4 percent is for social insurance (contributory pensions scheme and social security), 0.2 percent for social assistance, and the remaining 0.1 percent for labor market programs.[53] Due to fragmentation, Bhutan needs a comprehensive National Social Protection Policy for all, and the most significant challenge is coordinating social protection efforts. The ministries/agencies overseeing the various social protection programs have to enhance programs management data systems to support the multiple programs, as today program specific system cannot provide immediate understanding of key monitoring indicators such as number of beneficiaries and level and frequency of benefits, and most data systems are not interoperable.

93. **Bhutan has made significant strides in reducing poverty rates and implementing social protection measures across sectors, although its formal social protection system is still in its early stages.** Notable initiatives in social assistance include constitutional mandates for universal access to primary education and equal access to tertiary education based on merit. The National School Feed Program provides free meals to students; the Central School Program offers uniforms, stationery, and meals to boarding students; and the Early Childhood Care and Development Centers support early childhood education. In the health care sector, basic services are accessible to all citizens, with specialized referral programs for those needing treatment in India with a subsistence allowance. The agriculture sector's Highland Development Program has been rolled out to protect and develop the livelihood of the highlanders. Social insurance is primarily provided by the National Pension and Provident Fund, covering 20 percent of the labor force.[54] Labor market programs promote skills development, entrepreneurship, and internships, benefiting various groups, including the youth, rural residents, and differently abled individuals. The Startup and Cottage and Small Industry (CSI) Development Program supports startups and existing CSIs and the youth. General subsidy programs include subsidies for liquified petroleum gas (cooking fuel) and electricity for vulnerable groups, with subsidies targeted at rural and highland communities, benefiting thousands of households. These programs aim to enhance social protection in Bhutan.

94. **Nevertheless, where the system fails, the people are protected by the Kidu program under His Majesty's Secretariat.** The Kidu program helps in issues related to land, education, health, and most recently income support for those affected by shocks. During the pandemic, a National Resilience Fund was set up in 2020 through the Druk Gyalpo's Relief Kidu (DGRK) under the Kidu program to provide income support and loan interest payment support for the most affected population.[55] The RGoB promptly secured food stocks and provided direct cash transfers to the affected population through the DGRK.

95. **The adaptability of social protection programs in Bhutan is extremely low due to the lack of an integrated social protection registry, even though all existing programs have individual databases.** Currently, during shock responses, agencies and programs use civil registry (citizenship identity card), individual program registries, and databases or conduct ad hoc registration. However, an integrated social protection registry does not exist. Most social protection programs have their own databases. During the pandemic, the DGRK used ad hoc registration. All databases use the National Citizenship ID number as a primary number for identification/registration.

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[53] ADB. 2019. "The Social Protection Indicator for Asia: Assessing Progress."
[54] NPPF. Annual Report 2019–2020.
[55] https://royalkidu.bt/.

96. **The National Social Protection Policy for all relies on an interoperable social protection system (ISPS) built through the integration of data systems such as National ID system, Civil Registration and an Integrated Social Protection Registry, allowing quick response during shocks.** This system would also use other administrative databases to increase transparency and governance, real time monitoring and coordination, and delivery of benefits. The large coverage of banks system and connectivity also allows enhancing payment systems through provision of direct electronic payments to individuals bank accounts, hence generating financial inclusion in terms of usage of smartphones and applications designed for better service provision for all.

97. **There is also a critical need to integrate climate and disaster resilience principles into the planned Social Protection Policy, Social Protection Act, and Social Protection R&R to mitigate the worst effects of a disaster on socially and economically vulnerable households.** By clearly outlining roles and objectives, the planned National Social Protection Policy shall support the streamlining of social protection programs by addressing systemic fragmentation to ensure coherence in programming, financing, and service delivery, as well as clear institutional responsibilities. The incorporation of the climate and disaster resilience principles in the supported by a reliable social protection registry, enables a rapid response during disasters. The system would also promote greater financial inclusion as any cash transfer provided to the population would happen through electronic disbursements and bank accounts using technology and process as mentioned above. The planned policy shall include provisions for post-disaster assistance to affected households and individuals. In addition, the policy shall address specific challenges that women face in accessing and receiving social support and benefits by promoting greater financial inclusion and the use of electronic disbursements.

Food Security and Livelihoods

98. **By 2034, the agriculture sector will have to feed about 837,300 people; however, several challenges hamper Bhutan's agrifood system to respond to growing domestic and export demand.** Bhutan's drive toward food self-sufficiency and commercial agriculture is challenged with labor shortage, fallow land and land fragmentation, human-wildlife conflict, subsistence farming, weak value chain and marketing logistics, and poor private sector engagement, aggravated by climate change and natural disasters (extreme weather events, floods, and landslides), soil erosion, and pests and diseases. In addition, food safety risks in food nutrition security and food trade causing illness due to contaminated food is one the most widespread health problems and an important cause of reduced economic productivity. These challenges pose issues on food availability, access, safety, and stability and require a significant increase in the quantity and quality of agricultural products, ensuring access to safe, healthy, and nutritious food.

99. **The importance of food security is underpinned in the Food Act 2005 and further elaborated in the Food and Nutrition Security (FNS) Policy 2023.** The purpose of the Food Act is to protect human health and to regulate and facilitate the import, export, and trade of food in the country. During an emergency such as food shortage or a foodborne disease outbreak, the Food Act authorizes the National Food Quality and Safety Commission to identify the organizations or units responsible for acting, specify the actions to be taken, coordinate a national response, and keep records. The FNS Policy focuses on enhancing the production of high-value agricultural and livestock products; enhancing the country's self-sufficiency in selected essential food items; and strengthening the value chain, marketing, certification, and exports. The NDMCP designates the Food Corporation of Bhutan Limited (FCBL) and the MoAL under the logistics desk, with the core mandate to coordinate the supply of food, water, and equipment required for incident operations and relief.

100. **While Bhutan has a conducive policy environment to stimulate investment in ensuring food and nutrition security, the country needs improved institutional capacity to implement policy into action.** While the RGoB approved the Food and Nutrition Security policy in 2023 which outlined the major institutional and regulatory reforms needed to achieve improved nutrition outcomes, its effective implementation will be guided by the Agri-Food Sector Strategy 2030 and Agriculture Bill which are under ongoing review and expected to be finalized once the 13FYP is approved.

The sectoral objectives for the MoAL are ambitious in the FNS Policy 2023 and 13th FYP, and hence, its Policy and Planning Department will need technical support and institutional strengthening to effectively implement the proposed policy reforms. This includes setting up a robust monitoring and evaluation system as well as clarifying the roles and responsibilities of the different stakeholders at the central and local levels.

101. **The MoAL and the FCBL are the designated agencies for leading food security efforts under the Logistics Desk of the NDRCC in the NDMCP.** The FCBL was established in 1974 under a royal charter to centrally procure and distribute essential food items across the country. It was later incorporated as a state-owned enterprise under the Companies Act in 1992. The FCBL is mandated to always maintain national food reserves, trade in essential food and fast-moving commodity goods, facilitate the export of agriculture produce, and support school feeding program in all the *dzongkhags*. Currently, it operates through one central warehouse located in Phuentsholing; four regional warehouses in Thimphu, Phuentsholing, Gelephu, and Samdrup Jongkhar; and 23 district warehouses in all *dzongkhags*, except Gasa, to distribute food and essential items across the country.[56] The MoAL relies on FCBL as the corporate arm of the ministry to maintain the food reserve required at strategic locations and provides adequate support to enable FCBL to carry out that function. FCBL is expected to procure and store three basic food items (8,600 MT of rice, 860 MT of oil, and 33 MT of pulses [dal]) sufficient for three months to meet emergencies. The Bhutan Food and Drug Authority also published a hygiene and safety guideline for food handlers and food business operators during the COVID-19 pandemic.[57]

102. **There is improvement in the nutrition in school feeding programs resulting in a decline in peripheral neuropathy and glossitis outbreaks in schools.**[58] The issue of FNS is spread across all sections of the society. The results from the National Nutrition Survey 2015 show that child stunting prevalence still stands at 21.2 percent. Only about 1 in 10 Bhutanese children receives adequate mix of nutrients every day.[59] Malnutrition in children has been a long-standing problem in Bhutan, resulting in stunting and leaving children vulnerable to the triple burden of malnutrition: undernutrition, hidden hunger, and overweight. To address these challenges, concerted efforts are under way including supply of fortified rice and oil since 2015 to boarding schools. These have helped reduce diseases related to malnutrition.

