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Bridging the Climate Finance Gap: Rethinking Sovereign Funding and Climate Adaptation in Himachal Pradesh

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Abstract

Post COP15, discourses on climate-change have transitioned from being termed as a probable environmental risk to an imminent real time threat causing worldwide destruction at an unprecedented scale. The ecological sensitive region of Himachal Pradesh has rapidly become a hotspot of climate-induced disasters experiencing extreme weather events, accelerated rate of melting glaciers and loss of agrarian land due to recurrent events of cloudburst induced flashfloods and landslides. In the last five years, extreme weather events in Himachal have caused enormous loss and damage leading to economic devastation across public and private infrastructures, with an estimated loss of ₹ 25,000 to ₹46,000 crore between 2020 and 2025. However, coping mechanisms for addressing this “climate finance gap” have been inadequate. The state’s access to fund the climate finance gap is limited to allocations received from central agencies like SDRF and NDRF. These institutions are marred by rigid disbursement processes that restrict funding to only cover short-term emergency relief and cannot be used for long-term climate-resilient rebuilding. Due to limited access to varied funding sources, as of 2026, more than 80% of the Himachal's recovery needs are undercapitalised. Consequently, the state's public debt has skyrocketed to over 40% of its GSDP as it has resorted to excessive borrowings to cover the basic sectors of public expenditure. Against this backdrop, this paper has attempted to identify structural and institutional gaps in Himachal's disaster prone economic landscape. It has critically analysed the present sources of funding that covers adaptation, resilience and relief efforts in Himachal. By investing in innovative financial tools such as Green Bonds, Public-Private Partnerships (PPPs) along with multilateral support, Himachal can effectively cover this funding gap and shift from short-sighted reactive disaster relief to a prudent, long-term climate resilience planning.

1. Introduction: The Epistemic and Semantic Shift in Post-2015 Climate Discourse

Over the last decade, the severity of climate change-induced risks has worsened and is directly impacting the daily functioning of economic and ecological systems at the local, regional, sub-national, national, and levels. Much of this change is unprecedented, and some, such as sea-level rise, may even be irreversible over the next century to millennia¹. For the tenth consecutive year, global temperature was at least 1°C above pre-industrial levels, and is expected to follow the same trajectory till 2050². These observational confirmations are not only concerning but have altered the way climate change was viewed and strategised a decade ago.

Prior to 2015, global leaders (including politicians, bureaucrats, policymakers), academia

and climate scientists viewed this as a far-off phenomenon. Discourses were mainly centered on their projected impacts and presented ‘very likely to happen’ scenarios over the long term. As a result, climate finance talks were not part of the main agenda and were often treated as a secondary concern, with academic and policy attention shifting significantly toward financial mobilization only after the Paris Agreement³. Due to these misplaced priorities, the global community was nonchalant about diverting unified efforts towards mitigation and recovery.

Ever since the Paris Agreement in 2015, commonly referred to as COP15, discursive framing of climate change has changed markedly. It is no longer perceived as a probabilistic ecological risk but as a real-time concern due to its heightened destructive intensity, with cascading impacts on economies, cities, and ecosystems from micro to macro scales. The developing nomenclature of the Intergovernmental Panel on Climate Change (IPCC) clearly demonstrates this change as it has shifted its lexicon. In its Sixth Assessment Report (AR6), IPCC does not limit climate change to long-term changes in climatic averages but to persistent, statistically significant changes in the mean state and variability of the climate system⁴.

This evolution between definitions is epistemic and semantic. From AR6, past divisions of “detection” and “attribution” have collapsed into a clear statement of fact that human activities have increased the temperature of the atmosphere, ocean, and land, and every additional degree of warming would increase climate risks in all regions. Climate change has gone from a future threat to the present, impinging on socio-economic development, heightening various risks, and, at scale, affecting regional, sovereign, sub-sovereign, and local governance. Climate adaptation should not be seen as an afterthought environmental agenda, but rather as a basic structural condition in today's economic and development agendas. Although no region is impervious to the effects of climate change, the repercussions vary among populations, even within relatively small geographies, due to a variety of social, economic, political, environmental, and geographic factors⁵.

Table 1 shows that climate vulnerability is multidimensional rather than solely biophysical. Apart from exposure to natural hazards, the intensity of climate impacts is also contingent upon income levels, robustness of institutions, social inclusion, reliance on climate-sensitive sectors, and geographical risk. The above context is imperative for Himachal Pradesh because the effects of climate-related disasters are severe, given the state's dwindling economic indicators, its dependence on agriculture and tourism for jobs, and its constrained ability to adapt.

