



Guidelines on Climate Stress Testing 2025

Financial Stability Department

The Team

Shaukat Ali	Executive Director
Amer Hassan	Director
Dr. Jameel Ahmed	Additional Director
Sajawal Khan	Senior Joint Director
Muhammad Moaiz Siddiqui	Joint Director
Anum Naeem	Deputy Director
Mohammad Abdul Rehman Ansari	Deputy Director
Ali Inayat	Assistant Director

For queries and feedback, please contact: stresstesting@sbp.org.pk

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Definitions¹

Domestic Systemically Important Banks (D-SIBs): D-SIBs are the banks designated under D-SIBs Framework 2018 ([BPRD Circular No.04 of 2018](#)). However, keeping in view the risk profile of an individual bank and market dynamics, SBP may identify additional bank(s) as D-SIB(s) for the purpose of these guidelines.

Carbon Tax: A carbon tax (or energy tax) generally refers to a tax levied on the carbon content of some goods and services. The purpose is to reduce CO₂ emissions by increasing the price of these goods and services. It is one of the main types of tools currently used in climate change policies around the world.

NPLs: For the purpose of these guidelines, NPLs refer to exposures classified in Stage 3 under IFRS 9 or overdue as per the timeline prescribed in relevant prudential regulation². The estimated increase in NPLs under the shock shall be treated as “Loss” category for calculating the provisions / allowances.

Emissions Intensity: A ratio that measures the amount of pollution, typically Greenhouse gases (GHGs) such as carbon dioxide (CO₂), relative to a specific unit of activity or output.

¹ FIs may also refer to SBP's Regulatory Framework for Effective Management of Climate-Related Financial Risks, 2025 for other climate related definitions.

² See, [Annexure-I of BPRD Circular Letter No. 24 of 2021](#)

Introduction

1. State Bank of Pakistan (SBP) issued its first detailed guidelines on Stress Testing (ST) in 2005,³ which were revised in 2012⁴ and further updated in 2020⁵ to account for the developments in global supervisory practices, availability of new techniques and changes in local banking business and regulations.

Importance of Climate Change

2. Climate change and its related risks have emerged as the leading global challenge for economic and financial stability, with dire implications for the welfare of affected communities and parties. As encompassing as these risks are, measuring the adverse impacts on the performance and stability of the financial sector has become crucial. The climate related risks, viz., physical risk and transition risk, can transmit to the traditional risks faced by the financial institutions such as credit, market, liquidity, and operational risks. (See **Table 1**)

Table 1: Potential effects of climate risk drivers (physical and transition risks)

Risk	Effects
Credit	Credit risk increases if climate risk drivers reduce borrowers' ability to repay and service debt (income effect) or banks' ability to fully recover the value of a loan in the event of default (wealth effect i.e. damages to collateral).
Market	Reduction in value of financial asset, including the potential to trigger large, sudden and negative price adjustments where climate risk is not yet incorporated into prices. Climate risk could also lead to a breakdown in correlations between assets or a change in market liquidity for particular assets, undermining risk management assumptions.
Liquidity	Banks' access to stable sources of funding could be reduced as market conditions change. For instance, climate risk drivers may cause banks' counterparties to draw down deposits and credit lines.
Operational	Increasing legal and regulatory compliance risk associated with climate-sensitive investments and businesses. Also includes damages to bank's own infrastructure, e.g., branch building, IT equipment etc.
Reputational	Due to changing market or consumer sentiment, increasing reputational risk to such FIs, which are not adequately sensitive to the impacts of their products on climate.

