SAARC
Disaster Management Centre (IU)

GUJARAT INSTITUTE OF DISASTER MANAGEMENT
BUILDING RESILIENCE

Workshop on Integrated Flood Risk Management

08 - 11 December 2023

SAARC Disaster Management Centre (IU)
GIDM Campus, Gandhinagar, Gujarat, India

Nepal

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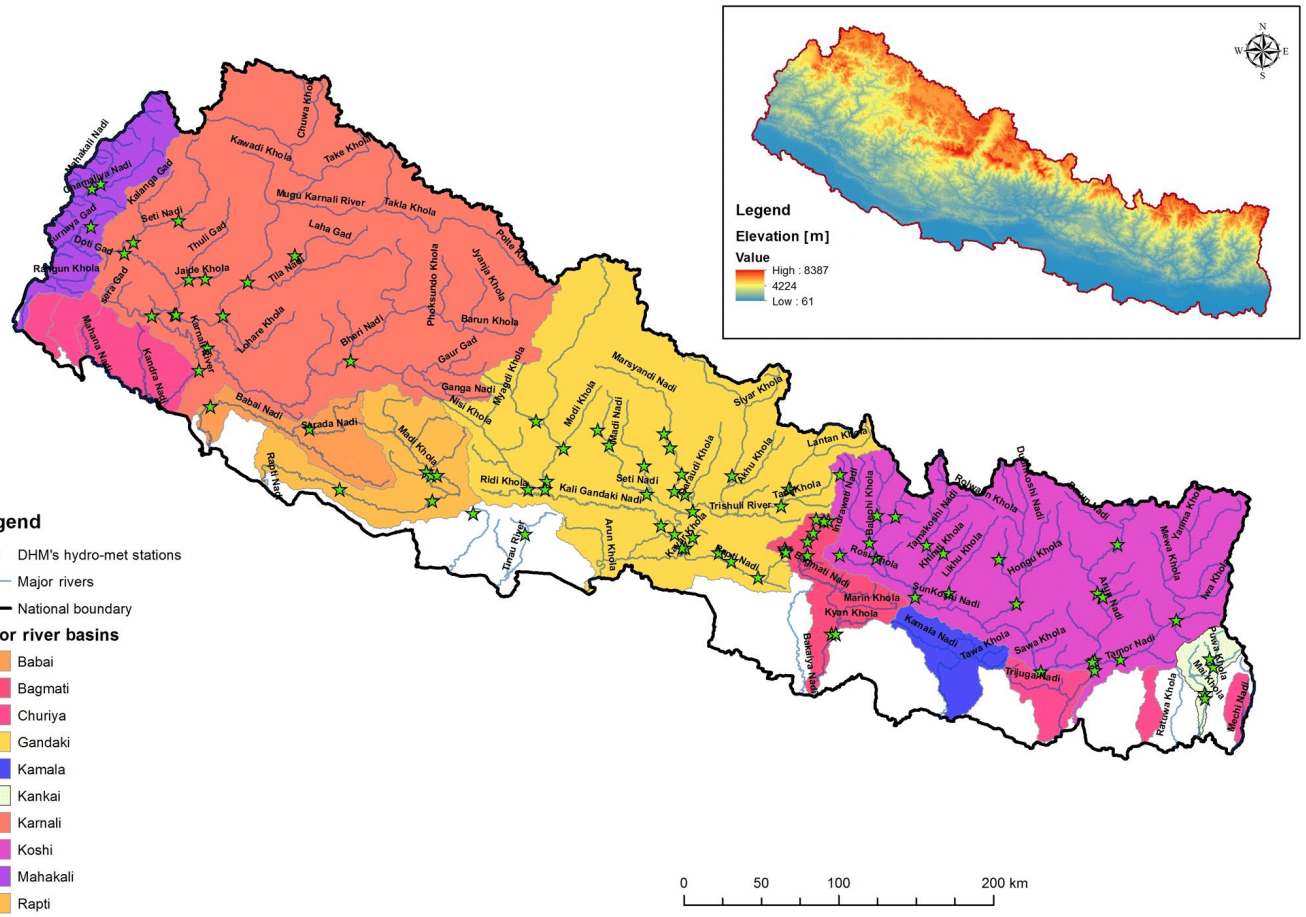
Country profile

- Demographic Details (As per census 2021)
  - Population: 29,192,480
  - Growth rate: 0.92% per year
- State Structure
  - Federal level
  - Provinces: 7
  - Local level: 753
- Geographical regions
  - Mountains: 15%
  - Hills: 68%
  - Plains: 17%



Nepal's Rank in Disaster

- 4^{th} in relative vulnerability to climate change (Global Climate Risk Index 2020)
- 11^{th} in earthquake risk (Global Report on Disaster Risk 2019)
- 30^{th} in flood hazard (World Risk Report 2022)
- 20^{th} topmost disaster prone country in the world (UN Office for Disaster Risk Reduction)

Institutional Arrangements

- Institutions:
  - NDRRMA (National Disaster Risk Reduction and Management Authority)
  - Water Induced disaster division, Department of Water Resources and Irrigation (DoWRI)
  - Disaster risk reduction and management committee in Central, Provincial and Local levels
  - National Plateform for DRR
  - Emergency Operation Centers in 77 districts
  - INGOs/NGOs/CBOs

Policy and Legal provisions

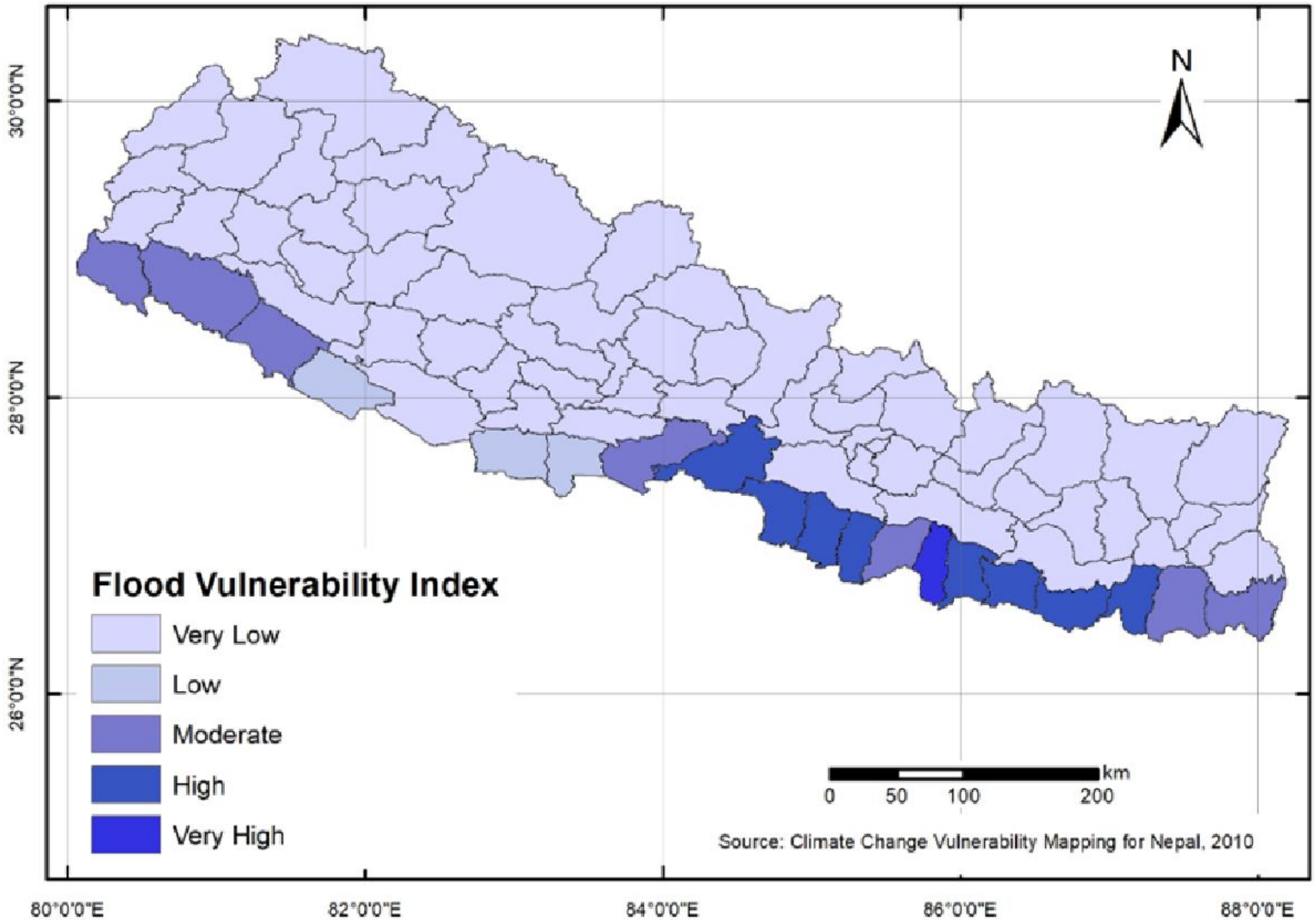
- Natural Calamity (relief) Act 1982
- National Strategy on Disaster Risk Management 2009
- Water Induced Disaster Management Policy 2015
- National Reconstruction and Rehabilitation Policy 2015
- Disaster Risk Reduction and Management ACT 2017
- National Policy for Disaster Risk Reduction 2018