Table 1: Himachal’s positioning with regard to Multidimensional Impacts of Climate Vulnerability⁶

Biophysical Exposure	Exposure to climate hazards like floods, droughts, landslides, glacial retreat	HP climate risk vulnerability index is quite high (e.g., rapid glacial melt, GLOFs, cloudbursts, landslides)
Economic Dependence	Highly reliant climate-sensitive sectors - agriculture, tourism, hydropower	HP's economy is highly dependent on agriculture/horticulture (54% workforce dependency), tourism, and hydropower, all severely impacted by hydrological volatility
Socio-Political & Institutional	Institutional robustness, social inclusion, governance capacity, disaster response effectiveness	HP has a high Climate Finance Gap, leading to high fiscal deficit rates and excessive reliance on borrowings/central funds
Income & Financial Capacity	Income levels, fiscal deficits, sovereign debt, ability to finance adaptation/resilience projects	State liabilities is approx. 40.5% of GSDP; high fiscal deficit limits concerted efforts towards investment in climate resilient infrastructure
Geographical Risk	Delicate topography, fragile ecosystems, isolated settlements, connectivity issues.	Fragile Himalayan terrain, highly localized and uneven vulnerability, and destruction of key access roads compound risk and impede disaster management response/recovery

Climate change has already shifted from a likely future threat into a current fact of life. It has a direct bearing on socio-economic development, aggravates geopolitical risks, and puts to the test regional, national, sub-national, and local administrative structures at various scales. Through this contemporary lens, climate adaptation needs to be seen as part of a bigger agenda than a siloed environmental one. Rather, it must be institutionalized as a basic, non-negotiable structural condition in all contemporary macroeconomic and development planning.

While no geographic area on the planet is immune to climate change’s physical impacts, the socio-economic consequences vary widely across populations, even within small, contiguous areas. The impacts of climate change threaten to actively undermine decades of poverty alleviation and structural economic development initiatives in the absence of timely, well-theorized, and adequately capitalized adaptive action⁷.

2. Profiling the Climate Risk Hotspot: Biophysical Destabilization in Himachal Pradesh

Himachal Pradesh has encountered unprecedented events of intense climate-induced disasters in modern human history. In this mountain state, climate change is not a theoretical projection but an “economic and administrative new normal”. Between 2015 and 2025, this state has transitioned from experiencing moderate climate-induced stress to being recognised as an acute “climate-risk hotspot.” HP State Economic Surveys and localized risk assessments by renowned think tanks⁸ have noted that the biophysical destabilization of this fragile Himalayan region has accelerated over the last decade. Average annual temperatures have risen by 1.5°C since 1901, triggering a rapid retreat of glaciers (over 50 meters annually) and deeply reshaping the state's hydrological cycle⁹.

The Himachal Pradesh Human Development Report 2025: Building the Future in a Climate-Impacted World, prepared by the Government of Himachal Pradesh in strategic cooperation with the United Nations Development Programme (UNDP)¹⁰, very clearly identifies Himachal Pradesh as one of the national-scale “hotspots of risk”. The following data, as presented in this report, shows:

- Major glaciers are now receding by more than 50 meters per year, every year. Due to ongoing glacial melting, water levels in high-altitude, ecologically vulnerable areas have risen to dangerous levels. Far from being benign environmental phenomena, these profound biophysical changes are significant and, to a degree, relatively predictable.
- At the same time, dramatic shifts in regional rainfall patterns, along with considerably warmer surface temperatures and longer droughts, have led to a rapid increase in wildfire occurrence and intensity. Recent data reveal that reported forest fire cases increased in the last three years, from 856 to 2,580.
- Kullu, Mandi, and Hamirpur have become the epicenter of hydrological volatility. These districts reported the heaviest monsoon rainfall in 2023 since the previous century.
- A vast chunk of prime agricultural land (approximately thousands of hectares) has been permanently lost to severe soil erosion and riverbank washouts, mainly along the Beas and Sutlej river valleys. Particularly in the Sutlej basin, the number of glacial lakes has surged dangerously from 562 in 2019 to 1,048 in 2023, exponentially raising the threat of GLOFs.