Source: BIS (2021). Climate Related Risk Drivers and Transmission Channels

3. Given that Pakistan ranks as the 5th most vulnerable country to extreme weather events like floods, heatwaves and droughts⁶, the significance of climate change and the country's high vulnerability to associated risk, the SBP has adopted climate change as one of the strategic themes in its Strategic Plan i.e., Vision 2028.⁷ The Vision, inter alia, aims to promote allocation of resources towards development of a green economy, support the buildup of resilience against climate risks and preserve financial stability. As part of annual scenario analysis (macro-stress testing), SBP has been covering the likely impact of severe weather event (e.g. flooding) on solvency of banking sector. For instance, Financial Stability Review (FSR) 2018 was the first document to include climate-related risks in the hypothetical

³ BSD Circular 5 of 2005

⁴ BSD Circular 1 of 2012

⁵ FSD Circular No. 01 of 2020

⁶ [Global Climate Risk Index](#)

⁷ SBP Vision 2028: <https://www.sbp.org.pk/SBPVision/Index.html>

shocks to conduct resilience analysis of banks. Later on, more focused and detailed climate stress testing, covering both physical and transition risks, were also published in [FSR 2023](#) and [FSR 2024](#).

4. Incidentally, post issuance of SBP's revised Stress Testing (ST) Guideline in 2020, the Basel Committee on Banking Supervision (BCBS) has also issued [Principles for Effective Management and Supervision of Climate-Related Financial Risks](#) in 2022 'to promote a principles-based approach to improving risk management and supervisory practices related to climate-related financial risks'.
5. In line with BCBS Principles for climate-related financial risks, 2022 and best practices of peer countries on climate stress testing, SBP is issuing the following Climate Stress Testing (CST) Guidelines for SBP regulated financial institutions, as a supplement/addendum, i.e., **Section 5**, of existing [Guidelines on Stress Testing, 2020](#). The new section aims to help financial institutions assess the impact of climate-related physical and transition risks on credit, market, operational and liquidity risks, and to set minimum regulatory expectations on this subject.
6. **Section 2** of Stress Testing Guidelines, circulated vide [FSD Circular No. 01 of 2020](#), which outlines Objectives of Stress Testing, Governance Structure, Resource Adequacy, Data and IT Infrastructure, shall continue to apply on this newly introduced Climate Stress Testing Guidelines. The Climate Stress Testing exercise should be forward-looking and shall be the primary tool in risk identification and monitoring at the institution. Accordingly, the climate stress testing exercise should explore the impacts of climate change and transition to a low carbon economy on the strategy and business model of FIs, identify relevant climate-related risks, measure impact of climate risks on exposures of FIs and potential losses etc. The exercise results should be reported to and discussed in the Risk Management Committee (RMC) regularly and may be used as an input in formulating strategic objectives and decisions. Furthermore, the sample D-SIBs should incorporate climate risk while designing scenarios for macro-stress testing (MST) exercise, as required vide [FSD Circular No. 01 of 2020](#).
7. **Climate related Data:** For an effective stress-testing exercise, the availability of accurate, relevant, reliable and appropriately extensive data in a timely manner is quite crucial. Since the management of climate-related risks is a relatively new field and rapidly evolving, the availability of quality data is a prime consideration.

Financial Institutions (FIs) are advised to collect necessary climate-related data that affect their business models via credit, market, operational and liquidity risks. The nature and extent of data should be commensurate with the size and complexity of FIs' exposure to climate risks. FIs may refer *inter alia* to National Disaster Management Authority (NDMA), [National Disaster Risk Management Fund's Natural Catastrophe \(NatCat\) Model](#), and provincial disaster management authorities of respective provinces for geospatial data on flood-affected districts as updated from time to time. Pakistan Green Taxonomy (PGT) provides a classification system to identify green activities / assets⁸. FIs may also collect relevant borrower-specific data for conducting climate stress testing such as outstanding exposures / financing, borrowers' carbon emissions⁹, list of climate vulnerable economic sectors etc. In addition to the afore-mentioned sources, FIs may use any reliable source for climate risk related data after duly assessing the reliability and suitability of the source and data. Furthermore, most of the data required for conducting Climate Stress Testing is also acquired and maintained in different units

⁸ [SH&SFD Circular No. 06 of 2025](#)

⁹ For transition risk assessment, FIs shall start compiling borrowers' emission data that are required to disclose under [SECP's directive dated December 31, 2024](#), as amended from time to time. For emissions data of the remaining significant borrowers, FIs may refer to the 'sectoral emission intensities' as a proxy from reliable sources.