Vulnerabilities

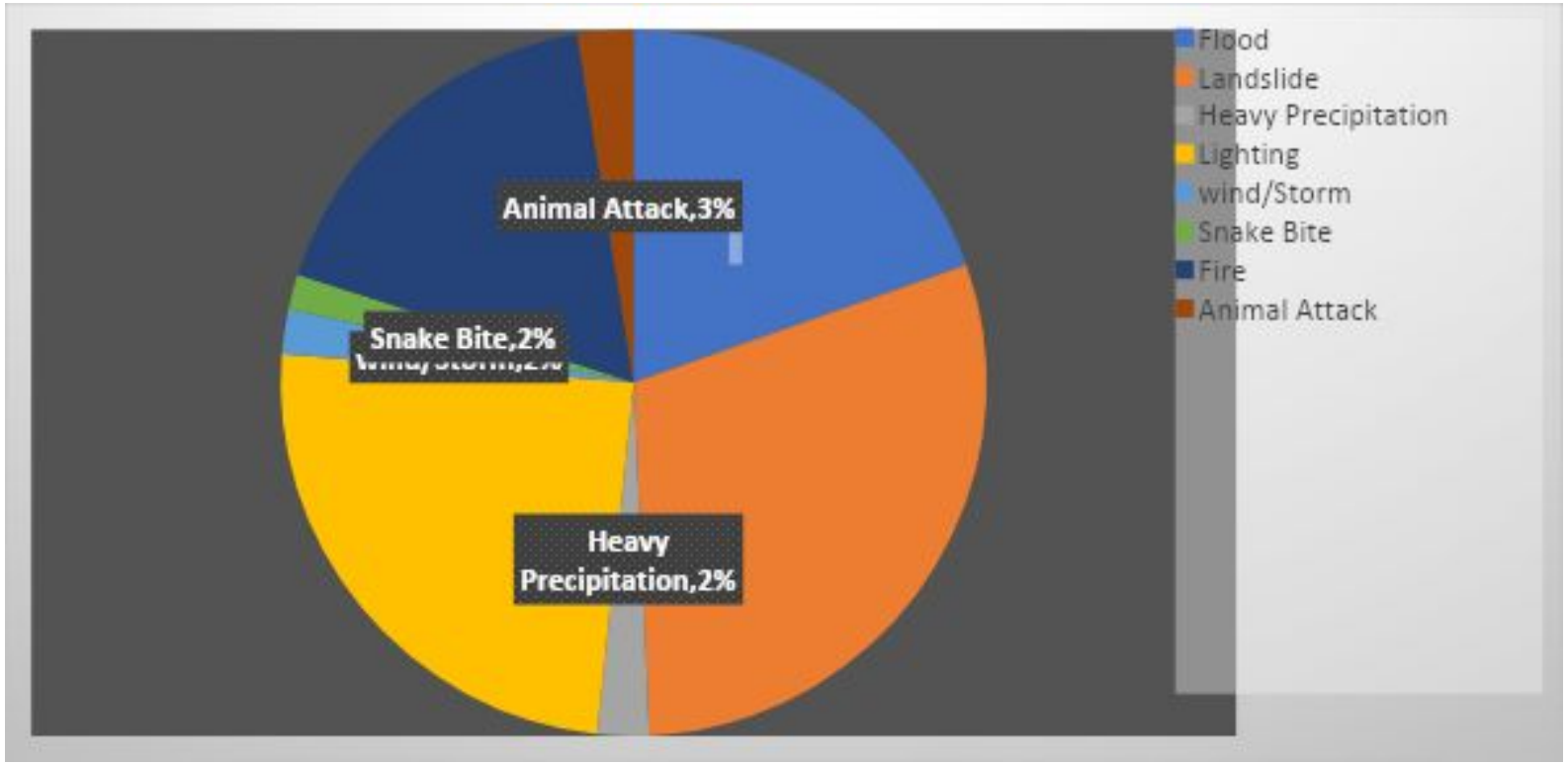
- **Physical and spatial vulnerability**
- *Extremely dynamic landscape: Fragile hills, melting Himalayas and flooding plains.*
- *Inaccessibility: Road and communication difficulties in remote areas*
- *Widely-dispersed human settlements and migration*

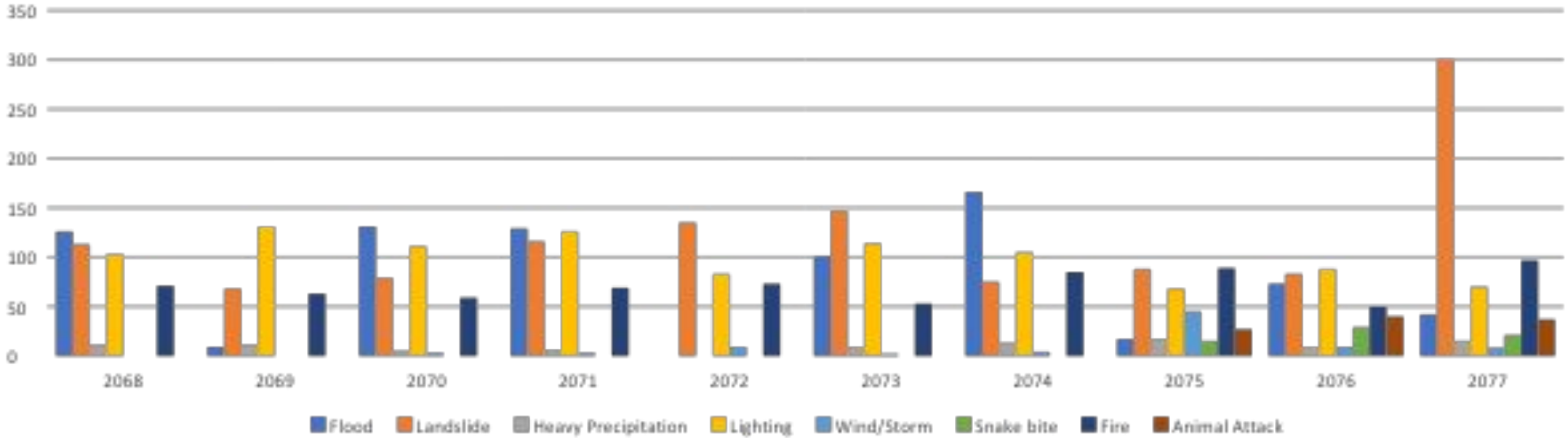
- **Socioeconomic vulnerability**
- *Low human development index and economic growth: 3rd form the lowest among SAARC countries*
- *Heavy dependence on agriculture and its poor production potential: 60% population is Agri based.*
- *Ineffective implementation of disaster management strategies, policies, and programmes*