It is evident that there is a direct correlation between the rising number of these climate hazards and climate-induced loss and damage in Himachal Pradesh. Before 2020, the state's localized landslides and seasonal flooding caused major financial damage but were manageable within existing disaster response structures. However, the post-2020 period transitions towards a violent inflection point. Heavy cloudbursts, disastrous flash floods, and massive rains triggered landslides, causing unprecedented, multi-sectoral devastation across the state and resulting in approximately 1700 deaths between 2023 and 2025¹¹.

Table 2: District Level Key Climate Risk Analysis from 2015-2025¹²

Time Period	Highly Vulnerable Districts	Key Climate Risk	Estimated Annualized Loss
2015 - 2019	Kinnaur Lahaul-Spiti Shimla	Accelerated glacial melt begins; 562 glacial lakes recorded in Sutlej basin (by 2019); seasonal landslides	Baseline / Moderate Impact
2020 - 2022	Kangra Chamba Sirmaur	Unpredictable snowfall; baseline temps rise; 856 forest fire incidents (2022-23); agriculture/horticulture losses	Escalating to Severe Impacts
2023-2024	Mandi Kullu Hamirpur	100-year return period rainfall extremes; Glacial lakes double to 1,048; severe Beas & Satluj valley erosion	> ₹10,000 Cr (Inc. ₹822 Cr Agrarian)
2024 - 2025	Statewide	2,580 forest fire incidents (2024); violent cloudbursts/flashfloods and 486 fatalities in 2025 monsoon Statewide fatalities till 2025: 1700+	₹46,000 Cr Cumulative (2022-25)

Data from the Himachal Pradesh State Disaster Management Authority (HPSDMA) indicates that Himachal Pradesh incurred approximately ₹25,000 crore in direct disaster losses between 2018 and 2025 (refer to Table 3). On the other hand, estimates from the Himachal Pradesh Human Development Report (2025) suggest that total climate-related losses (including indirect and chronic impacts) amount to nearly ₹46,000 crore (this estimation also includes economic cost of climate change covering productivity losses, livelihood disruption, and ecosystem degradation), costing 4% of the state's annual Gross Domestic Product (GDP). In 2023, agricultural and tourism losses amounted to around ₹822 crore and ₹264 crore, respectively. By 2025, these damages are estimated at ₹5,400 crore (approx. US\$653 million). As climate risks have increased, as of today, the state's fiscal deficit and total liabilities have ballooned to nearly 40.5% of Gross State Domestic Product¹³, proving that increasing climate vulnerability directly undermines state socio-economic development.

Table 3: Disaster Loss vs Indicative Funds Received in Himachal from 2018-2025¹⁴

Year	Official Disaster	Funds Allocated(SDRF+ NDRF) (₹ crore)	
	<u>Losses (₹ crore)</u>		
2018-19	1594.01	273.00	<u>SDRF + NDRF</u>
2019-20	1583.75 (346.70+1237.05)	287.00	<u>SDRF + NDRF</u>
2020-21	865.19	363.20	<u>SDRF + NDRF</u>
2021-22	1363.29 (211.59+1151.7)	363.20	<u>SDRF + NDRF</u>
2022-23	2773.63 (2516.82+256.81)	380.80	<u>SDRF + NDRF</u>
2023-24	9905.77	2006	<u>NDRF + SDRF</u>
2024-25	1613.50	486.92	<u>SDRF (MHA/PIB)</u> 420 SDRF +66.92 NDRF
2025-26	5909.30	1625.63	<u>SDRF + NDRF (PIB)</u> 441.60 (SDRF) +107.15 (NDRF Natural Disasters)+23.52 (NDRF Fire Services) +1053.36 (NDRF PDNA)
Year	Official Disaster	Funds Allocated(SDRF+ NDRF) (₹ crore)	
	<u>Losses (₹ crore)</u>		
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2022-23	2773.63 (2516.82+256.81)	380.80	<u>SDRF + NDRF</u>
Total (2018-2025)	25608.4	5785.75	
TotalTotal (2022-2025)	46000		Himachal Pradesh HumanDevelopment Report 2025

Himachal incurred an average annualised loss of ₹1636 crores from 2018-2022 (refer to Table 3). This relatively stable pattern breaks after 2022, with overall losses at around ₹10,000 (six times the pre-2022 annual average). The impact of this economic devastation was not proportional across the state; it was hyper-localized, tearing through distinct geographical vulnerability zones with different hazard profiles¹⁵(refer to Table 4):