103. **Recognizing the high production risks in Bhutan, operationalizing the agrometeorological (agromet) advisory services is one of the main priorities in the FNS Policy and the NAP.** Bhutan's high vulnerability to various climate-related natural hazards, which are exacerbated by climate change and the growing impacts of pests and diseases, is a major concern for the productivity of the agriculture sector and mainly for the production of high-value export crops such as citrus and cardamon. The research and development (R&D) on pest and disease prevention, management, and monitoring and surveillance is underfunded and needs to be strengthened to address these issues. The DoA is currently working on operationalizing the Agromet Decision Support System (ADSS) under the World Bank-financed Strengthening Risk Information for Resilience project. The ADSS is expected to enable delivering agromet advisories such as when to plan, when to apply fertilizers, when to irrigate, and so on in a timely manner to help farmers make farm-level decisions. The ADSS will also include a pests and diseases panel. At present, the advisories are being piloted using the 3-day weather forecast issued by the NCHM. The aim is to produce advisories based on 5–7-day weather forecasts from the NCHM. At present, challenges include issuing agromet advisory at the right time and right place through a multichannel dissemination mechanism due to limited technical capacity and manpower.

104. **Investment in improved resource management, area and crop-specific farm advisory and climate smart agriculture (CSA) technologies will**

[56] Food Corporation of Bhutan Limited. 2022. Annual Report.
[57] https://www.bafra.gov.bt/wp-content/uploads/2022/08/Guideline-for-Safety-and-Hygiene-of-Food-Handlers-FBOS-2020.pdf.
[58] https://kuenselonline.com/enhancing-nutrition-and-food-security-in-bhutan/.
[59] https://kuenselonline.com/nutrition-education-critically-important/.

strengthen the resilience of agricultural systems at the farm level. Under the World Bank-financed Food Security and Agriculture Productivity Project, a review of the challenges and opportunities in Bhutan's agrifood systems identified the following actions to increase the resilience of farmers. First, investment in proper resource management (water, land, soil) would counter the degradation of natural resources and declines in productivity for fruit orchards and spice plantations. Examples include training to improve farmers' knowledge and capacity of pruning techniques, tree rejuvenation, and drip-irrigation to attenuate alternative bearing of fruit plantations in core production zones. Second, better access to hybrid seeds and improved farming practices such as higher seed replacement through extension services and awareness campaigns would promote the adoption of improved and high-yielding varieties adapted to the impacts of climate change by providing. These technologies will help to improve productivity, reduce production costs, overcome pest and disease issues and emerging problems associated with climate change. Third, by upgrading and digitizing public extension and marketing information with soil fertility, pest incidence, and natural hazard information, the system can provide area and crop-specific recommendations and advisories for risk management. Present investment plans for locally developed and scientifically-vetted CSA packages to investors can bring in public and private finance for resilience building

105. **In addition, investment in animal and plant health and market information systems would build resilience and sustainable value addition throughout the agrifood system**. By professionalizing existing informal farmer coordination into marketing-oriented institutions, collective action can promote resilient production systems through product quality upgrading and collaborative selling. Providing institutional strengthening support for improved governance, market linkages, and enhanced service access would empower farmers to bargain better and be more responsive to the market. Similarly, improving existing market information systems with market research and trade regulations could empower farmers to make informed decisions. Over time, digital systems allow financial institutions to analyze better financial and credit risk in agribusiness and offer tailored agri-finance products to farmers and SMEs. Innovations in post-harvest service delivery for value addition, such as an integrated cold chain and air-freight export of fresh or processed organic products, would encourage investments from (international) aggregators and processors in sustainable value addition. Setting up public-private dialogue to identify suitable post-harvest solutions could be used as entry points to organize investment forums to generate interest from private players active in aggregation, processing, and export.

106. **One particular challenge of Bhutan's mountainous and natural production systems is the high risk in agricultural production and finding suitable solutions to attract more investment for resilience building.** The level of credit to the agricultural sector is below 5 percent of the bank's outstanding loan portfolio. This reflects the inherently risky nature of agricultural production in Bhutan because of the small production areas, seasonal rainfall, and human-wildlife conflict. As a result, interest rates for commercial agricultural loans are above 12 percent, and because of their low financial literacy, farmers and agro-entrepreneurs are reluctant to seek finance and invest in quality upgrading and resilience building. In addition, farmers face large losses from natural disasters or conflict from wildlife. While some initial pilots are ongoing on crop insurance in Bhutan, the insurance (and financial market) for smallholder farmers is nascent in Bhutan, and mostly focused on compensation of losses.[60] The effectiveness of an index-based insurance remains to be seen given the small landholding, fragmented farms, and large incidence of covariate shocks in Bhutan. However, if the early pilots prove to be successful, an index-based crop insurance is a potential tool to address resilience in the longer term. In the shorter term, the country should consider alternative financial incentives to promote resilience building by offering concessional financing for investments in climate smart agriculture and improve farmer financial and business skills to apply for and manage agricultural finance.

107. **Bhutan's agricultural imports are dominated by trade with India,[61] increasing its dependency on**

[60] There are currently discussions ongoing in the National Council to introduce a national compensation policy for human-wildlife conflicts and crop damages caused by natural calamities

[61] FAO and the World Bank. 2012. "Bhutan Agricultural Sector Review."

trade with external trade partners. This makes Bhutan vulnerable to export trade bans, such as the recent one on basmati rice and red onions imposed by India. In such cases, after prices initially surge, Bhutan needs to apply for an exemption to meet its demand. Bhutan's high dependence on imported foods was escalated during the lockdowns imposed during the lean season as a response to the COVID-19 pandemic. While the food prices increased drastically in town areas, the farmers in rural areas struggled to find markets and transport goods. Due to movement restrictions, FCBL struggled to export cabbage, potatoes, and ginger.[62] Even after borders were opened, transportation cost became very high, causing logistical disruptions, adversely affecting the import of food items, resulting in a shortage. The government responded by providing land and inputs to promote agricultural production.

108. **Cold storage facilities in the country are reported to be underutilized by farmers in some districts while others find them sufficient.** Such facilities in Wangduephodrang, Trashigang, and Sarpang, equipped with a capacity of 300 MT each, are reported to be underutilized due to the preference by farmers to transport their produce to markets directly, their unawareness of the benefits of cold storage, and unaffordability of storage fees. Mainly traders use cold storages for export and dairy products.[63] However, as farmers and other agribusinesses become more aware of the benefits of cold storage, these issues are likely to subside. For example, farmers in Khaling in Trashigang find the cold storage highly useful, as they can store perishable vegetables to be used during off seasons.[64]

109. **During COVID-19, controlling the price of food items was critical to making food accessible and affordable.** During the pandemic, there was a significant price escalation at the source for food items as India was also going through COVID-19-related impacts on food distribution. Regardless of price, the FCBL had to purchase a significant amount of food items to cater to the public needs. However, as COVID-19 subsided, and market prices slightly normalized, the food items bought at a high price had to be sold in the market at a significant discount. Also, as private vendors managed to bring in food items, FCBL had challenges in selling its stock in a timely manner as the market did not have the capacity to consume all the goods purchased. Therefore, a significant amount of food, mainly rice and oil, was lost to infestation and damages. The Competition & Consumer Affairs Authority was responsible for monitoring the market prices in line with its mandate. The authority monitored the price of the essential items in the market. The Department of Agricultural Marketing and Cooperatives (DAMC) under the MoAL was monitoring and controlling the prices of fruits and vegetables, as there was no standard pricing for these food items. For fruits and vegetables imported from India, price fixation was done jointly by the DAMC and FCBL.