Flood Vulnerability in Nepal



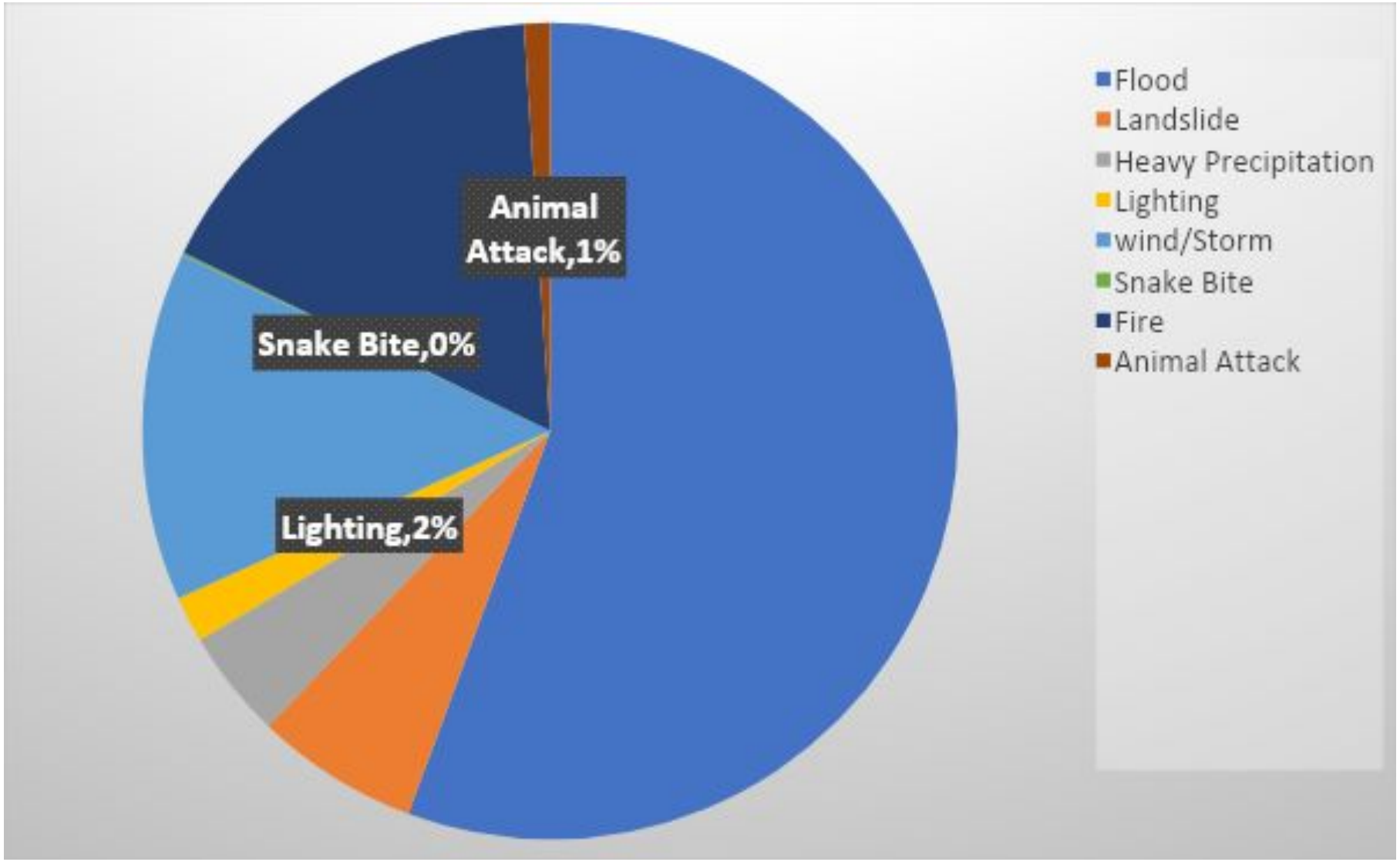
Casualties Due to Various Disasters in Nepal