/ divisions of the regulated FIs. The senior management of FIs shall ensure cross-functional integration and cooperation for availability of required data.

8. **Climate Stress Testing and Risk Management:** Climate stress testing is a rapidly evolving area of risk management and tools/techniques in this area are being refined to capture impact of climate risk accurately. It is faced with the challenges of data limitations and involves diversity and idiosyncrasies in the risk profile of FIs' exposure to climate change due to unique circumstances of their borrowers. In this connection, these guidelines provide basic regulatory expectations for climate stress testing. In view of the complexity of environmental science, emerging climate change patterns, unique circumstances of each FI as well as its significant borrowers and exposures, the FIs may exercise due judgement while using the results of Climate Stress Testing to determine the materiality of climate-related risks. Going forward, these guidelines will be further strengthened in the light of developments, experiences gained and the emerging best practices. In addition to these guidelines, FIs are encouraged to adopt more innovative and sophisticated approaches to model climate risk and conduct stress testing according to their risk profiles, size and availability of data.
9. The newly introduced **Section 5** is divided into two parts:
 - **5.1 - Physical Risk Analysis for Banks, DFIs and MFBs** covers scenarios for physical risk applicable on banks, DFIs and MFBs while
 - **5.2 – Transition Risk Analysis for Sample D-SIBs** covers transition risk analysis applicable on the sample D-SIBs, as determined by the SBP.
 - Moreover, this section also requires the inclusion of climate risk in Macro Stress Testing / Scenario Analysis as conducted by sample D-SIBs.

The relevant requirements for these exercises are as follows:

Scope: Physical Risk: Banks (including Islamic banking operations of conventional banks), DFIs and MFBs; and Transition Risk: Sample D-SIBs.

Balance sheet assumption: A static balance sheet shall be assumed in order to gauge the sensitivity of existing business models to potential shocks.

Frequency: Physical and transition risk analyses will be conducted at least *annually*, based on end December data.

Timeline: Physical and transition risk analyses will be conducted by second quarter of the following year. However, the first analysis may be conducted by end of Q3CY26 based on end-December 2025 data.

5.1: Physical Risk Analysis for Banks, DFIs and MFBs

10. Pakistan's climate has experienced significant fluctuations in recent years, and flooding has emerged as a leading physical risk affecting vast agriculture plains, rural dwellings, urban centers and coastal areas of the country. Floods in Pakistan primarily occur during monsoon season damaging cash crops like cotton and rice and sometimes affect winter (Rabi) crops e.g. wheat due to prolonged water retention. Since its creation, Pakistan has faced major flood events almost every 3rd year, causing damages to the

economy and carrying implications for the financial soundness of FIs. The significance of this risk is evident from the fact that prior to the unprecedented floods of 2010, the total cumulative damages caused to the national economy by the recurring floods amounted to around US\$ 19 billion. Thereafter, the floods of 2010 alone inflicted losses of around US\$ 10 billion, with further losses of US\$ 30 billion caused by the 2022 pluvial floods.

11. In this backdrop, the physical risk analysis presented here attempts to estimate the incremental credit losses to the banking sector in case of flooding in different districts of the country in varying intensities. The scope of this exercise extends to the lending portfolio of banks (including Islamic banking operations of conventional banks), DFIs and MFBs.