110. **Through the MoAL and FCBL, the government made essential food items available for the public during the COVID-19 pandemic with the support of the Dzongkhag Administration and Desuung volunteers and private wholesalers.** The MoAL was responsible for food and essential supplies during COVID-19 as per the National Influenza Pandemic Preparedness and Response Plan (NIPPRP). During normal times, FCBL does not keep the full amount of reserve as private vendors also keep large quantities of these items. As FCBL only caters to 15 percent for rice and oil and 20 percent for pulses during normal times, it keeps less during normal times considering the practical challenges related to damage and infestations. While stocks are maintained based on demand during normal times, FCBL steps up during emergencies such as pandemics. During the COVID-19 pandemic, although international borders were closed, trade of essential food items was continued to be facilitated by relevant government, private, and corporate agencies. In addition to the FCBL facilities, the district governments and the Desuung volunteers supported the distribution of food items at the local levels. Private wholesalers supported in distribution efficiently.

111. **Although domestic food production was enhanced during COVID-19, which contributed to increasing**

[62] https://kuenselonline.com/bhutans-food-security-status-exposed/.
[63] https://thebhutanese.bt/underutilization-of-new-cold-storage-facilities-in-wangdue-and-sarpang/.
[64] https://kuenselonline.com/cold-storage-facility-in-khaling-to-help-farmers/.

food sufficiency, the increase in production and price stimuli led to the dumping of excess output on local markets. In summer, when borders were still closed, the increase in production and price stimuli led to the dumping of excess output on local markets. Therefore, there is a need to review the supply chain of food import, export, and internal consumption during emergencies, including pandemics. An agriculture stimulus plan with a total budget of BTN 944 million was initiated to strengthen food security through domestic production, creating employment and income opportunities during COVID-19.[65] This made the agricultural sector remarkably resilient during the pandemic, demonstrating growth, in contrast to the shrinking industry and services sectors. Measures including distribution of 594 prefabricated greenhouses to farmers, rehabilitation of 2,070 acres of land through sustainable land management, and machine hiring services to 6,450 households covering 14,785.97 acres resulted in achieving 84 percent self-sufficiency in vegetable production in the country.[66]

112. **Lessons from the COVID-19 pandemic highlight the need to enhance FCBL's logistics and financial capacity and improve the coordination of supply responses.** The RGoB requested FCBL to increase its food reserve from 3 months to 6 months and the number of essential items from 3 to 21 with one-time funding support from the RGoB. This resulted in the need for higher storage capacity. It used multipurpose halls and school auditoriums as storage facilities to cater to the increased need for essential food supply during COVID-19. The plan is to build a 1,300 MT capacity warehouse in Nganglam, 1,300 MT in Wangduephodrang, and 3,000 MT in Thimphu and expand the outlets in Lhuentse and Trashiyangtse by about 300–500 MT capacity. There is support from the WFP in this area and some budget allocated by RGoB; however, funding is not adequate to construct these warehouses. Although District DMCPs were in place, there were coordination issues on the ground during COVID-19, highlighting the need for FCBL to put in place a DMCP with SOP for emergency operations. FCBL also highlighted the need for an annual budget for implementing the DMCP.

113. **Although there is no registry to identify crisis-affected and vulnerable population, there is a well-established administration system from the national to village levels**. The DM officers are responsible for identifying the persons affected by disasters and providing the required relief. During COVID-19, task forces were put in place to facilitate access to food items for vulnerable population. For efficiency during future emergencies, it is recommended to put in place a registry of vulnerable population. Nonetheless, given the high levels of stunting and anemia, the lack of an early warning system for food and nutrition security poses a significant crisis risk to the country. Bhutan should therefore assess the feasibility and effectiveness of a dedicated monitoring and early warning system for food and nutrition security. The government could seek the support of the World Bank, which has developed strong expertise in establishing high frequency food and nutrition security risk monitoring.

Continued Access to Education

114. **Although the NDMCP outlines the critical role of the MoESD in ensuring education service continuity before, during, and after disasters, lessons from COVID-19 highlight the need for a data-driven approach.** Although the MoESD's Education EOC coordinates disaster response, logistical challenges persist such as changes in focal personnel, transportation hurdles, limited supplies, and delayed resources. Lessons from COVID-19 highlight the need for improved situational analysis via real-time data collection, monitoring, and evaluation. This data-driven approach will inform effective responses with locally tailored strategies, technology utilization, and targeted interventions to address dropout rates, learning outcomes, and other issues.

115. **Although the MoESD, all schools, public colleges, and private colleges have prepared DMCPs in 2016 as per the DM Act of 2013, the plans need to be updated to address multi-hazard risks.** The MoESD prepared a DMCP in 2016 and integrated the National Action Plan for School Earthquake Safety 2013, which was prepared following the 2009 and 2011 earthquakes that damaged a significant number of schools, with estimated losses of about BTN 735

[65] https://kuenselonline.com/bhutans-food-security-status-exposed/.
[66] https://businessbhutan.bt/bhutan-achieves-84-self-sufficiency-in-vegetable-production/.

million (approximately US$8.8 million). The MoESD regulates all public and private schools, and disaster preparedness plans and programs are addressed in the DMCPs. There is an SOP as part of the DMCP of the MoESD that covers the procurement of food and the arrangement of water, sanitation, and hygiene (WASH) facilities during emergencies. However, the current DMCPs primarily focus on earthquake hazards and thus require updating to include other potential hazards, including disease outbreaks, floods, landslides, and GLOF. The school DMCP needs to align with the DMCP of the MoESD and Nutrition in Emergencies Program led by the MoH, as the WASH in schools and institutions are critical investments in the well-being and education of the children. However, securing financial resources for implementing the DMCPs remains a challenge.

116. **The MoESD and the Royal Education Council, with support from volunteer teachers, media, and the United Nations Children's Fund, have developed and implemented an Education in Emergency (EiE) plan[67] during the COVID-19 crisis.** Phase I focused on advocacy and awareness, development of EiE curriculum, development of guidelines for teachers, scaling up of WASH practices, and provision of psychosocial support. The school curriculum was adapted into five key stages, from which 440 video lessons were developed within one and a half months and broadcast through Bhutan Broadcasting Service. Teachers and students used social media for interaction. The MoESD also developed and provided self-instructional materials and radio lessons to support 17,000 children in remote areas without television or reliable internet facilities. These initiatives aimed to provide education and psychosocial support to individuals and families affected by COVID-19, addressing issues such as stress, fear, relationships, and few cases of domestic violence and suicide attempts.

117. **During the COVID-19 pandemic, the Royal University of Bhutan (RUB) developed and implemented the Response Plan for COVID-19 to safeguard the safety and well-being of university staff and students while ensuring continuity in the learning environment.** The response plan was crafted following government protocols. The university swiftly transitioned to online teaching via Moodle (Virtual Learning Environment) and various other applications. To facilitate students during this transition, financial support, especially for data charges, was provided by the university. However, challenges persisted due to limited internet connectivity or access, particularly in remote areas, and the occasional lack of access to devices such as computers or smartphones. The colleges have in place online infrastructure such as Moodle-based learning management system (LMS) and online cloud file storage and sharing for dissemination.

118. **The MoESD introduced the Sherig LMS as a lesson learned from COVID-19.** The LMS is a web-based, device-independent system designed to facilitate learning anytime and anywhere developed by the MoESD as part of the Digital Flagship Programme. The MoESD aims to enhance the ICT literacy for students, teachers, education officers, and other supporting staff to operationalize the LMS while diversifying the means of education (for example, broadcasting through television) and providing a set of self-learning materials for those without internet access, which is 14 percent of the population.[68]

119. **Lessons learned from the COVID-19 pandemic underscore the importance of a comprehensive approach to ensure continued learning for children, particularly those with disabilities and hard-to-reach children,[69]** focusing on teacher support, modified curriculum, and diverse delivery mechanisms. While most children can be reached through a range of measures, specific targeting is required for those who have not participated in any learning. Despite efforts to address hard-to-reach children, there was a lack of support for children with disabilities. Inclusion of organizations working with people with disabilities in the development of school DMCPs and consultation with parents of children with disabilities could enhance effectiveness in meeting their needs.