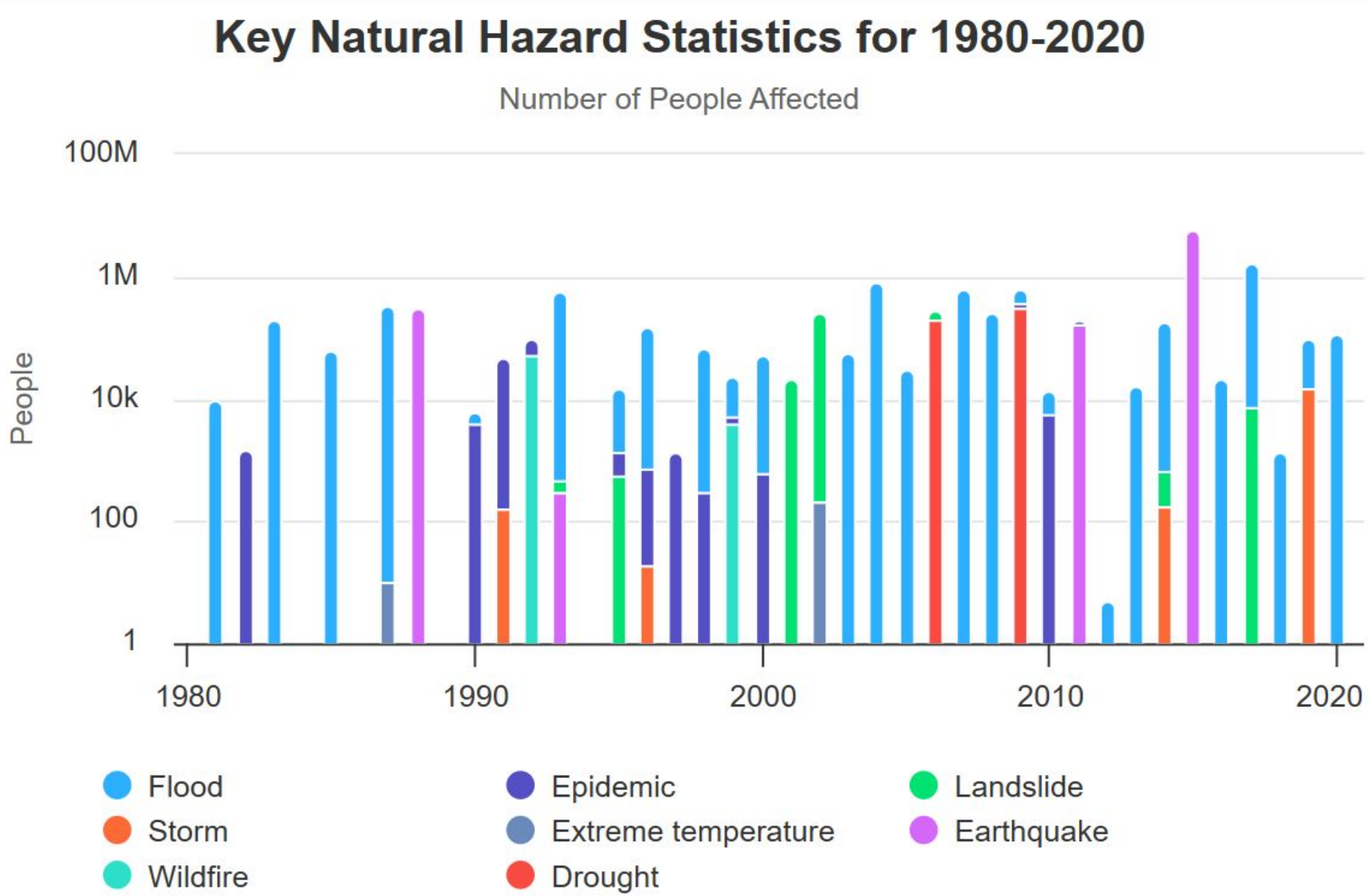


Source: NDRRMA

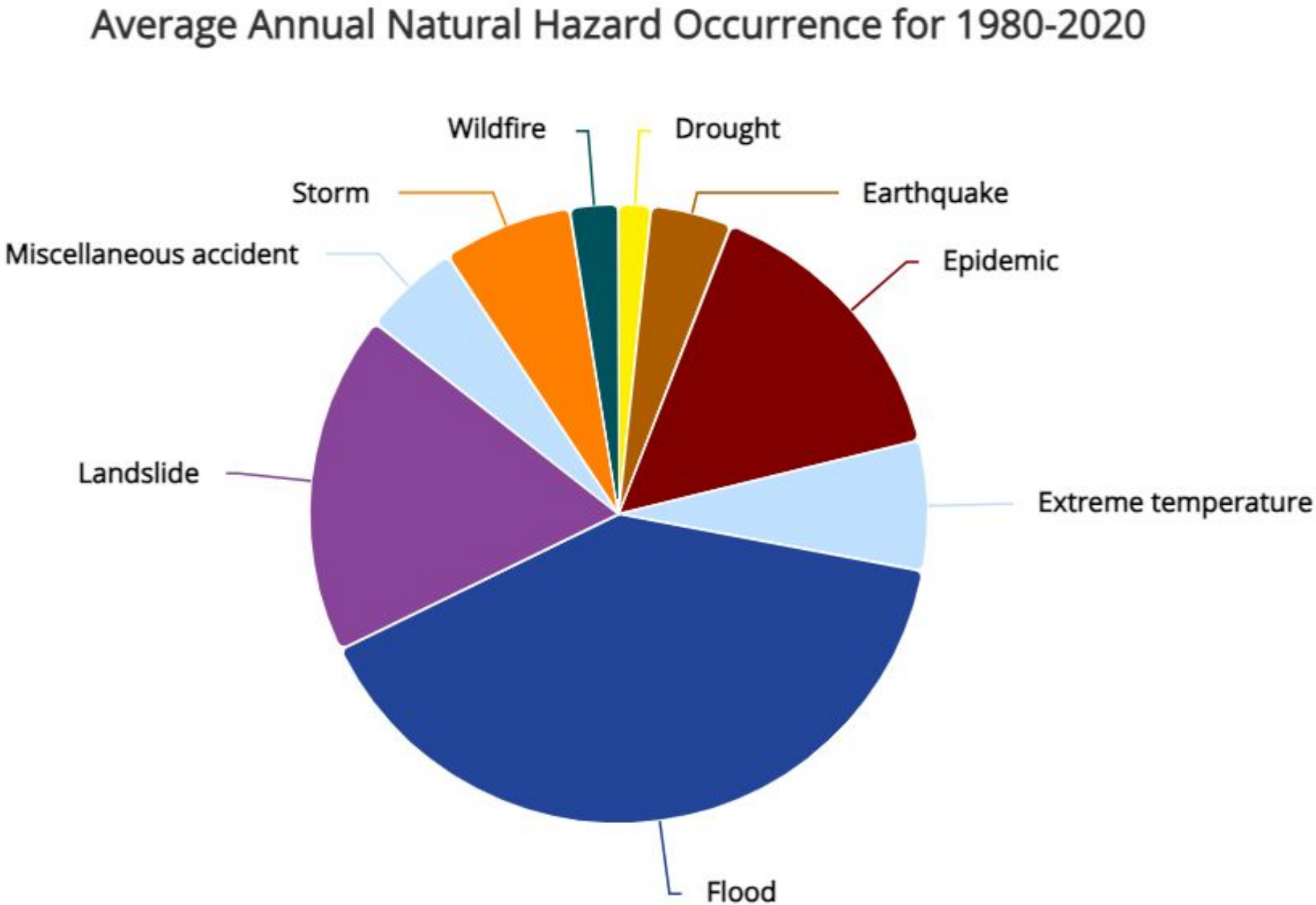
Disasters in Nepal- Affected Families



Source: NDRRMA



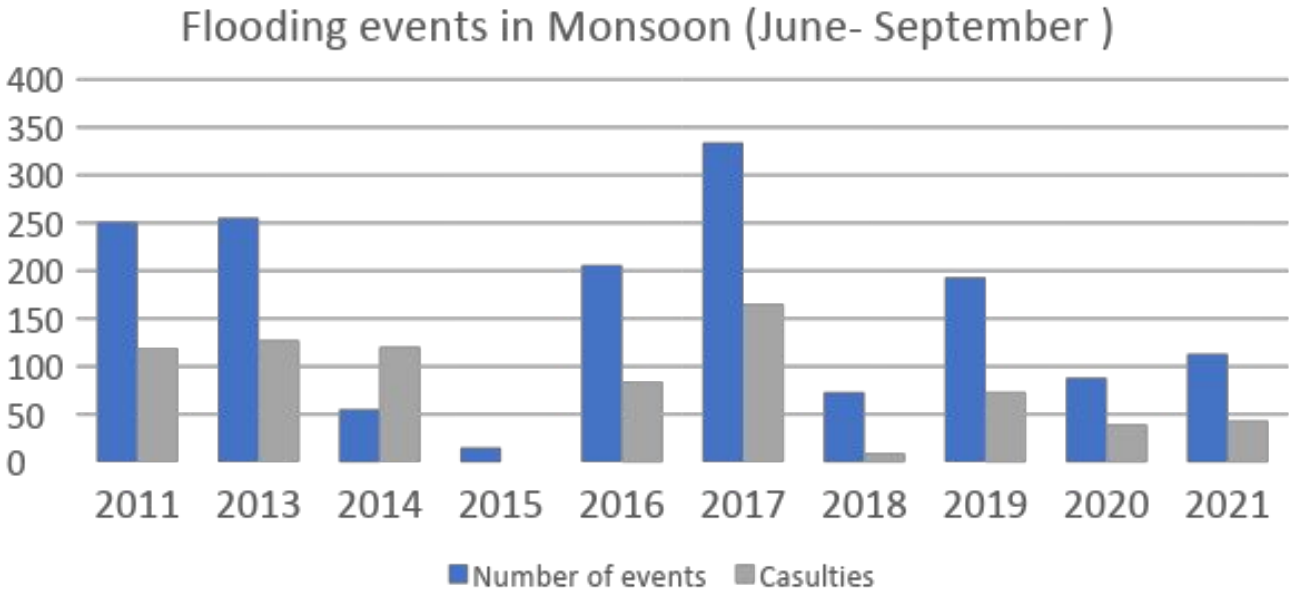
Source: https://climateknowledgeportal.worldbank.org/country/nepal/vulnerability