Sensitivity Analysis for Physical Risk

12. Historically, three episodes of intense floods have been recorded in Pakistan, which carry somewhat unique patterns and dynamics and affected different geographic areas of country. For instance,
 - a. In 2010, the floods caused by heavy rains and melting of glaciers in Karakorum, Hindukush and catchment area of river Indus affected areas around Indus River basin.
 - b. In 2022, heavier than usual monsoon rains in central and lower parts of the country, melting of glaciers and heatwaves brought about one of the worst floods, inundating one-third of the country land mass for prolonged period, displacing large swathes of population and taking a heavy toll on human lives, livelihoods and livestock.
 - c. In 2025, unprecedented deluge in three rivers i.e. Ravi, Satluj and Chenab due to heavy rains in the Himalayas and adjacent lower ranges caused widespread destruction in both rural and some urban areas surrounding these rivers as well as in lower belt of Indus River.
13. In this backdrop, five shocks related to physical risk have been developed to test the resilience of banks, DFIs and MFBs to potential recurrence of another episode of such devastating floods: four credit risk shocks and one liquidity risk shock.¹⁰ This exercise will enable FIs to assess the impact of climate risks from one year to another as the loan portfolio dynamics as well as vulnerability levels of hazard-prone areas are likely to change. Specifically, first two credit risk scenarios take into account the effects of temporal changes in loan portfolio, whereas, the remaining three scenarios also take into account the changes in vulnerability levels of hazard-prone districts in the light of changing climate patterns. The shocks will thus enable a regulated FI to assess resilience of its existing business model (loan portfolio) to either potential recurrence of historical stress events (e.g., floods) or changes in climate patterns.

Physical Risk: Credit Shocks

14. The four credit risk scenarios can be broadly classified into two sets:
 - a. First set of physical risk credit shocks (PRCS) include PRCS-1 and PRCS-2, which are applicable on banks, DFIs and MFBs. First two shocks are based on the actual (historical) losses experienced by FIs in the past and assess the impact on FIs' asset quality (NPLs) and capital position if floods similar to 2022 and 2025 occur again in climate vulnerable sectors and locations. While, PRCS-3 is a hypothetical shock that encompasses the impact of all districts affected during flood episodes of 2022 and 2025.
 - b. PRCS-4 (applicable only on banks and DFIs) stipulates banks/DFIs to design and apply an additional physical risk scenario in respect of large corporate borrowers for their material

¹⁰ Due to the nature of FIs' business i.e. saving mobilization and lending, credit risk is the leading risk faced by them accounting for 67% of their required regulatory capital. Similarly, the liquidity risk carries significance due to its nature and potential to suddenly jeopardize the stability of FIs.

exposure to major flood vulnerable areas. Furthermore, this scenario also encourages banks / DFIs to design and apply another additional physical risk scenario in respect of large corporate borrowers for their material exposure to other major physical risk hazards such as droughts, heatwaves etc.

Physical Risk Credit Shock One (PRCS-1): Losses Similar to Floods of 2022

15. This scenario assumes recurrence of floods of 2022, considering the then affected districts. The list of affected districts of 2022 are placed at **Annexure – B1**. Two sub-scenarios are considered:
 - a. Existing loan portfolio (fund based) in selected sectors and districts (see **Annexure- A: Table-1 for Banks, DFIs and Table-3 for MFBs**) are stressed equivalent to the actual growth in NPLs for FIs observed during the one-year period following the floods of 2022, i.e., actual, post-floods sectoral growth of NPLs over four quarters i.e., Q3CY22 to Q2CY23. [Note: (i) Any flood-affected loans, which are rescheduled/restructured under any contingency regulatory relief schemes or under the existing flexibility in prudential regulations (e.g. R-5 of PRs for agri-financing for banks/DFIs) are to be added back in NPLs. Similarly, any flood-affected loan that is directly written off by FIs should be added back into the loan and NPL portfolios to prudently assess the impact of flooding. (ii) In case the FI lacks data for the period or experienced a contraction in NPLs during the one-year period, the respective industry's growth¹¹ in overall NPLs may be used.]
 - b. NPLs determined in (a) above is doubled.

Physical Risk Credit Shock Two (PRCS-2): Losses Similar to Floods of 2025

16. This scenario assumes recurrence of floods of 2025, considering the then affected districts. The list of affected districts of 2025 are placed at **Annexure – B1**. Like previous flood scenario, two sub-scenarios are considered:
 - a. Existing loan portfolio (fund based) in selected sectors and districts (see **Annexure- A: Table-1 for Banks, DFIs and Table-3 for MFBs**) are stressed equivalent to the actual growth in NPLs for FIs observed over one-year period, post floods of 2025, i.e., actual sectoral growth of NPLs over four quarters i.e., Q3CY25 to Q2CY26. [Note given in PRCS-1 will also be applicable on PRCS-2]
 - b. NPLs determined in (a) above is doubled.
17. FIs are encouraged to update the existing scenarios in case any flood event more severe than the floods of 2022 and 2025 occurs.