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[67] Education in Emergency (EiE) during COVID-19 Report, April 2021, Education Monitoring Division, Department of School Education, MoESD.

[68] International Telecommunication Union (ITU) World Telecommunication/ICT Indicators Database.

[69] Bhutan Case Study: Situation Analysis on the Effects of and Responses to COVID-19 on Education Sector in Asia.

120. **Although disasters can significantly disrupt education and increase dropout rates, especially for out-of-school children, these are not addressed in the education sector's DMCPs.** The MoESD acknowledges the challenges associated with out-of-school children and has planned strategic interventions to address them.[70] A study on enrollment and retention strategies in Bhutan[71] by the MoESD indicates that inaccessibility due to distance, poverty, inadequate facilities, shortage of teachers, and unemployment, among other factors, exacerbates the issue of dropouts from education. Following the study and research, several plans and programs have been developed, such as strengthening the current Continuing Education Programme, developing and deploying a network of School Management Committees, and enhancing the system for monitoring out-of-school children. However, the DMCPs of the MoESD and schools/institutions do not explicitly address this pertinent issue of out-of-school children.

121. **The ongoing emigration severely affects the availability of teachers in the country, posing a significant risk to the continuity of quality education during a crisis.** According to the Annual Education Statistics 2023[72], the teacher attrition rate averaged 3.8 percent, totaling 371 teachers who left the public school system. Reasons for departure include voluntary resignation, superannuation, and contract expiration, with the highest number of resignations being voluntary. Notably, there was a significant increase in teacher resignations from 7.7 percent in 2022 to 15.5 percent in 2023. To address the critical shortage of qualified teachers, the MoESD is rehiring experienced and qualified educators who had previously resigned.

Crisis-Induced Displacement

122. **Internal displacement is not a prevailing issue for Bhutan; however, community displacements had occurred in the past due to earthquake, floods, and GLOF.** The 1994 GLOF incident due to the partial burst from Lugge Tsho located in eastern Lunana marked Bhutan's first major GLOF event, affecting 91 households, out of which 12 houses were damaged,[73] and 17 lives[74] were lost along the Punakha-Wangdue valley. The floods in 2000 displaced more than 1,000 people and destroyed key roads between Bhutan and India. In 2009, Cyclone Aila affected approximately 65,000 people, and 12 lives were lost, followed by an earthquake in the same year.[75] The most significant displacement occurred due to the 2011 earthquake, displacing 20,000 people.[76] The other notable incidents include a storm displacing about 2,900 people in 2015 and flash flood and landslides in the southern region in 2016, displacing 640 people. Cyclone Amphan of 2020 displaced about 84 people while a landslide displaced 36 people in 2020. In such cases, affected people are relocated to safer places where temporary camps are set up with provisions of food, water, and sanitation facilities.

123. **Although local governments have designated temporary relocation zones as precautionary measures against potential GLOF events, these are not formally documented in their DMCPs.** The local governments are responsible for coordinating settlement activities and ensuring essential service delivery among newly displaced communities with technical, financial, and relief assistance from the central government. The local communities are not made aware of the temporary relocation zones. In addition, awareness-raising programs on evacuation have been limited.

124. **The NDMCP and local DMCPs do not recognize and make specific provisions for catering to protracted displacement and the conditions of displaced populations**, including special needs and vulnerabilities, place and conditions of living, and the potential unequal treatment or access to assistance opportunities that may derive from those conditions. There is no legislative provision for the government to construct

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[70] GNHC (Gross National Happiness Commission). 2016. *Bhutan Vulnerability Baseline Assessment*.
[71] http://www.education.gov.bt/wp-content/uploads/2021/09/Bhutan_Enrolment_retention_strategies.pdf.
[72] http://www.education.gov.bt/wp-content/uploads/2023/11/AES-2023_Final.pdf
[73] https://lib.icimod.org/record/21972/files/c_attachment_130_1055.pdf.
[74] NCHM. Compendium of Climate and Hydrological Extremes in Bhutan since 1968 from Kuensel. nchm.gov.bt.
[75] UNDP. 2010. *Bhutan Recovery and Reconstruction Project Progress Report 2010*.
[76] Internal Displacement Monitoring Center (accessed February 16, 2024), https://data.humdata.org/dataset/idmc-idp-data-btn.

temporary housing or provide financial assistance for protracted displacement.

125. **There is no standardized system to record and monitor crisis-induced displacement at the country level.** Although there is a practice for collecting data on the affected community due to recurrent flood disaster in the southern part of the country, there is no standardized template for documenting displacement related to disasters. Data collection and maintenance occur at the local government level, with the central agency relying on this information.

SUMMARY OF ENTRY POINTS	TIMELINE
Social and Livelihood Support	
COVERAGE AND SCALABILITY OF SOCIAL PROTECTION	
Improve social protection coverage and strengthen governance with well-established data and information. • The Cabinet Secretariat in collaboration with Ministry of Industry, Commerce and Employment (MoICE) and other relevant ministries to formulate the Social Protection Policy, Social Protection Act, and Social Protection R&R to protect, prevent and promote resilience and mitigate vulnerabilities in order to promote economic growth of those population and mitigate the worst effects of a disaster on socially and economically vulnerable households.	Long Term
• The Cabinet Secretariat in collaboration with the MoICE to develop an expanded data system strategy that contains information on population pre and post shock and relies on an ISPS encompassing interoperable and dynamic social registries and interoperable beneficiary registries, benefiting from robust National Identification Systems.	Medium Term
FOOD SECURITY AND LIVELIHOODS	
MoAL to develop its DMCP and finalize the Agri-Food Sector Strategy 2030 as strategies for improving food security and sustainable livelihoods, particularly in disaster-prone areas, to reduce the impact on the most vulnerable. • Finalize the Agri-Food Sector Strategy 2030 to guide the implementation of the FNS Policy 2023 and sectoral programs in the 13th FYP. • Develop adequate storage and distribution infrastructure and facilities and capacity building of MoAL and FCBL. • Review the supply chain of food import, export, and internal consumption during emergencies and use the to-be-developed national farm registry to identify and track vulnerable farm population. • Enhance resilience in agricultural systems at the farm level with the operationalization of agromet advisories to manage risks from extreme weather conditions, pests, and diseases. • Promote investment in modern technologies, improved agronomic knowledge, climate-smart agriculture, market information systems and animal and plant health systems would further strengthen agricultural resilience at farm level and sustainable value addition throughout the agrifood value chain. • Assess the need and feasibility of an early warning system for food and nutrition security, seeking guidance of the World Bank's expertise in establishing high frequency food and nutrition security risk monitoring	Medium Term
The MoAL to finalize the Agriculture Bill to simplify some of the legal and regulatory issues to the modernization and resilience building in the agricultural sector.	Medium Term
MoAL to de-risk the agrifood sector by reviewing and assessing the potential and cost-effectiveness of national agricultural insurance products Based on the ongoing pilots to introduce index-based insurance in Bhutan, assess its potential and cost-effectiveness of national agricultural insurance products in the longer term. In the short term, consider alternative risk mitigation measures such as financial incentives to invest in climate smart agriculture technologies and build farmers financial literacy.	Long Term

SUMMARY OF ENTRY POINTS	TIMELINE
CONTINUED ACCESS TO EDUCATION	
MoESD to review and update existing DMCPs for education sector addressing multi-hazard risks. Sustain and expand the use of technology in delivering school education curriculum and services in times of crisis.	Short Term
CRISIS-INDUCED DISPLACEMENT	
RGoB to develop a policy and strengthen governance structure for providing financial support on housing reconstruction in case of protracted displacement, raise public awareness about GLOF EWS and the location of temporary relocation zones, and develop a system for recording and tracking crisis-induced displacement.	Short Term