- **Hydrological Epicenters (Kullu and Mandi):** These two districts accounted for half of the state’s total financial losses in 2023. The regional tourism economy suffered immensely after critical sections of NH-3, damaged by extreme rainfall, were completely destroyed¹⁶. In Mandi, inundated waters and silt deposition showed their destructive face on key hydroelectric projects, including the Pandoh dam, as well as on centuries-old apple orchards and agrarian topsoil¹⁷.
- **Urban and Industrial Corridors (Shimla and Solan):** Heavy rainfall caused widespread land subsidence and deadly urban landslips, including the Summer Hill collapse of Shimla. In Solan, recurrent breakdowns of the Kalka-Shimla NH-5 were paralyzing critical industrial transport and commercial real estate activities¹⁸.
- **High-Altitude Cryosphere (Kinnaur and Lahaul-Spiti):** Damages in these remote districts were reported due to various types of hazards. This rapid warming also triggered GLOFs and large-scale avalanches, as well as unseasonal snowfall that shredded vulnerable cash crops and paralyzed strategic border road networks for long durations¹⁹.
- **Agricultural Basins (Kangra and Sirmaur):** They suffered losses to key connectivity infrastructure and agriculture. Heavy flash floods in the Giri and Chakki river systems swept away vital rural irrigation networks, inundated paddy fields, and damaged railway infrastructure.

Table 4: Indicative District-Level Loss Breakdown (Aggregated 2022-2024 Estimates)²⁰

District	Primary Hazards	Climate	Sectoral Impact
Kullu	100-Yr Flash floods		destruction of NH-3, tourism
	river), Cloudbursts		infrastructure washout, apple orchard erosion.
Mandi	Riverine Landslides	flooding,	Hydro-project siltation/damage, Pandoh damstress, severe agrarian land loss.
Shimla	Urban Subsidence	landslides,	High human fatalities (Summer Hill collapse),critical municipal infrastructure, roads.

Solan	Landslides, Extreme rainfall	Industrial disruptions, highway collapse(Kalka-Shimla NH-5), commercial real estate.
Sirmaur	Flash floods (Giri river), Agrarian stress	Crop destruction, rural road network collapse,livestock mortality.
Kangra	Flooding, High-intensity rainfall	Major bridge collapse, damage to irrigationnetworks and paddy fields.
Kinnaur & Lahaul-Spiti	GLOFs, Avalanches, Unseasonal snow	Apple/cash crop failure, border road blockages,telecommunication blackout.
Others (Hamirpur, Una, Bilaspur)	Flash floods, Soil erosion	Rural housing collapse, drinking water supplydisruption.

3. The Climate Finance Gap: Fiscal Deficits and the Erosion of Human Development

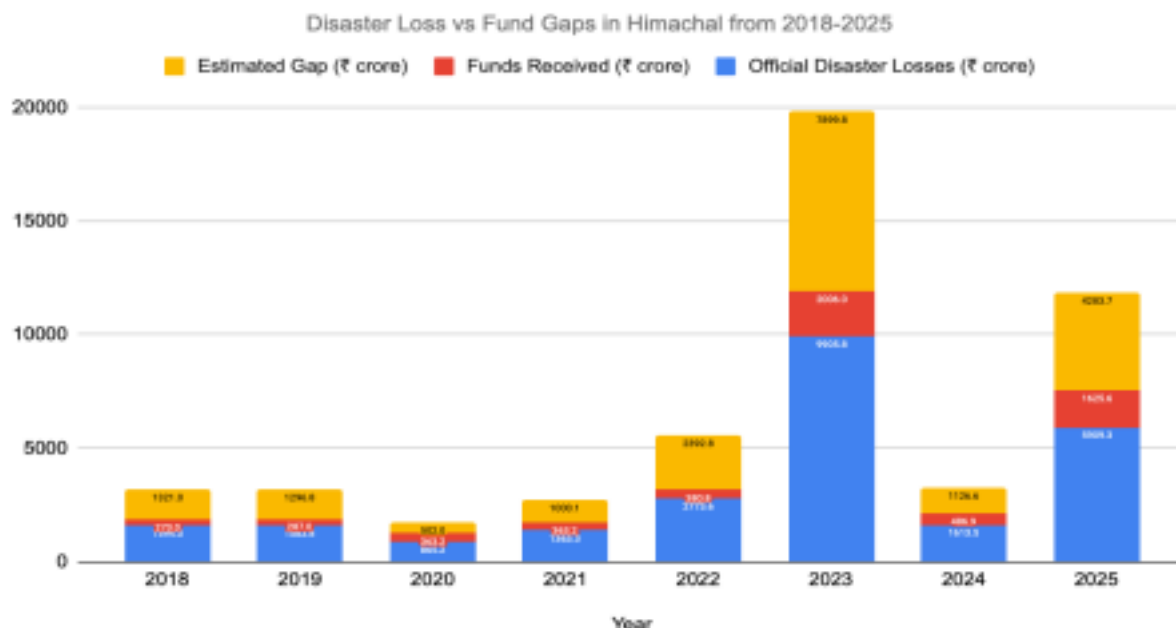
Disaster recovery in Himachal Pradesh critically depends on the State Disaster Response Fund (SDRF) and the National Disaster Response Fund (NDRF). This federal financing architecture has not kept pace with the proportion of damage to the state caused by climate-related disasters. Approved allocations vis-à-vis disbursed funds through this institution are disbursed strictly in accordance with rigid, ancient decrees. One major limitation is that allocations disbursed through this body cannot be used for long-term, climate-resilient reconstruction. It places restrictions on capital funding for immediate emergencies such as clearing muck and rubble, restoring basic road infrastructure, and providing makeshift shelter to the affected.