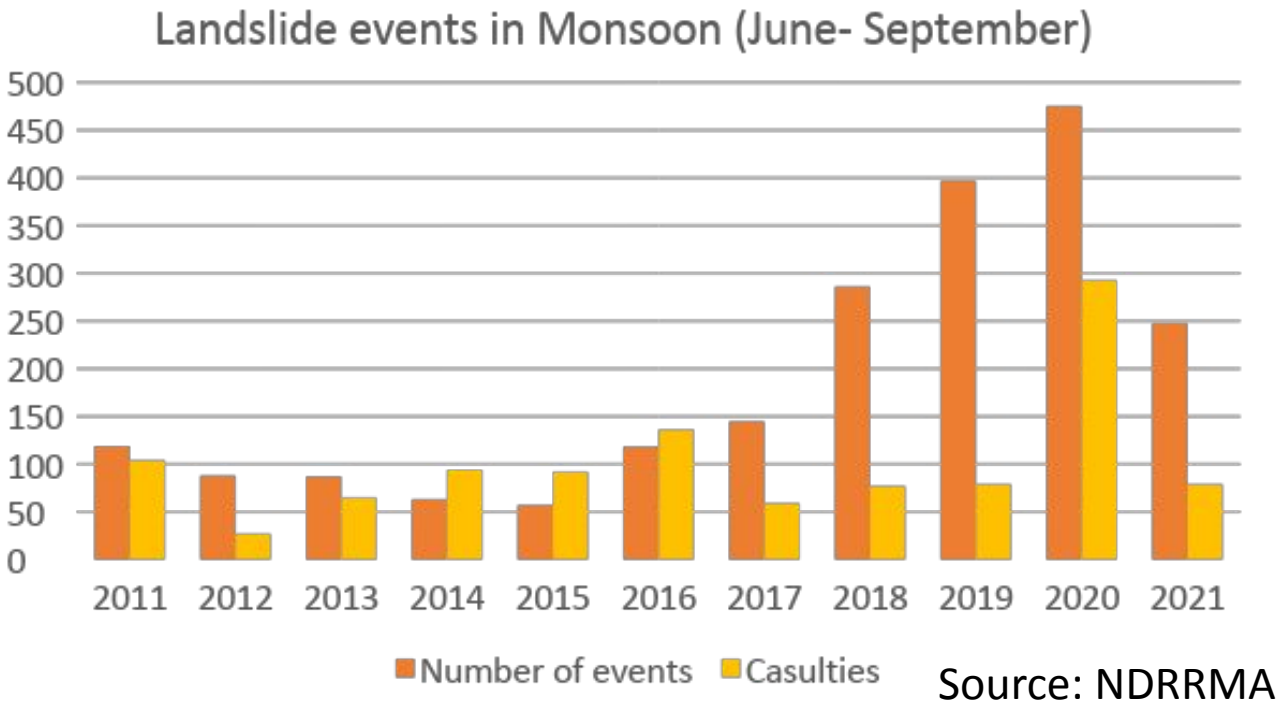


Source: https://climateknowledgeportal.worldbank.org/country/nepal/vulnerability

Normal Rainfall but Abnormal Disasters

Year	Forcast	Actual	Casualties-monsoon (all year)	
			Flood	Landslide
2010	Normal	Normal	119 (126)	104 (113)
2011	Normal	Normal	9 (9)	27 (68)
2012	Above normal (Below Normal in far west and south west)	Normal (Below normal in west)	127(131)	65 (79)
2013	Above normal	Normal	120(121)	94 (116)
2014	Normal	Normal	0(0)	92 (135)
2015	Below normal (normal in north west)	Below normal	84(101)	136 (147)
2016	Normal	Normal	165 (166)	59 (75)
2017	Normal(Below normal in Mid and Far West)	Normal(Below normal in Mid and Far West)	9 (17)	77 (88)
2018	Normal	Normal	73 (73)	79 (83)
2019	Normal Western half to below normal eastern half	Normal Western half to below normal eastern half	39 (42)	293 (301)
2020	Normal	Normal	43 (64)	79 (194)
2021	Above Normal	*Above Normal*		





Source: NDRRMA

Flood Risk and challenges

Details of Major Flood Events during last ten years

Kagbeni (Mustang) Flood (August 13, 2023): caused due to incessant rains washed away houses and infrastructures and destroyed livestock and crops causing **the economic loss of around 10 million dollars.**

Melamchi hazard (2021) : was initiated by intense rainfall in the upstream region which caused the cascading hazards along the river reach. **22 people died, 1500 household displaced, losses of 1% of National GDP**

Karnali Flood (2021) : extreme rainfall in the month of October, after the monsoon season is formally over, **damaged ready to harvest crops in 110,000 ha** of irrigated land and caused the devastating effect along with losses of infrastructure and productive lands.

Flood Risk and challenges

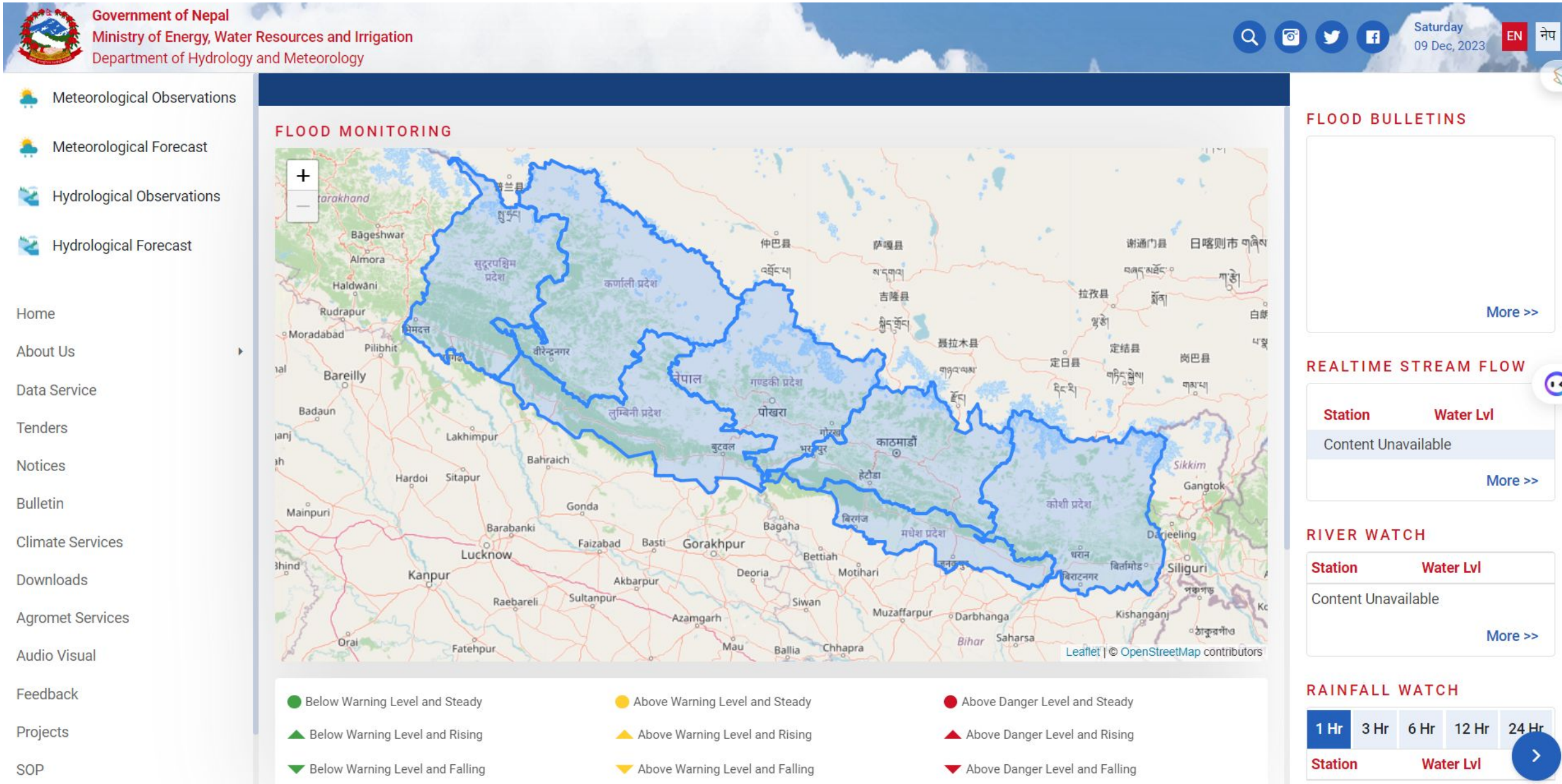
Details of Major Flood Events during last ten years

Bardiya Flood (2014) : unprecedent flood struck Nepal's Bardiya district where **3000 homes were destroyed while over 500 homes sustained damages .**

Seti River Flood (2012) : an avalanche event after intensive rainfall over three days near Machhapuchre mountain triggered a flash flood in the Seti River sweeping the settlements downstream causing loss of lives and severe damage to infrastructure and livelihoods. **72 people were killed, Over 1,000 people displaced**