Photo: ©Andrew Peacock | istock.com

APPENDICES

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APPENDIX 1: SUMMARY OF CHARACTERISTICS ASSOCIATED WITH EACH MATURITY LEVEL IN THE CPGA

MATURITY LEVEL	KEY CHARACTERISTICS
ADVANCED	• Comprehensive efforts have been made to promote preparedness with few gaps. • Preparedness is prioritized and mainstreamed in key government documents and plans. • A (relatively) advanced plan, system, or institution is in place. While it may still have some shortfalls, it covers all planning and operational aspects needed to ensure holistic uptake of preparedness activities.
GOOD	• Clear and dedicated efforts related to preparedness have been promoted. Solid gains have been made, though efforts to promote preparedness may not be fully comprehensive. • Balance of priorities still favor response. • Has well-thought-through and dedicated plans, systems, or institutions in place. Most areas are well resourced and have decent capacity, though not across the board.
BASIC	• Decent efforts have been made to promote preparedness, with a vision laid out in relevant policy or planning documents. Progress in implementation may be uneven or disjointed. • Priority is still often given to ex post response over preparedness. • Has a plan, system, or institution in place. However, it may face shortfalls in capacity or resourcing. Design features are often good, though inadequate to have meaningful effect.
NASCENT	• Some (or minimal) efforts have been made to promote ex ante preparedness, though typically with little ability to follow through. • Ex post relief and response are typically the focus of government intervention. • May have a plan, system, or institution in place though it does not address crisis preparedness as a priority. System suffers from resource and capacity constraints, resulting in limited implementation/ operationalization.
UNMET	• Nothing (or very little) has been done to address aspects of preparedness or the country has little to no ability to promote preparedness activities. • No plans, systems, or institutions in place and little to no ability to follow through/operationalize.

Note: For full details on distinctions between maturity levels and grading criteria, see CPGA Approach Note.

APPENDIX 2: CPGA DATA COLLECTION PROCESS

In the first stage of the assessment, a targeted search of gray and academic literature as well as websites of international and other organizations focused on Bhutan's crisis preparedness was conducted. The review of gray and published literature focused specifically on the five pillars of crisis preparedness as defined within the CPGA: legal and institutional foundations, understanding and monitoring of risks, financial preparedness, primary response systems, and social and livelihood support.

Findings from the desk-based review were supplemented by qualitative data gathered through consultations with relevant agencies in Bhutan including government, corporate, and private entities and World Bank task teams and experts who hold critical engagements in the five areas of crisis preparedness. Consultations were conducted through semi-structured interviews, based on high-level questions followed by section-specific questions. The World Bank team consulted with the Ministries of (a) Education and Skills Development, (b) Industry Commerce and Employment, (c) Infrastructure and Transport, (d)Agriculture and Livestock, (e) Home Affairs, (f) Energy and Natural Resources, (g) Health, and (h) Finance and other autonomous agencies including the GovTech, NCHM, RUB, RBP, Royal Bhutan Army, Gyalsuung, Desuung, Druk Green Power Corporation, BPCL, Tashi InfoComm Limited, Bhutan Telecom Limited, and Royal Insurance Corporation of Bhutan Limited (RICBL). Key GPs/themes have included Agriculture; Education; Environment and Natural Resources; Finance, Competitiveness and Innovation; Fragility, Conflict, and Violence; Health, Nutrition and Population; Poverty; Social Protection and Jobs; and Urban, Disaster Risk, Resilience and Land.

The inputs received during consultations and interviews were integrated into the framework, and preexisting information was revised based on the resulting insights. Consultations were an important methodological addition to the overall process, as they provided key insights into preparedness issues that were not addressed by the secondary literature reviewed.

For a full set of methodological guidelines, refer to the CPGA Approach Note.

APPENDIX 3: LIST OF STAKEHOLDERS CONSULTED

NR	NAME	DESIGNATION	DIVISION/DEPT	ORGANIZATION
1	Mr. Dorji Wangchuk	Chief Program Officer	School Liaison and Coordination Division/Department of School Education	MoESD
2	Ms. Pema Wangmo	Assistant Program Officer		
3	Ms. Kinzang Dechen	Assistant Program Officer		
4	Mr. Thuenzang Choephel	Deputy Executive Engineer	Division of Telecom and Space	GovTech
5	Mr. Thakur Timsina	Assistant Information and Communication Technology Officer (ICTO)		
6	Mr. Migmar Tshering	Assistant ICTO		
7	Mr. Sonam Dorji	Assistant ICTO	Digital Surface Transformation	
8	Mr. Tashi Loday	Assistant Finance Officer	Finance and Investment Department	Druk Green Power Corporation Limited
9	Ms. Sonam Pelden	Senior Environment Officer	Druk Green Consultancy	
10	Mr. Suman Pradhan	Specialist	Department of Labor	MoICE
11	Mr. Karma Dupchu	Director	Department of Infrastructure Development (DoID)	MoIT
12	Ms. Tshering Choden	Executive Engineer	Water and Sanitation Division/DoID	
13	Mr. Tandin Dorji	Executive Architect	Sustainable Resilient Building Division/Department of Human Settlement	
14	Ms. Bhawana Chhetri	Chief Urban Planner	Geomatics/Logistics/Department of Human Settlement	
15	Mr. Jigme Wangdi	Deputy Executive Engineer	Specialized Engineering and Innotech Division/Department of Infrastructure Development	
16	Mr. Karchung	Executive Engineer	DoST	
17	Ms. Sonam Lhamo	Engineer		
18	Ms. Gyem Lham	Assistant Airport Manager	Airport Management Division/ Department of Air Transport (DoAT)	
19	Mr. Nado Rinchen	Sr. Administration Officer	Airport Management Division, DoAT	MoIT
20	Mr. Sonam Phuntsho	Safety Manager	Airport Management Division, DoAT	MoIT

NR	NAME	DESIGNATION	DIVISION/DEPT	ORGANIZATION
21	Mr. Dorji Khandu	Head	Airport Emergency and Security Division, DoAT	MoIT
22	Ms. Chencho Om	Airport Emergency and Security Officer	Airport Emergency and Security Division, DoAT	MoIT
23	Mr. Samten Dorji	Deputy Chief Flight Safety Officer	Flight Safety Division/Bhutan Civil Aviation Authority (BCAA)	MoIT
24	Mr. Sangay Wangdi	Chief	Air Navigation Service Division, Bhutan Civil Aviation Authority (BCAA)	
25	Mr. Karma Gayley	Air Navigation Service Officer	Air Navigation Service Division, BCAA	
26	Mr. Karma Phuntsho	Assistant Engineer	Regulatory and Complaince Division /Bhutan Construction and Transport Authority (BCTA)	
27	Ms. Nima Lhamu	Engineer	Safety Standard Division /BCTA	
28	Mr. Pema Rabgay	Deputy Chief Program Officer	Policy and Planning Division	
29	Mr. Leki Choda	Program Officer	Policy and Planning Division	MoAL
30	Mr. Ngawang	Senior Agriculture Officer	DOA	
31	Mr. Wangdi Tshering	Superintendent of Police , Lieutenant Colonel	Special Police Branch	RBP
32	Mr. Tshering Dakpa	Colonel	Fire and Rescue Service Division	
33	Mr. Dechen Dorji	Lieutenant Colonel	Army HQ	Royal Bhutan Army
34	Mr. Yeshey Gjamtsho	Officer-in-Charge	Army Disaster Response Cell	
35	Mr. Sonam Dorji	Lieutenant Colonel	National Service Core Working Group	Gyalsung
36	Mr. Lodey Tshering	Lieutenant Colonel		
37	Mr. Ngedup Tshering	Desuup		Desuung HQ
38	Mr. Ugyen	Fire Focal/Desuup		
39	Mr. Dophu	Deputy Chief ICTO	Demography and Information Division, Department of Civil Registration and Census (DCRC)	MoHA
40	Mr. Nidup Tshering	Electrical Engineer	Department of Culture and Dzongkha Development	
41	Ms. Karma Tshering	Registrar	Office of the Vice Chancellor	RUB
42	Mr. Pema Dorji	Senior Student Service Officer	Sydent Service Division	
43	Mr. Mani Gyeltshen	Chief	HR Department	
44	Mr. Shamsher Pradhan	General Manager	Corporate Strategy Division	BPCL
45	Ms. Ku Karma	Executive Engineer		
46	Mr. Kado Zangpo	Director	DLGDM	MoHA