The result is a huge “scale gap” for the state. This has been evident from the trajectory of funding patterns received by the state from these institutions. Data shows that, while climate-induced disasters have caused systemic damage of thousands of crores (reported losses of ₹10,000 - ₹12,000 crore approximated in 2023), central subsidies cover only a fraction of these costs. The analysis of the relationship between disaster-related losses and the funds received by Himachal Pradesh from 2018 to 2025 shows a persistent and growing gap in climate finance (refer to Graph 1).

Since 2022, economic losses from disasters have increased exponentially, whereas endowments have been sub-optimal, thereby affecting the overall growth trajectory of this hilly state. In the years 2018-2022, irrespective of disaster severity, yearly allocations have consistently remained in the ₹300-₹400 crore range. In 2023, the total losses and damages incurred by the state have crossed a jaw-dropping Rs 10,000 crore, with only about 20 percent of this amount paid to date under central assistance. That left a financing gap of more than 80 percent, or about ₹8000 crore. In 2025, too, a similar pattern is seen, with more than ₹5900 crore in losses offset by less than ₹1625

crore in SDRF and NDRF assistance overall.

Graph 1: Disaster Loss versus Fund Gaps in Himachal from 2018-2025



Meanwhile, a CAG report recently said that the utilization and reporting of funds amounting to ₹254.73 crore in central assistance were being blocked. Analysis from the CAG 2023 report points to several reasons for the non-dispersal of funds.

- The Central government wants accountability before allotting more funds and releases funds only after receiving strict “Utilization Certificates” (UCs) — proofs of expenditure on earlier funds. In a disaster-hit state, administrative delays are more pronounced, and as a result, overextended local administrations are often unable to file them promptly, which delays fund release or results in funds being held.
- NDRF and SDRF have rigid federal spending rules for these allocations. Central auditing agencies often flag state-level departments that use emergency triage funds for permanent, long-term rebuilding, leading to funds not being released or to their accounts being frozen. Third,
- If the funds are not forthcoming from the Centre anytime soon, the state government will need to deposit a 10% matching share for the disbursement of federal funds, which, in Himachal’s case, is also likely to be delayed periodically due to a severe fiscal deficit.
- Finally, during ongoing disasters, the state’s administrative machinery is overstretched in implementing projects under stringent financial deadlines.

All in all, such stringent compliance mechanisms have not only reduced the state's overall funding but also impeded essential recovery work at the district level. Consequently, the financing provided for disasters is only a tiny fraction of total losses,

at best within 10%-20% range, through formal disaster funding processes. Because these funds don't cover the real reconstruction costs of pulverised infrastructure and allocated funds are not discovered on time, the state is forced into a vicious cycle of high-interest sovereign borrowing to fill the gap. Consequently, Himachal is battling with economic slowdown amid growing scale and frequency of climate-related disasters that have taken a toll on the state's public finances and resulted in:

- **Rising Debt:** The state's public debt reached 44.3% of its GSDP by 2022-23. In 2025, the fiscal deficit and total liabilities of Himachal are around 40.5 per cent of GSDP.