Flood Forecasting and Early Warning System

https://www.dhm.gov.np/hydrology/floodMonitoring

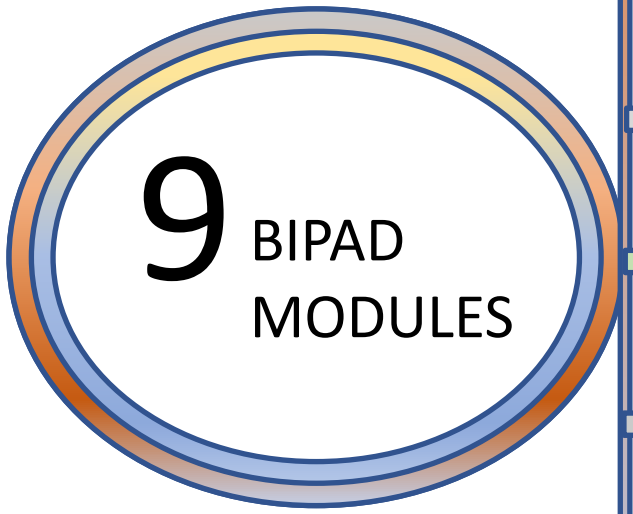


An Integrated Disaster Data Portal for MHEWS

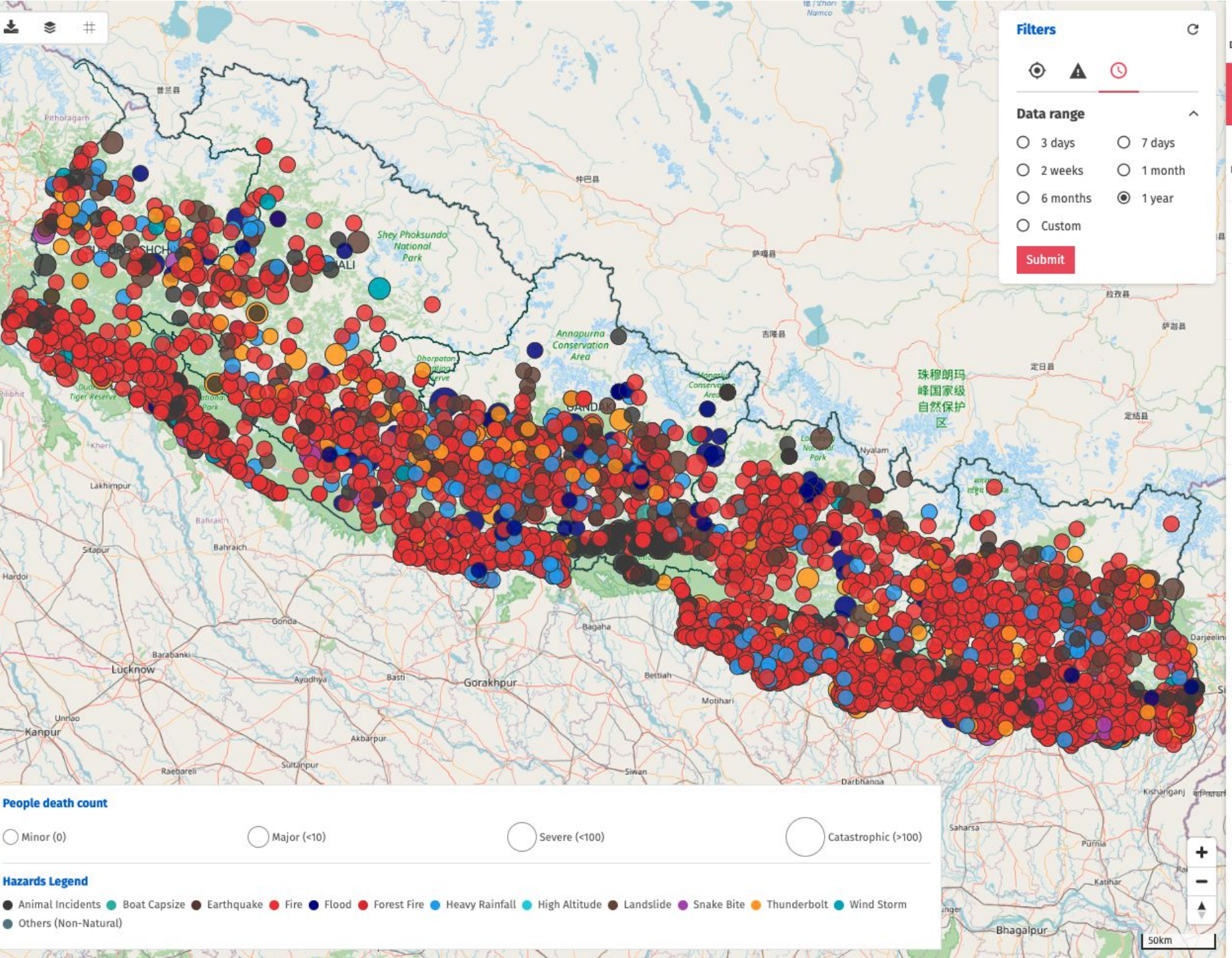
BIPAD PORTAL

Visualization of spatial and temporal data of alerts, incident, real-time, loss and damage along with hazard and risk information and climate change in a single platform

https://bipadportal.gov.np



Dashboard	Provides spatial and temporal alerts of potential hazards
Incident	Display incident reports
Damage and Loss	Historical database for loss and damage
Real time	Real time data of various hazards
Profile	Records of DRRM projects and other information
Risk Info	Repository of hazard exposure and vulnerability
Data Archive	Archives various data
VisRisk	Visualizing risk
IBF	Impact Based Forecasting