NR	NAME	DESIGNATION	DIVISION/DEPT	ORGANIZATION
47	Mr. Yang Dorji	Chief Program Officer	Preparedness and Response Division, DLGDM	MoHA
48	Mr. Yeshi Namgyel	Deputy Chief Program Officer		
49	Mr. Choki Tashi	Deputy Chief Program Officer		
50	Mr. Thinley Norbu	Chief Program Officer	Risk Prevention and Reduction Division, DLGDM	
51	Mr. Sonam Tshewang	GIS officer		
52	Ms. Tenzin Choden	Senior Program Officer		
53	Mr. Chimi Dorji	Senior Program Officer		
54	Ms. Dawa Chhoedron	Chief Engineer	Power System and Market Division/Department of Energy	MoENR
55	Ms. Tashi Choeden	Executive Engineer	Energy and Strategy Division/ Department of Energy	
56	Mr. Jamyang Phuntsho	Chief	Hydrology and Water Resources Division	NCHM
57	Mr. Chimi Namgyel	Senior Statistical Officer	Hydrology and Water Resources Services Division	
58	Ms. Sonam Ihamo	Principal Hydro/Meteorological Officer	Cryosphere Division	
59	Mr. Sangay Tshering	Meteorological Officer	Meteorological Service Division	
60	Mr. Sherub	Interim Head	Bhutan Power System Operator	BPCL
61	Mr. Ngawang Tenzin	Senior Manager		
62	Mr. Jigme Dorji	Senior Engineer		
63	Mr. Ugyen Tshering	Senior Programme Officer	Health Emergencies Programme/ DoPH	MoH
64	Ms. Choki Dolkar	Assistant Program Officer	Health Emergencies Programme, CDD/DoPH	
65	Ms. Nityam Nepal	Senior Geologist	Geohazard Division/DGM	MoENR
66	Ms. Phuntsho Choden	Geologist		
67	Ms. Rinzin Wangmo	Geologist		
68	Ms. Kuenzang Lham Sangay Designation	Chief Planning Officer	Social Cluster Division	MoF
69	Ms. Kezang Lhamo	Chief Budget Officer	Economic Cluster Division	
70	Ms. Yeshey Seldon	Commissioner	Customs/ Department of Revenue and Customs	
71	Mr. Sonam Wangchuk	Deputy Collector		
72	Mr. Chonga Dorji	Engineer	General Insurance Division	RICBL
73	Mr. Binod Kumar Pradhan	Engineer	Engineering Valuation Division	
74	Mr. Sonam Tashi	Deputy General Manager	Corporate Strategy Office	Bhutan Telecom
75	Mr. Ganga R Sharma	General Manager		TashiCell

APPENDIX 4: DETAILED ENTRY POINTS

Box 4.1. Entry Points for Legal and Institutional Framework for Crisis Preparedness

The RGoB to amend the DM Act and the DM R&R to address the implementation bottlenecks and define the scope more explicitly to include climate change impacts and disease outbreaks and be read as all-encompassing except for the specifically excluded ones.

- Define the conditions for activating NDMA and DMCs to enable an objective activation.
- Redefine Type I–III disasters to incorporate the scale of loss and damage to make an objective declaration.
- Link the declaration of Type I–III disasters with the level of financial and technical assistance from the central government to the affected local governments.
- Mandate the adoption of NDRCC and DRCP for all hazard types.
- Review and amend the DM R&R to elaborate provisions on the clauses in the DM Act, with clear definition of responsibilities and processes.

The MoHA to update and NDMA to endorse the updated NDRCC to clarify mandates and responsibilities of agencies and institute one standard ICS for all hazard types.

- Finalize the NDRCC with identification of lead agencies for each desk and obtain endorsement by the NDMA, following which, clear SOPs should be developed for each desk for efficient and effective coordination during emergencies.
- Review and discuss the provisions in the DRCP and the NIPPRP to understand whether it would be beneficial to have one national coordination response document that can be customized for any kind of emergencies, including emergencies related to health and food security, or to have both these documents as they are now.
- Raise awareness about the NDRCC and DRCP among the Cabinet, local governments, ministries, and other relevant agencies to ensure the implementation.

The DLGDM to formulate SOPs for IMTF and revamp it based on the Civil Service Reform Act.

- Revamp the IMTF with clear terms of reference based on the organizational reforms in accordance with the Civil Service Reform Act of 2022.
- Develop SOPs for the operationalization of the IMTF as per the DM Act, including an M&E framework to evaluate the implementation and performance of the IMTF for improvement.

The RGoB to prepare or update sectoral and local government DMCPs based on up-to-date multi-hazard risk information.

- DLGDM to develop a guideline and establish a mechanism for M&E of DMCPs.
- Sectoral agencies and local governments to update or develop the DMCPs based on multi-hazard risk information.
- Local governments to integrate CBDRM including measures targeted toward vulnerable groups.

The RGoB to strengthen technical capacity of DRM agencies with adequate financial resources to implement the DM Act and related policies and guidelines.

- Key technical and scientific agencies (for example, DLGDM, NCHM, MoIT, MoH, and MoAL) relevant to DRM to conduct an HR assessment and prepare an HR plan based on the findings.
- DLGDM to strengthen the capacity of DMCs through training on fundamentals of DRM and simulations based on DMCPs.

Box 4.2. Entry Points for Understanding and Monitoring Risks and EWS

Conduct a nationwide multi-hazard risk assessment, develop a DSS, and strengthen governance on data management.

- MoIT, NCHM, and DGM to build their capacity in conducting multi-hazard risk assessments with a focus on earthquake, floods, and landslides, especially on probabilistic assessments and DLGDM in conducting socioeconomic vulnerability assessments.
- NLCS to amend the Geo-information Policy 2018 and DLGDM to develop Risk Information Guidelines to set geospatial and non-geospatial data standards and define the roles and responsibilities of relevant government agencies in generating and regularly updating risk information to avoid the duplication of efforts and lack of coordination and information sharing.
- DLGDM to develop a DSS to share risk information and enable risk-informed planning and development in critical sectors.
- DLGDM to operationalize the Disaster Management Information System, either stand-alone or interfaced with the DSS to keep (a) updated record of disasters for future reference, (b) inventory of resources to be utilized during emergency response, and (c) updated information on vulnerable population.
- RGoB to institutionalize the Technical Working Group for multi-hazard risk assessment established under the Strengthening Risk Information for Resilience project to sustain coordination among relevant agencies for generating and improving risk information.

Enhance the capacity of NCHM for medium-term weather forecasting, impact-based forecasting, flood forecasting, and sector-specific services.

- RGoB to allocate budget to establish the new NCHM HQ, National Weather and Flood Warning Center that is crucial to modernize the observation, ICT, and forecasting infrastructure.
- NCHM to develop probabilistic forecasting, impact-based forecasting, now-casting systems, sector-based forecasts, monthly and seasonal climate forecasts, and climate projection and downscaling and initiate hydrological and weather forecast verification.
- NCHM to expand GLOF EWS where required and upgrade 10 stations to reduce the current time lag of more than 2 hours between the time of monitoring and when data are available on the system for warning.
- NCHM to train forecasting staff to establish a solid baseline of meteorological knowledge and understanding as per the World Meteorological Organization (WMO) standard for the 'Basic Instruction Package in Meteorology'.
- NCHM to develop tailored services to meet the needs of the critical user sectors such as DM, water resources, hydropower production, and agriculture.

Develop a near real-time forest fire surveillance system, leveraging satellite technologies, to identify and suppress forest fires in a timely manner.