Himachal Pradesh may have human development indicators and per capita income levels traditionally higher than the national average, yet perennial climate disruptions have led to a brutal reactionary redistribution of state capital. The government is structurally compelled to redirect financial resources away from investments in critical infrastructure (such as tertiary level health care facilities and high-level education over the long term) to emergency relief logistics/rehabilitation activities and interest payments on disaster relief debts that just keep piling up. This forced macroeconomic myopia - where immediate short-term survival takes precedence over any long-term developmental strategy- is what threatens to significantly depress its Human Development Index (HDI) ranking on a national scale. Ultimately, these unmitigated and ongoing economic losses artificially suppress real economic progress. The latest State Economic Survey shows clearly that real GSDP growth is slowing significantly from baseline growth rates for the decade prior to the global pandemic. A regional economy cannot prosper when its entire fiscal policy framework is permanently bound to ongoing reactive disaster recovery efforts because then even years of painstakingly hard-won developmental gains could be virtually wiped out in just one extremely violent monsoon season. It is clear that Himachal has entered a phase of acute climate instability, and the scale-up immediately makes a strong case from a policy perspective, given the climate financing gap. Moreover, there is a need to shift from reactive disaster finance to proactive investment in climate resilience.

4. Bridging the Gap: Innovative Financial Instruments

A major policy conundrum for Himachal Pradesh is not just the lack of available climate finance, but also how that money is structured. This is based on the fact that disaster losses do not match available public funding. As analysed in the preceding section, the present disaster funding institutions, SDRF and NDRF, have not been able to fulfill the climate funding gap as they are marred by corpus limitations and procedural ambiguities. Therefore, it becomes imperative to think about the current financial dynamics and chalk out a sustainable pathway for the state so that it can raise more money without worsening its government budget or becoming overly dependent on external borrowing that is leading to a persistent pressure of a heightened fiscal

stress.

The present climate finance landscape is misaligned with spatial and temporal trajectory of climate risk in Himachal Pradesh. Climate-induced loss and damage have multiplied and become a recurring ritual every monsoon season. On the other hand, the current relief financing is sub-optimal, takes a long time to get credited in the state's kitty, and its usage is often limited to quick, short-term reactive relief. Moreover, even large multilateral inflows are not large enough to fill the annual financing gap. To top it off, the state's excessive reliance on borrowing is making it more vulnerable to falling into the quagmire of high fiscal deficit in contrast to dwindling levels of revenue generation, thereby impeding the socioeconomic growth trajectory. .

In these concerning circumstances, ongoing dependence on traditional means of borrowings or improvised budget reallocations is neither feasible nor economically cost effective. Taking inspiration from states like Maharashtra and Gujarat, Himachal Pradesh is advised to adopt and implement a diversified climate finance strategy for securing its future and making it climate proof.

Apart from exploring funding and off-budget borrowings through traditional multilateral mechanisms, the state should tap into new and innovative financial tools such as green bonds, and mobilising private capital through the Public Private Partnership (PPP) framework.

4.1 Multilateral Funding c

Multilateral funding institutions cover an array of financial models like Development Finance Institution (DFI), Multilateral & Bilateral Development Banks (MBDs/BDBs), Bilateral/Multilateral Development Aid Agencies, National DFIs, and State government agencies to list a few. DFI provides long-term, concessional loans, often refereed as blended finance having a grant element of around 35% as per World Bank, for high risk projects²¹. Bilateral and Multilateral Development Aid Agencies provide grants to developing nations to recover from loss and damages caused by climate-induced disasters. Similarly, every country has National DFIs (or domestic DFIs) and they too provide concessional loans and grants to the state governments as a part of their disaster risk finance funding. Domestic DFIs in India include agencies like NABARD (National Bank for Agriculture and Rural Development), IREDA (Indian Renewable Energy Development Agency), SIDBI (Small Industries Development Bank of India), and National Disaster Management Authority (NDMA)- it monitors funding through NDMF and SDMF. In sum, the climate finance framework in India covers a vast variety of financial institutions that operate at multi-tiered levels of governance. Table 4 shows the current climate finance architecture in India extracted from the latest report of INECC²².

Table 4: Current Architecture of Climate Finance in India

Category	Key Entities / Funding Mechanisms
Government Budgetary Support	Budgetary Support to National Missions and other Climate Action
Government Budgets	Central Government and State Government Budget (including off-budget borrowing)
Domestic Climate Funds	NAFCC, CCAP, NCEF, NAF, NDRF, CAMPA, etc. (Funded by Union Budget and Cesses)
Domestic DFIs	SIDBI, NABARD, etc.
Public Enterprises & Non Banking Financial Corporations	IREDA, PFC, REC, SECI, NTPC, IFC, PTC, etc.
Banking & Private Capital	Private and Public Sector Banks (CDM, Debt Finance, Private Equity, Venture Capital, Green Bonds, etc.)
International Finance	International Climate Finance (Multilateral Institutions, Bilateral Institutions, International Private Finance)
Non-Governmental	Non-Governmental Actors / Foundations