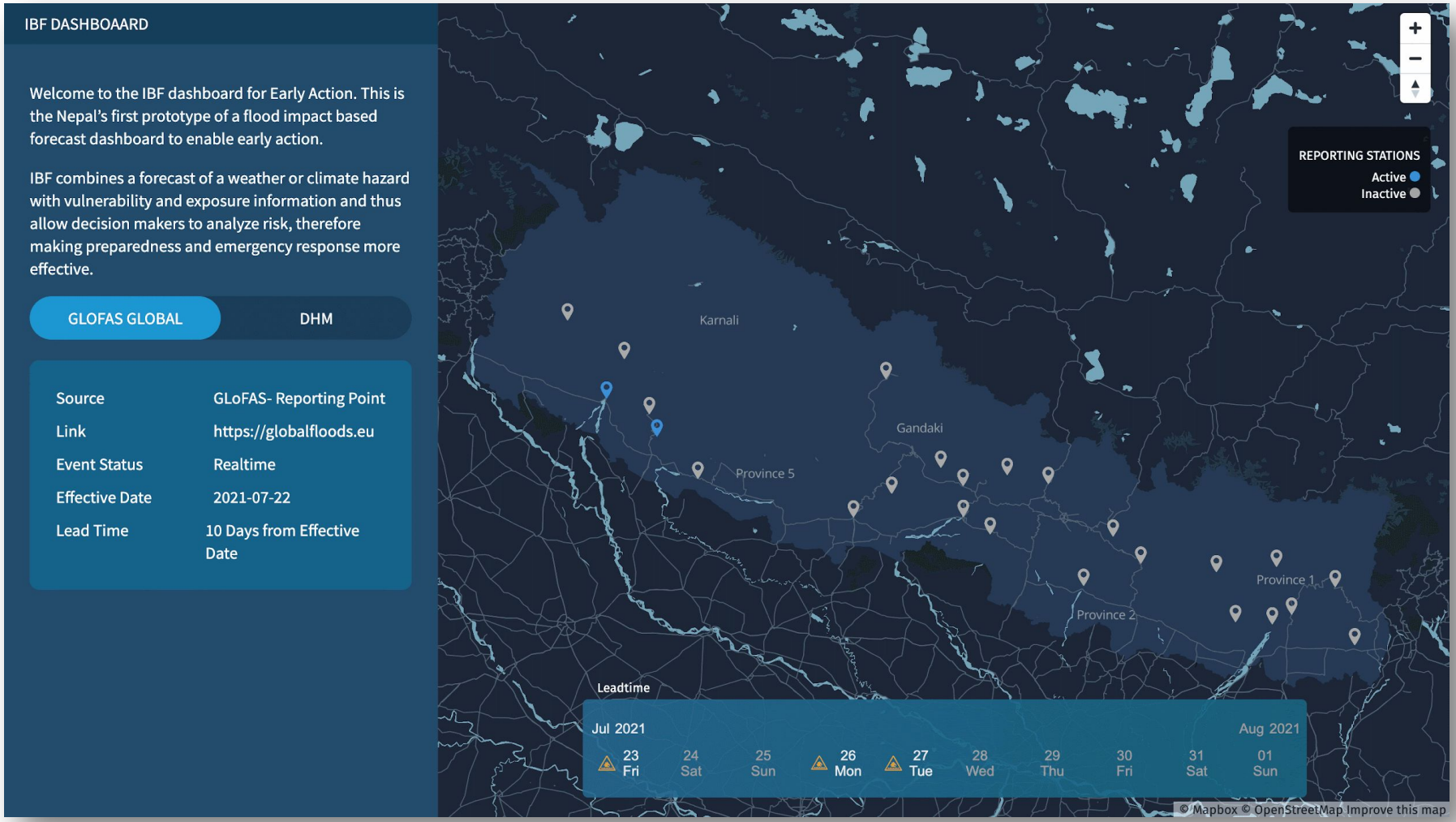


BIPAD Portal

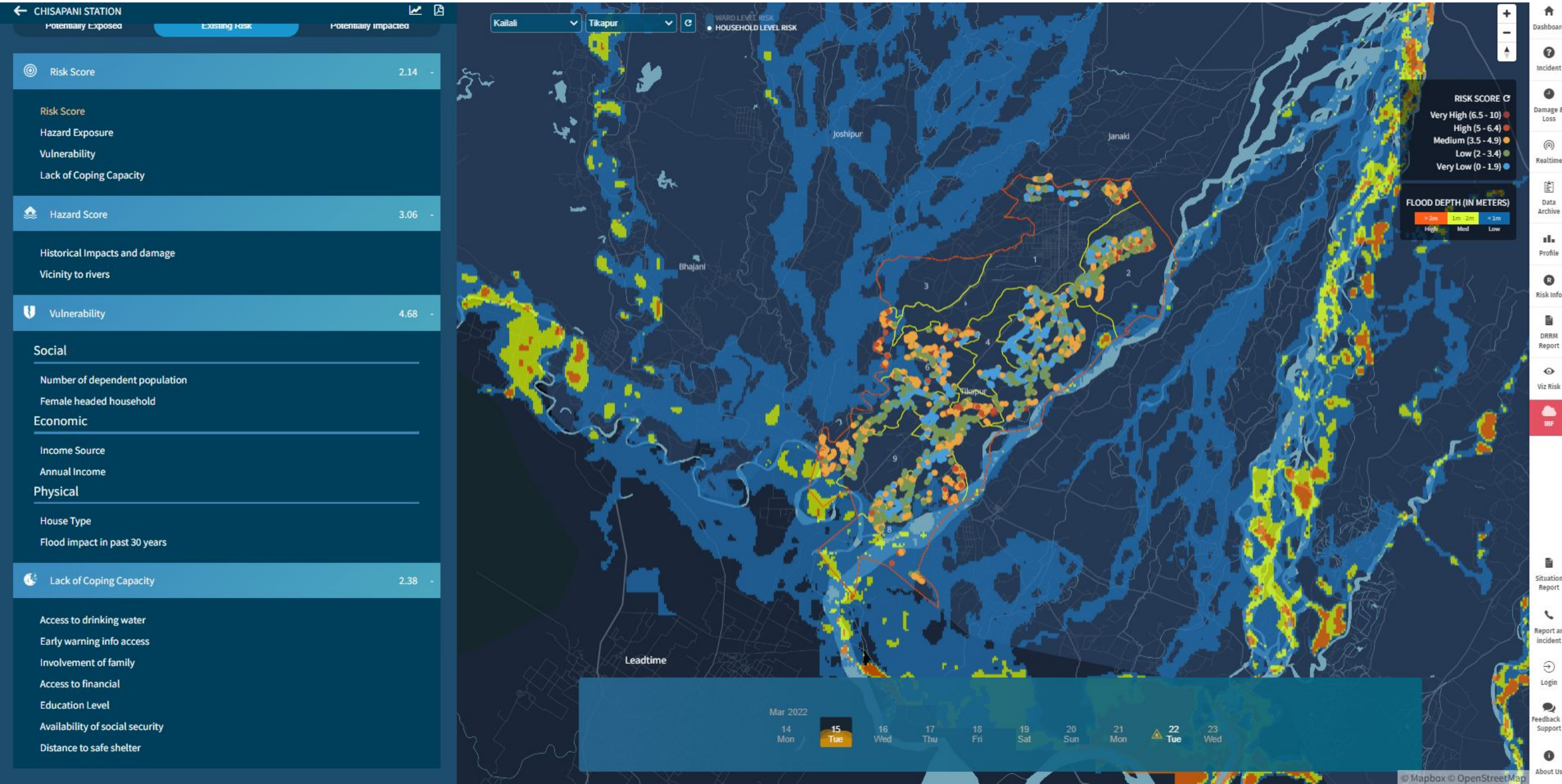
- Developed by the Government of Nepal, Ministry of Home Affairs
- Owned by National Disaster Risk Reduction and Management Authority
- Developed in coordination of steering committee & technical committee from 11 ministries
- Hosted in the Government server: https://bipadportal.gov.np/

Intervention Mapping: Where to Act?

- Impact-based Forecasting (IBF) dashboard in BIPAD Portal of the Government
- Integration of Flood Forecasts & Inundation Layers
- **Multi-criteria Risk Analysis** (Risk Scoring based on a set of indicators)
- Real-time **quantification of potential flood impact** level at the household level



Risk Indicators (Hazard, Exposure, Vulnerability, Coping Capacity)