- DoFPS to establish a nationwide forest fire surveillance system leveraging satellite images by integrating a forest fire danger rating system, a forest fire simulation/prediction model, and a forest fire monitoring system which is currently hosted by ICIMOD.

Enhance seismic and landslide hazard mapping and pilot a landslide EWS.

- DGM to conduct land deformation mapping and refine susceptibility and inventory maps.
- DGM and DoST to establish a formal data-sharing mechanism for inventory and any relevant studies on landslides.
- DGM to install a dense network of seismometers and establish an earthquake EWS in collaboration with the Government of India and other Himalayan states.
- DGM and DoST to pilot a comprehensive landslide EWS that can be deployed for critical landslide hot spots, incorporating real-time monitoring, event detection, data analysis, and early warning dissemination. Link the EWS to a communication infrastructure to disseminate warnings.
- DLGDM to conduct regular training and drills for at-risk communities.

Strengthen monitoring of communicable and vector-borne diseases.

- RCDC to build its capacity in terms of both laboratory facilities and human resources.
- MoH to enhance cross-border coordination with India for sharing information and mitigation measures during breakout of vector-borne diseases.

Box 4.2. Entry Points for Understanding and Monitoring Risks and EWS (cont.)

Enhance the MoAL's capacity to develop an EWS for food security.

- MoAL to develop a systematic baseline and pre-crisis food security information for conducting regular food security monitoring, needs assessment, and rapid food security assessments for food assistance.
- MoAL to conduct a feasibility study on setting up a food security information and monitoring system for early warning, learning from regional experiences such as Nepal.

Enhance risk communication through the development of an online DSS to disseminate multi-hazard risk information and raise public awareness through disaster simulations based on updated local DMCPs.

- DLGDM to develop a framework to foster collaboration among relevant agencies to develop an accessible platform for sharing vital risk information.
- DLGDM to enhance public awareness of impending disasters with scientific data of potential impacts in the country from the socioeconomic and safety perspectives by updating local DMCPs and conducting simulations.

Box 4.3. Entry Points for Financial Preparedness

Develop a disaster risk financing strategy to adopt a risk-layered approach to disaster risk financing.

- MoF and DLGDM to review the Operational Guidelines for Disaster Financing 2017 based on lessons learned from COVID-19 and develop relevant SOPs to streamline the procedures for accessing the General Reserves and include guidelines to access emergency funding and resources from development partners.
- MoH to finalize a health emergency financing strategy and consider establishing a dedicated contingency fund for health emergency management.
- MoIT to conduct a cost-benefit analysis of insuring critical public infrastructure to inform decision-making.
- MoF to access a contingent line of credit through the second Cat DDO under preparation.
- MoF to consider a sovereign risk transfer mechanism such as a Cat Bond and accessing international markets (for example, Green Bonds) in the long term after exhausting the use of concessional funding from IDA and other donors and upon confirmation of its fiscal viability.

Conduct a comprehensive assessment of the public procurement system for emergencies.

- MoF to conduct a comprehensive assessment of the public procurement system using the universally recognized Methodology for Assessing Procurement Systems tool, which aims to identify the strengths and remaining gaps and provide recommendations for reforms and effective M&E of procurement performance.

Improve property and land valuation profession and services for accurate disaster risk insurance.

- MoF to establish the Property Valuation Division.
- MoF to establish national valuation standards adhering to IVS.
- Designate MoF or NLCS as a regulatory body for property valuation.
- RGoB to develop an educational program at postgraduate diploma and master's level in partnership with a leading international academic institution.
- MoF to establish professional standards, code of conduct, accreditation, and oversight for valuation profession.

Box 4.4. Entry Points for Primary Response

Public Health Systems

Strengthen pandemic preparedness and response capability considering recent pandemic and climate change impact.

- MoH to review and update the HEDCP to streamline, integrate, and incorporate lessons learned from the COVID-19 response and the BPPRP.
- MoH to train medical staff for managing large-scale disasters especially focusing on triage.

Prioritize capacity building of the health care workforce and address issues related to the workforce shortage.

- MoH to expand recruitment efforts, increase training opportunities, and implement retention strategies to ensure sufficient and skilled health care workforce.
- MoF to allocate budget for training and capacity building of public health professionals, particularly in the areas of disease surveillance, outbreak investigation, and emergency response.

Strengthen diagnostic capabilities to cater to emerging needs.

- MoH to ensure that laboratory facilities are well equipped and staffed to handle disease diagnostics efficiently.
- MoH to strengthen the national diagnostic system through enforcing third-party quality assessments.
- MoH to improve the international referral system for diagnostics not available in the country through developing links with reputed international diagnostic laboratories.

Improve coordination for delivery of health services during emergency.

- MoH and DLGDM to strengthen coordination between health service providers and emergency responders such as RBP SAR teams, emergency medical responders, and Desuups to deliver essential health services efficiently to the affected communities.
- RGoB to improve resource mobilization through improved coordination and response mechanisms between MoH and local governments and between DRM and health professionals.

Finalize a health emergency financing strategy to diversify financing sources and address regional disparities.

- MoF to consider establishing a dedicated health emergency fund and diversify health care financing sources, including integrating the private sector into the health care system.
- MoH to address regional disparities in health care expenditure for a better and equitable resource allocation.

Critical Infrastructure

Strengthen the legal and regulatory foundations for a resilient built environment and adopt national standards for business continuity.

- MoIT to formulate the National Construction and Surface Transport Act and its R&R to mandate strict quality standards and ensure the resilience of critical infrastructure services, including timely emergency preparedness and response planning.
- MoIT to revise the Building Code 2018 to strengthen the regulatory framework for ensuring the resilience and safety of all buildings in the country.

Develop GIS-based asset management systems for critical infrastructure to enable risk-based O&M planning and ensure service continuity.

- MoIT to develop a GIS-based asset management system for critical infrastructure to enable risk-informed decision-making for replacement and retrofitting, risk-based O&M planning, and business continuity planning, leveraging the NSDI being developed by NLCS and the multi-hazard risk DSS being developed by DLGDM.
- MoIT and BPCL to develop service continuity plans and SOPs for critical infrastructure services such as energy, water supply, and transport.

Develop and allocate budgets to implement a retrofitting investment plan for critical infrastructure that were constructed before 2000s based on detailed multi-hazard vulnerability assessments.

- MoIT to conduct detailed vulnerability assessment of critical infrastructure such as hospitals and schools.
- MoIT to prioritize retrofitting of schools and hospitals that were built before the introduction of the current seismic codes in early 2000s employing Life Cycle Cost Analysis methods.

Incorporate integrated geohazard assessment and management into hydropower planning, designs, construction, and O&M.

- MoENR to formulate the National Energy Policy and revise the Hydropower Dam Design Guidelines to mandate integrated dam safety and geohazard management of hydropower plants.

Box 4.4. Entry Points for Primary Response (cont.)

Enhance the resilience and efficiency in water infrastructure, focusing on NRW losses through strategic investments and capacity-building measures.

- MoIT to prioritize investments in NRW reduction as a matter of urgency over investments in additional water production capacity.
- MoIT to implement a water metering infrastructure in the distribution network for diagnostic and monitoring (bulk water meters, pressure gauges, and data network systems).
- MoIT to restructure the secondary and tertiary distribution network to implement equitable water distribution.
- MoF and Royal Civil Service Commission (RCSC) to allocate staff and financial resources for implementing and sustaining NRW management.
- MoIT to train and develop technical capacity of local governments to reduce reliance on central agencies.

Strengthen the resilience of T&D infrastructure based on a multi-hazard exposure and vulnerability assessment.

- BPCL to conduct an exposure and vulnerability assessment of T&D lines, along with a system and service impact assessment for scenario earthquakes and recommendations for structural and nonstructural risk reduction measures.

Enhance resilience and emergency preparedness across digital connectivity and data infrastructure.