Table 5 provides an overview of sources of Climate Relief/Climate Adaptation/Climate Resilience Funding in Himachal Pradesh from 2022-2026. Apart from the regular NDRF and SDRF allocations, Himachal Pradesh receives funds from a mix of state budget allocations, international MDBs and BDBs, domestic DFIs and international Development Aid Agency. Analysis of Himachal's multi-year Economic Survey points to a grim reality as the state's economic losses are soaring to an all time high while the quantum of grants and loans received from multilateral sources have not been able to fill the climate finance gap. The state has only been able to secure concessional funding and grants from a specific category of DFIs (World Bank and KfW), while the role of domestic DFIs (NABARD, SIDBI) are limited and the flows of funds/grants through these channels are inconsistent and tied to several obligations.

On the other hand, funding through externally aided projects from international aid agencies like

JICA and GIZ, are mostly conditional with a multi-year disbursement schedule, sector-specific investments that do not directly translate into immediate funding pools for disaster recovery.

Therefore, to implement a comprehensive financial protection strategy, the state government of Himachal needs to look beyond the current disaster risk funding mechanisms and multilateral funding should be seen as an additional cushion rather than a stand-alone solution.

Table 5: Sources of Relief / Adaptation / Resilience Funding in Himachal Pradesh from 2022-2026²³

Year	Scheme / Project	Target ed Sector	Proje ct Size	Type (Relief / Adaptati on / Resilienc e)	Counts TowardImmed iate Funding Gap? (Yes/No)	Fundi ng Source	Catego ry of Fundin g Source
2022 –23	Forest Ecosystems Management & Livelihood Improvement Project	Forestry	₹800 crore	Adaptatio n	No	JICA	Govt. Developm ent Aid Agency

2022–23

Crop Diversification

Project (Phase II) Agriculture

₹1010.13

crore Adaptation No JICA

Govt. Development Aid Agency

²³Data synthesized from various sources that include reports of:

- Government of Himachal Pradesh (2023). *Economic Survey 2022–23*.
- Government of Himachal Pradesh (2024). *Economic Survey 2023–24*.
- Government of Himachal Pradesh (2025). *Economic Survey 2024–25*.
- World Bank (2020). *Himachal Pradesh State Roads Transformation Project*.
- World Bank (2026). *Resilient Action for Development and Disaster Recovery (HP-READY) Project*. 18

2022–23	HPHDP (Post-harvest Infrastructure)	Horticult ure	₹26 6.14 rore	Resilienc e	No	World Bank	Multilateral Development Bank (MDB)
2023–24	Special Disaster Relief Package	Disaster recovery	₹4,500		Ye s	HP Govt	Sub-sovereign Govt.
2023–	Road Restoration	Connectivi		Relief	Ye	HP Govt	Sub-sovereign

24	(Apple belts)	Infrastructu —			s		Govt.
2023– 24	Forest Ecosystems Management Project	Forestry	₹800 crore	Adaptati on	No	JICA	Govt. Developmen t Aid Agency
2023– 24	Climate-resilient Rain-fed Agriculture Project	Agricultu re	~US\$1 00 million	Adaptati on	No	World Bank	MDB
2023– 24	Forest Climate Proofing Project	Forestry	₹308.4 5 crore	Adaptati on	No	KfW	Bilateral Developm ent Bank (BDB)
2023– 24	RIDF (Rural Infrastructure Dev. Fund)	Irrigation / Flood c		Adaptati on	No	NABAR D	National DFI
2023– 26	CAFRI Programme	Adaptatio n capacity			No	GIZ + MoEFCC	Bilateral Developme nt Aid Agency + National Govt.
2024– 25	Forest Ecosystems Management Project	Forestry	₹800 crore	Adaptati on	No	JICA	Govt. Developmen t Aid Agency
2024– 25	Additional Climate-resilient Agriculture Project	Agricultu re	~US\$1 00 million	Adaptati on	No	World Bank	MDB
2024– 25	Model Eco Villages Scheme	Climate action	—	Adaptati on	No	HP Govt	Sub-sovereign Govt.
2020 onwar d	HP State Roads Transformation Project	Transport resilience	US\$82 million	Resilienc e	No	World Bank	MDB
2026	HP-READY Project	Disaster recovery	US\$24 5 million	Relief	Ye s	World Bank	MDB

4.2 Promoting Public-Private Partnerships (PPP) in Climate Resilient Infrastructure

Public-Private Partnerships (PPPs) are being touted as one of the successful mechanisms for financing disaster risk recovery and climate adaptation, mitigation and resilience infrastructure.