Physical Risk Credit Shock Three (PRCS-3): Losses on Vulnerable Districts and Sectors – Flood Hazard Ranking

18. This scenario aims to check resilience of banking sector to floods in two dimensions: geographic and sectoral. For geographic vulnerability, it utilizes district-wise 'vulnerability to floods', as determined by latest available [National Disaster Management Plan – 2025](#) of NDMA, as updated from time to time. For sectoral vulnerability, scoring is based on climate physical risk for the given sector (see **Annexure- A: Table-2 for Banks, DFIs and Table-3 for MFBs**). This scenario, therefore, combines vulnerable districts and sectors (as shown in **Table-2**).

¹¹ The banks, DFIs and MFBs may use their respective sectoral NPLs data as published in [SBP's Financial Soundness Indicators and Quarterly Compendium of the Banking Sector](#).

19. This scenario considers districts with NDMP flood hazard ranking of **Low, Medium** or **High**¹² that were flooded either in 2022 or 2025 and sectoral climate risk vulnerability scoring of **Low, Medium** or **High**.¹³
20. In the first step, the Climate Vulnerable Exposure (CVE) is calculated for each district-sector combination based on the table below. For example, if the district vulnerability ranking is High and the sector vulnerability ranking is Medium then fund based exposure for given sector and district will be multiplied by the weight given in row 1 [High (100%)] and column 2 [Medium (30%)] of the table to get CVE for given district-sector combination.

		Sectoral Vulnerability		
		High (100%)	Medium (30%)	Low (10%)
District Vulnerability	High (100%)	1	0.3	0.1
	Medium (50%)	0.5	0.15	0.05
	Low (20%)	0.2	0.06	0.02

$$CVE_{i,j} = \alpha_{i,j} \times \text{Fund Based Exposure}$$

where, i is the district (row in the matrix) and j is the sector (column in the matrix).

The table is calculated based on the following workings. If the physical risk of a sector is ‘High’, then 100% of the Fund Based Exposure (FBE) of that sector will be considered. Further, if the sectoral physical risk score is ‘Medium’ or ‘Low’, 30% and 10% of FBE will be considered, respectively. These weights are further calibrated based on the vulnerability of the district. If the physical risk in the district is ‘High’, then 100% of the FBE in that district is considered. Further, if the district vulnerability is ‘Medium’ or ‘Low’, 50% and 20% of FBE will be considered, respectively. Hence, final weights of district-sector combination are calculated by multiplication of the respective vulnerabilities of given district and given sector. Once CVE is calculated for each district-sector combination, the Total CVE is calculated by adding CVEs for all sectors in all districts.

In the second step, three scenarios are assumed for total CVE in vulnerable sectors and districts

1. 5 percent of CVE become non-performing
2. 10 percent of CVE become non-performing
3. 20 percent of CVE is become non-performing

¹² See Annexure – B1 for district scoring, which is based on floods of 2022 or 2025.

¹³ See Table 2 in Annexure – A for sectoral scoring wherein physical risk vulnerability score of 1 denotes ‘Low’, physical risk vulnerability score of 2 denotes ‘Medium’ and physical risk vulnerability score of 3 denotes ‘High’.

Physical Risk Credit Shock Four for Banks and DFIs (PRCS-4): The Impact of sector-specific vulnerabilities to climate change on credit-worthiness of borrowers

21. PRCS-4 is applicable only for banks and DFIs. All banks and DFIs shall design and apply an additional physical risk scenario in respect of large corporate borrowers for their material exposure to major flood vulnerable areas (see **Annexure – B1 for list of districts**). For the purpose of this scenario, *large corporate borrower* means corporate borrower having fund-based outstanding exposures greater than 5% of the bank or DFI's equity as defined in Prudential Regulations for Corporate / Commercial Banking¹⁴.