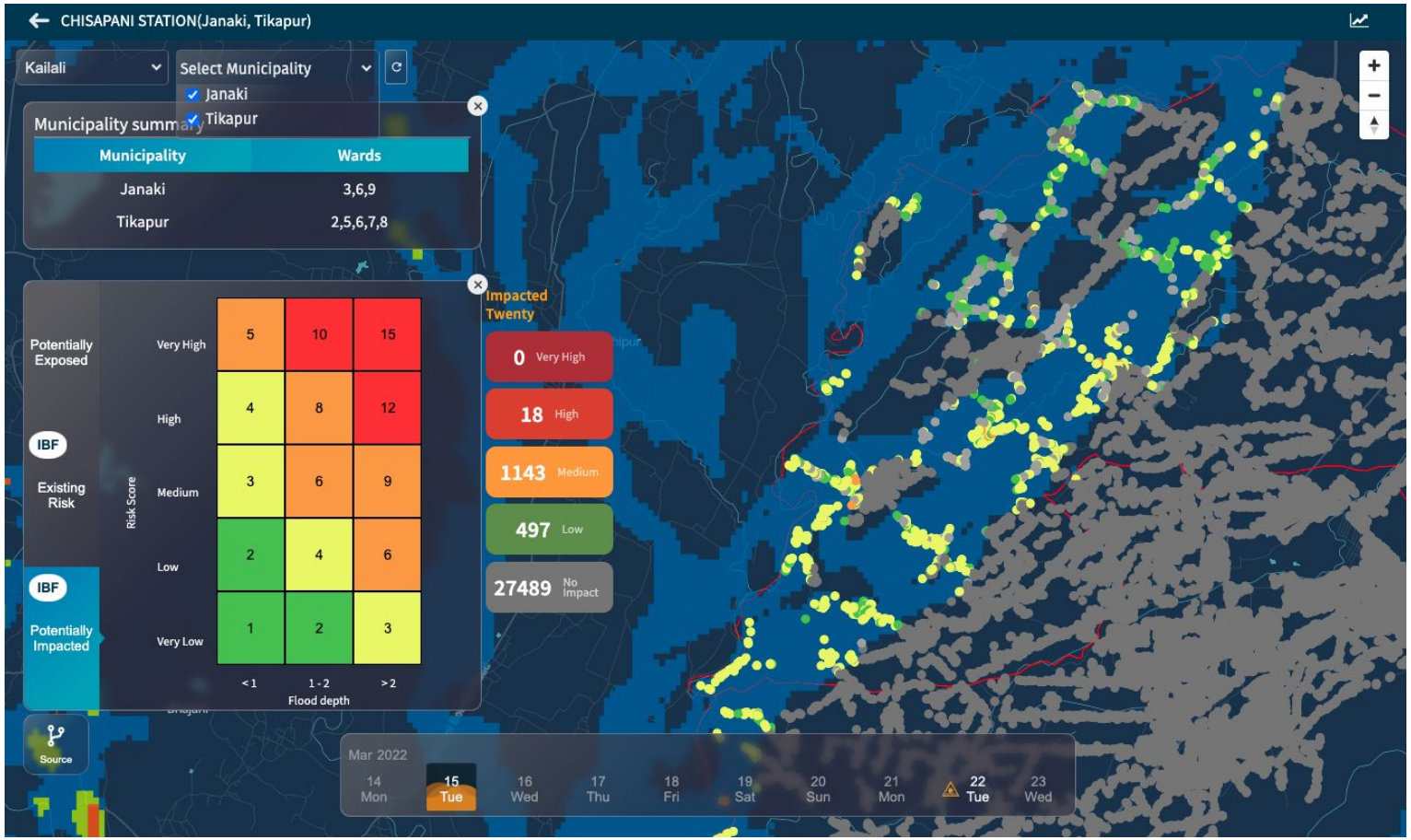


Quantifies & visualizes risk data

- **Exposed, vulnerable, at-risk, and lack of coping capacity** are quantified based on given indicators and score are visualized in a map
- Indicators are defined and risk score are calculated following the **INFORM Index** for Risk Management
- Helps to individually locate the most Hazard exposed, vulnerable, and at-risk household to prioritize for the risk-reduction and preparedness intervention

Quantifies & visualizes potential impacts

- Visualize **potential impacts,** for example, potentially impacted households of the forecasted Hazard events in near real-time.
- Potentially impacted households are derived using an **impact matrix**.
- Each household is given a color with **red, orange, yellow and green indicating very highly, highly, medium and low impacted household** respectively.

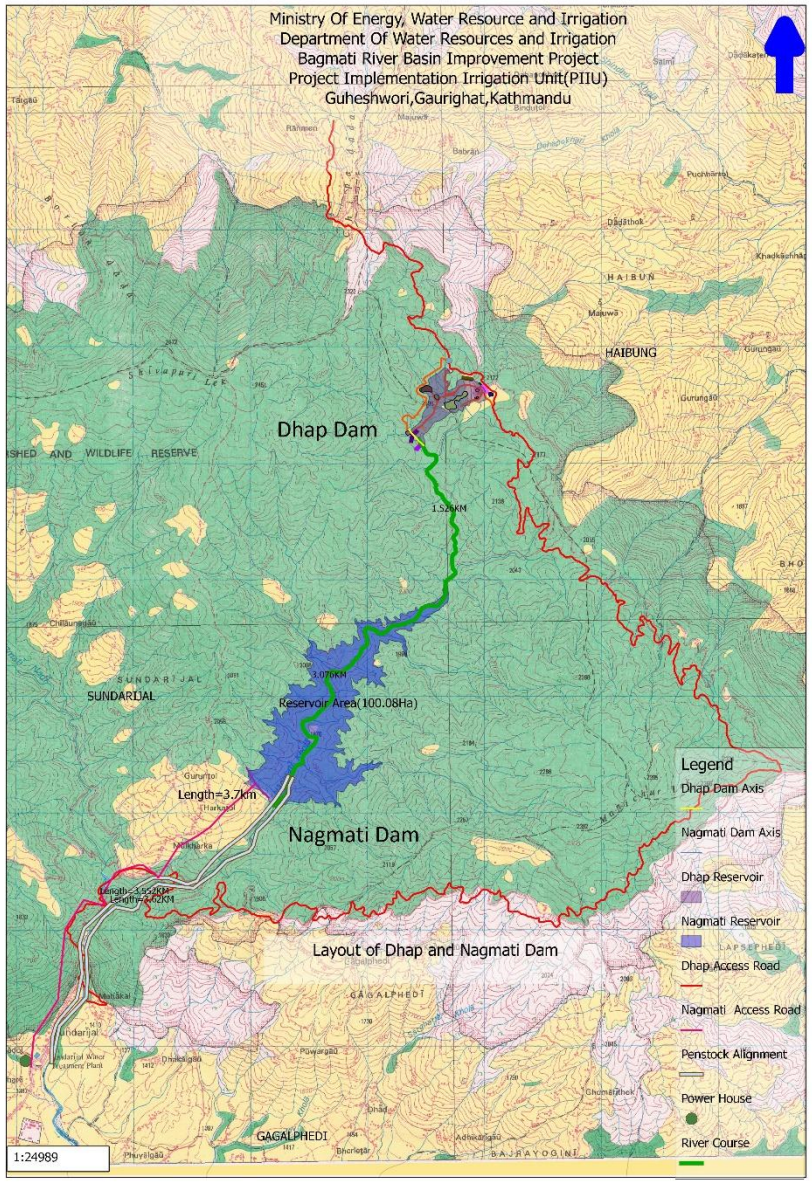


Untold stories of climate change loss and damage in the LDCs: Nepal

Source(s): International Institute for Environment and Development (IIED)

Integrated River Basin Approach for Flood Management

- High Power Committee on Integrated Development of Bagamti Civilization (HPCIDBC) has implemented Flood management in an Integrated River Basin Approach.
- The major initiatives are
  - Watershed management in the catchment area
  - Construction of Dam for ensuring dry season flow and controlling flood flow in the Bagmati River
  - Flood Protection walls and related river training works carried out.
  - Flood Forecasting and Early Warning System Established.



Community based solutions for Flood risk management

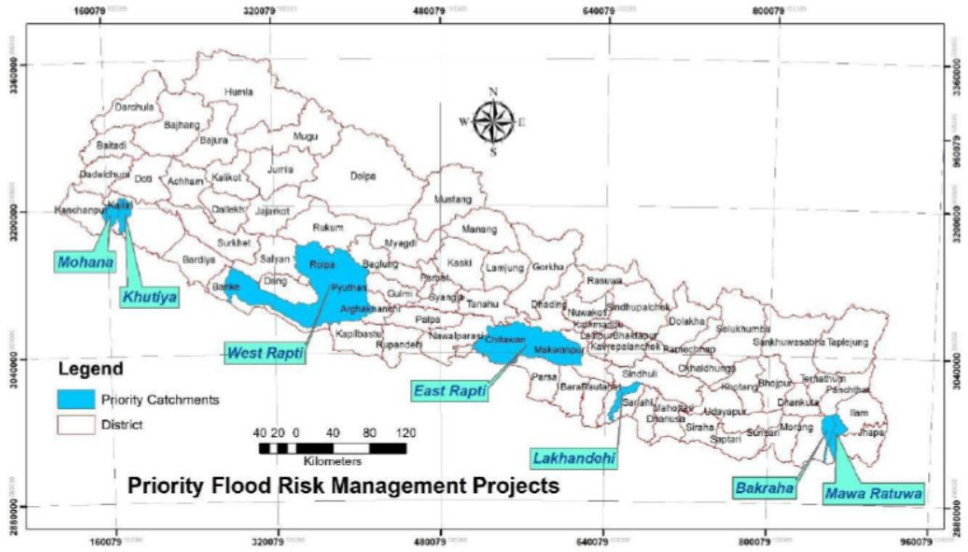
- Community Based Disaster Risk Management (CBDRM) Platform
- led by the Ministry of Federal Affairs and General Administration and the International Federation of Red Cross and Red Crescent Societies

Source: https://floodresilience.net/blogs/nepal-municipal-disaster-risk-governance-assessment-tool/

Flood Risk Informed Development

- Priority River Basins Flood Risk Management Project in western part of Nepal has initiated risk informed development in Nepal.
- River Training works have been planned to be integrated with Flood forecasting and Early Warning Systems in 6 Rivers in the Plains of N

Figure 8: Location of Priority Flood Risk Management Projects



Source: Project Feasibility Reports, 12 July 2019 Mott MacDonald

Source: Irrigation Master Plan 2019, Nepal

Thank you