One of the major advantages of the PPP model is a balanced risk sharing with the private sector that significantly reduces the fiscal stress on state governments and it leads to quality outputs along with faster project delivery²⁴. Even NITI Aayog is encouraging the sub-sovereign machineries in India to leverage PPP models as these models have proven to bridge the climate finance gaps²⁵. In a similar vein, the World Bank points out that PPPs can be an effective mechanism to mobilize private investment for disaster-resilient infrastructure²⁶.

Himachal Pradesh has previously implemented PPP frameworks in connectivity infrastructure projects via the Build-Operate-Transfer (BOT) model, showcasing their efficacy and success. Expanding PPPs to climate-resilient sectors, like slope stabilization, flood management systems and low-emission transport (such as ropeways, e-vehicles, etc), can enhance resilience in such sectors that are vulnerable in mountains is an effective mechanism to mobilize private investment for disaster-resilient infrastructure. Through enabling policies, better project pipelines and regulatory clarity, institutional investors can be attracted to scale up climate-resilient development in Himachal through the PPP mode.

4.3 Tapping into the Green Bonds Market

Green bonds are debt instruments used to mobilize capital (domestic and international) to finance projects that contribute positively to the environment. They can be used to finance or refinance green or climate-related projects, including renewable energy projects, clean transportation projects, eco-farming projects, and other environmental infrastructure projects. Green bonds also help incentivise Public-Private Partnerships (PPPs) and encourage corporations to invest in green initiatives²⁷. The Central government of India has recently issued a 'sovereign green bond program' to finance green projects such as renewable energy, sustainable infrastructure, and climate change Adaptation.

The Central government of India has recently issued a 'sovereign green bond program' to finance green projects such as renewable energy, sustainable infrastructure, and climate change Adaptation. These debt instruments are also becoming popular at a sub-sovereign level. In 2024, Vadodara Municipal Corporation issued Asia's first certified Municipal Green Bonds worth Rs 100 crore²⁸ while Ahmedabad Municipal Corporation of Gujarat announced to raise Rs 200 crore from these instruments²⁹. Himachal Pradesh can take advantage of this opportunity by issuing state-level green bonds to finance climate-resilient infrastructure, renewable energy systems, and eco-friendly tourism.

4.4 Green Bonus System

Himachal Pradesh offers the country important ecological services, such as protecting watersheds, storing carbon, and preserving biodiversity. Because of this, the state has asked the Finance Commission for a "Green Bonus" or a special fund for environmental compensation. This kind of system would pay hill states for protecting natural resources instead of using them to make money.

5. Conclusion

Traditional finance mechanisms are failing to alleviate the structurally destructive

climate crisis that Himachal Pradesh is currently facing. The state's high biophysical sensitivity to extreme hydrological events (such as rainfall with a 100-year return time, rising glacier melt, and catastrophic landslides) combined with a significant economic reliance on climate-sensitive industries like tourism and agriculture, makes it extremely vulnerable. The financial cost has been disastrous. Between 2020 and 2025, the estimated total economic losses were ₹46,000 crore.

A huge, systemic climate funding deficit is the primary problem endangering the state's long-term sustainability. The government funding structures currently in place (SDRF, NDRF, World Bank, JICA, etc) are quite limited and serve only as emergency triage tools rather than as means to construct climate-resilient infrastructure. As a result, 80% of the current climate finance gap is still left unfunded while the state has only been able to leverage a handful of multilateral funding sources. To keep the fiscal deficit within the range of 3% as per RBI's Fiscal Responsibility and Budget Management Act, it is an opportune time for the Himachal Government to explore additional avenues of climate finance. The state must direct its efforts to proactively mobilise domestic and international private capital through Public-Private Partnerships (PPPs) mode, issue Green Bonds to fund climate mitigation and adaptation programs, and advocate for a dedicated "Green Bonus" fund to compensate for its vital ecological services, even though multilateral loans offer crucial long-term support. To sustain its high rankings in HDI, per capita income and GDP growth rate, Himachal needs to pivot from reactive relief to proactive, diversified climate investment, so that it is able to utilize the state funds for socio-economic growth and diversified capital investments.

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