For calculating the impact under this scenario, the banks/DFIs may take into account:

- i- The borrower's idiosyncratic characteristics, which determine resilience against major flooding.
 - ii- Factors that can materially affect (directly and indirectly) the credit worthiness and repayment capacity of the borrower in a major flooding event. These factors may include, for instance, the geographical location of the borrower's operation including the consideration of any difference between place of loan origination (e.g., a major city) and place of utilization (e.g., operations in vulnerable area); damages to infrastructure and capital/operating assets in the vulnerable area; breakdown of supply chain including damage to raw material, inputs, stocks, crops, livestock, farmland, (as applicable), etc.
22. However, banks and DFIs are also encouraged to design and apply additional physical risk scenario(s) in respect of large corporate borrowers for their material exposure to other major physical risk hazards such as droughts, heatwaves etc. (for selection of hazard prone areas, please refer to [National Disaster Management Plan - NDMP](#)).
 23. Banks/DFIs shall calculate the incremental Allowance for Expected Credit Losses (ECL) arising from the deterioration in the creditworthiness of the stressed large corporate borrowers, in accordance with the instructions prescribed under [BPRD Circular No. 3 of 2022](#), [BPRD Circular Letter No. 16 of 2024](#), and any other directives issued by SBP from time to time. The impact of such additional or incremental ECL (net of tax) shall be reflected in the Capital Adequacy Ratio (CAR) of banks/DFIs as a part of the final results of the stress test scenario.

Physical Risk Liquidity Shock (PRLS): Withdrawal of Deposits in High Flood Hazard Areas

24. This Liquidity Risk Shock (LRS) is applicable for all banks, DFIs and MFBs. The LRS assumes that in districts with flood hazard score of 5 (High) as per the NDMA's latest available NDMP Flood Hazard Plan¹⁵ (see **Annexure – B2**), demand for cash increases leading to substantial deposit withdrawals over a period of *three days* as follows:
 - a. Withdrawal of 5 percent deposits in the affected area on Day 1;
 - b. Withdrawal of 5 percent deposits on Day 1 and additional 5 percent on Day 2;
 - c. Withdrawal of 5 percent on Day 1, 5 percent on Day 2 and an additional 5 percent on Day 3.
25. For guidance, FIs may also refer to physical risk scenarios outlined in [Box 4.1: Climate Risk Scenario Analysis \(FSR 2023\)](#)

¹⁴ [Prudential Regulations for Corporate / Commercial Banking](#)

¹⁵ Currently available Plan can be found at: [NDMP Plan 2025](#).

Assessing the Financial Impact of Physical Risk Analysis

26. To carry out physical risk analysis, FIs may use district-wise, fund-based outstanding exposures / financing in vulnerable sectors (**list of sectors at Table-1, 2 and 3 of Annexure-A for different shocks**) and list of flood affected districts given for floods of 2022 and 2025 (**Annexure – B1**) and National Disaster Management Plan 2025 (**Annexure – B2**)

27. Credit Risk:

Under all credit scenarios, FIs are required to:

- i. Calculate post-shock increase in NPLs for different physical risk scenarios
- ii. Calculate additional provisions / allowances (assuming incremental NPLs as loss),
- iii. Charge the additional provisions / allowances (net of taxes) to the capital and
- iv. Estimate the post-shock capital adequacy ratio (CAR).

The post-shock CAR

$$CAR_{PS} = \frac{\text{Capital} - (1 - \tau)\Delta\text{Prov}}{\text{RWA} - \Delta\text{Prov}}$$

where, τ is tax rate

28. **Liquidity Risk:** The amount of withdrawal of the deposits should be deducted from the liquid assets and the level of remaining liquid assets needs to be re-calculated after each day. The post shock liquid assets to total assets ratio may then be calculated.