- GovTech to conduct a comprehensive assessment focusing on digital connectivity resilience and recovery, with a particular emphasis on exploring technical options such as LEO satellite technology to enhance international connectivity beyond existing links through India.
- GovTech to conduct a comprehensive assessment of data infrastructure resilience and recovery options, focusing on vulnerabilities, future-plans, and technical solutions under 'energy-efficient' principles.
- GovTech to develop plans to strengthen disaster recovery capabilities of the GDC, exploring innovative solutions like geographic split with neighboring data centers.
- GovTech to explore implementation of a hybrid cloud strategy for nonsensitive data storage in public clouds, requiring a detailed analysis of cloud disaster recovery and BCPs.
- GovTech to review and strengthen the existing SOPs for emergency telecommunications based on lessons learned from COVID-19.
- GovTech to undertake a detailed study to assess communication-related challenges during various situations, especially in remote areas, and identify strategies to ensure all-weather communications.

Civil Protection and Emergency Management Systems

Strengthen SAR equipment, develop SOPs for its timely mobilization, and train the responders to build their capacity for severe and high-altitude disasters.

- DLGDM to facilitate the preparation of critical life-saving equipment inventory and a gap assessment of critical equipment for collapsed structure SAR, high-altitude SAR, and structural firefighting by MoH, RBP, and Desuung; emergency communication by GovTech; and forest firefighting by MoAL.
- DLGDM to facilitate the development of a framework for collaboration among the primary responders during a mega disaster including specific SOP for mobilizing and sharing of equipment among RBP, Royal Bhutan Army, and Dessung.
- RGoB to strengthen capacity of first responders for SAR and firefighting.
- DLGDM to facilitate the development of an SOP for deployment of equipment from different government agencies and private stakeholders along with the agreements wherever needed.

Establish and operationalize EOCs at all levels and institutionalize ICS.

- DLGDM to develop and implement an investment plan for strengthening EOC systems at the national, *dzongkhag,* and *thromde* levels and allocate budgets to establish and equip EOCs.
- DLGDM to develop and implement an HR and capacity-building plan for various positions for operating EOCs in times of Type III disasters.
- Local governments to establish IMT at the *thromde* and *gewog* levels.
- DLGDM to conduct disaster simulations and regularly train government officials and responders on ICS.

Standardize and institutionalize PDNA methodologies and protocols.

- DLGDM to establish uniform PDNA forms and establish the SOPs defining the roles and responsibilities of local governments and line agencies.

Box 4.4. Entry Points for Primary Response (cont.)

DLGDM to create awareness on the post-earthquake assessment procedure and train engineers and other technical personnels, both from public and private sectors.

- DLGDM to establish a centralized database, preferably a cloud-based system, for data collection to enable analysis for effective disaster response.
- DLGDM, NCHM, and GovTech to establish an SOP for activating the International Charter on Space and Major Disasters to access satellite data for a rapid PDNA.

- **Conduct a needs assessment for establishing humanitarian staging areas.**
- MoIT to conduct a comprehensive needs assessment to identify high-risk areas prone to disasters or humanitarian crises to identify strategic locations across the country.
- MoIT to determine whether an existing structure can be used or whether there is a need to retrofit or construct a new structure.
- MoAL with relevant agencies including MoIT to develop SOPs outlining the setup, management, and operation of humanitarian staging areas, including logistics, communication, security, coordination, and resource management.
- MoAL with relevant agencies to develop an action plan to equip it with the necessary resources and sustainability.
- DLGDM with relevant agencies including MoAL, Ministry of Foreign Affairs and External Trade, and primary responding agencies to establish partnerships between development partners, main responders, and relevant lead agencies as per the NDMCP; conduct simulations; and train personnel who will manage and operate these staging areas.

Box 4.5. Entry Points for Social and Livelihood Support

Expand coverage and improve scalability of social protection.

- The Cabinet Secretariat and MoICE to formulate the Social Protection Policy, Social Protection Act, and Social Protection R&R to build resilience and mitigate the worst effects of a disaster on socially and economically vulnerable households.
- MoICE to define clear roles and responsibilities for social protection mechanisms in the country and promote better coordination with the DLGDM.
- MoICE to develop an expanded data system strategy that contains information on population pre and post shock and relies on an ISPS encompassing interoperable and dynamic social registries and interoperable beneficiary registries, benefiting from robust National Identification Systems.
- In coordination with NCHM and DLGDM, MoICE to develop a GIS database of residents at the community level and, if possible, at the household level, with details of vulnerable population and their special needs. Ensure that the database is linked to existing relevant databases and a mechanism for regularly updating it.
- MoICE to predefine financing sources and triggers as well as add provisions in guidelines of social protection systems to allow for the temporary scale-up of programs to respond to shocks based on ISPS.

Review the food supply chain and identify vulnerabilities.

- MoAL to review the supply chain of food import, export, local production, and internal consumption during emergencies.
- MoAL to utilize the to-be-developed national farm registry to identify and track vulnerable farm population.

Enhance food security preparedness through capacity building of MoAL and FCBL with plans, SOPs, and adequate storage and distribution infrastructure and facilities in place.

- MoAL and FCBL to develop a comprehensive DMCP with a focus on coordinated food security preparedness and response.
- MoAL to develop SOPs and conduct drills for the operationalization of the DMCPs.
- MoAL to assess the feasibility, management roles, and responsibilities of an effective cold storage chain for preserving food supplies during emergencies, as well as the need for additional storage and distribution facilities during emergencies.
- MoAL to assess the need for a dedicated financial reserve for FCBL earmarked to emergency response.
- MoAL to develop an SOP for food distribution during emergencies to clearly delineate the roles and responsibilities of local governments.

Enhance resilience in agricultural systems at the farm level with the operationalization of agromet advisories to manage risks from extreme weather conditions, climate change adaptation, and pests and diseases.

- MoAL to operationalize the ADSS and build the capacity of the NCHM to generate medium-term weather forecasts.
- MoAL to assess the feasibility to integrate the ADSS into other digital farmer support tools.

Box 4.5. Entry Points for Social and Livelihood Support (cont.)

Review and update existing DMCPs for education sector to address multi-hazard risks.

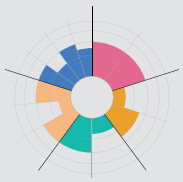
- MoESD to review and update the DMCPs for the education sector in collaboration with relevant organizations, communities, and caregivers, reflecting real-time needs assessment and data-centric approach, continued learning, diverse delivery methods, and targeted strategies for children with disabilities and hard-to-reach populations.
- MoESD and schools to conduct regular tabletop exercises based on DMCPs and make necessary adjustments to ensure safety of schools.

Expand the use of technology in delivering EiE.

- MoESD to leverage and expand the scope of Sherig LMS, Moodle, and other open-source technologies to enhance ICT integration in the regular curriculum and broaden online learning.
- MoESD to establish and/or upgrade ICT infrastructure to ensure a seamless online teaching and learning environment and bridge the digital divide in access to education.
- MoESD to develop teachers' digital literacy for online learning and integrate remote delivery (for example, mobile learning) into teacher's training programs.
- MoESD to diversify the means of providing EiE considering that 14 percent of the population has no internet access.
- MoESD to train teachers to provide first response and targeted support for students facing specific challenges including mental health and disabilities.

Develop a policy for providing housing reconstruction support in case of protracted displacement, raise public awareness about GLOF EWS and the location of temporary relocation zones, and develop a monitoring system for recording and tracking crisis-induced displacement.

- Local governments to document the designated temporary relocation zones in local DMCPs and disseminate the information to the public.
- NCHM and DLGDM to design and deliver an awareness-raising program about GLOF EWS and conduct disaster simulations to ensure timely evacuation of local communities in GLOF-prone areas.
- MoHA to include a provision in the DM Act to provide financial assistance for housing reconstruction in case of protracted displacement triggered by a large-scale disaster such as earthquake and GLOF.
- DLGDM to develop a Disaster Management Information System to record and monitor the displaced population.
- DLGDM, in coordination with local governments, to develop SOPs for the management of crisis-induced displacement.



CPGA

Crisis Preparedness Gap Analysis

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