29. Apart from the scenarios prescribed above, banks, DFIs and MFBs are encouraged to explore other scenarios for physical risk such as heatwaves, droughts, landslides, smog, earthquake, snowfall, hailstorm etc., which impacts their strategic objectives, business model, operations and loan and investment portfolios over relevant time horizons. Moreover, changing frequency and intensity of climate hazards over time may result in losses higher than historical experiences; accordingly, banks, DFIs and MFBs are also encouraged to explore the impact of additional forward-looking shock scenarios of physical risk on credit risk, market risk (for example, variation in liquidity across assets exposed to climate-risk and variation in the speed at which exposures could be impacted), operational risk and liquidity risk.

5.2: Transition Risk Analysis for Sample D-SIBs

30. Transition risks, inter alia, entails financial risks that result from moving to a low carbon economy. They are driven by changes in policies, technology, market sentiment or customer behaviors.

Transition Risk Scenario – Imposition of Carbon Tax

31. In line with the international commitments and climate risks, Pakistan and other countries are working towards low-carbon and resource efficient economy.¹⁶ For this purpose, policymakers use different incentive structures such as imposition of carbon tax, stricter emission limits, introduction of carbon

¹⁶ As per latest [NDC \(Sep-2025\)](#), Pakistan has committed to reduce projected emission up to 50 percent by 2035.

markets etc. that affect the performance and financial soundness of firms. Moreover, changes in technology as well as the sentiments of customers, investors and market could lead to economic dislocation and a reassessment of the value of a variety of financial assets. It is important to note that firms can be exposed to both direct impact e.g. imposition of carbon tax in the country as well as indirect impact e.g. carbon tax on importers in EU under Carbon Border Adjustment Mechanism can impact the exports and revenues of domestic firms. For assessing the impact of transition risk on firms and financial institutions, a scenario of imposition of carbon tax has been suggested. The carbon tax reduces the bottom line of firms, thus affecting their financial performance as well as the repayment capacity to honour obligations to financial institutions.

32. Transition risk scenario is mandatory for sample D-SIBs; other banks and DFIs are encouraged to incorporate transition risk scenario in their climate risk analysis. For transition risk scenario, imposition of a carbon tax on corporates/firms based on their contribution to greenhouse gas (GHG) emissions is assumed. The tax would impact their profitability and hence the repayment capacity. In particular, the pre- and post-tax imposition Interest Coverage ratio (ICR) of corporate borrowers are assessed. Specifically, depending on which sector the firm belongs, the emissions may be estimated as

$$Emission = [Sales \div Threshold] \times Intensity,$$

where, ‘Threshold’ is the PKR equivalent of one million US dollars.

33. For calculation of emissions, FIs shall start compiling borrowers’ emission data that are required to be disclosed under SECP’s directive dated December 31, 2024, as amended from time to time. For emissions data of the remaining corporate borrowers, FIs may use ‘sectoral emission intensities’ from any reliable source as a proxy. For reference, Standard & Poor’s data¹⁷ on GHG emissions of global industries is given at **Annexure – C**

34. Based on the emission levels of the corporate/firm, the Carbon Tax can be calculated as:

$$Carbon\ Tax = Emission \times Tax\ Rate$$

The indicative tax rates may range from USD 5/tCO₂e (i.e. US\$ 5 per metric ton of carbon dioxide equivalent) to USD 50/tCO₂e (in equivalent PKR). Incidentally, IMF (2021) suggests a floor of USD 25/tCO₂e for lower income emerging countries.¹⁸

Assessing Financial Impact for Transition Risk for Banks

Interest Coverage Ratio

35. To calculate the shock, FIs would use financial statements data of corporate borrowers, adjust the earnings before interest and taxes (EBIT)¹⁹ for different levels of carbon tax expenses, i.e., 5, 25 and- 50 US dollars per tCO₂e, and calculate post shock ICRs of corporate borrowers as:

¹⁷ See S&P (2021), “[Transition Risk: Historical Greenhouse Gas Emissions Trends for Global Industries](#)” for sectoral emission intensities. In case of unavailability of borrower-level carbon emissions, for now, FIs may use sector-level emissions provided by S&P in “[Transition Risk: Historical Greenhouse Gas Emissions Trends for Global Industries, 2021](#)” (or an updated version) as a proxy to calculate borrower emission intensities. For reference, Carbon Emissions by Sector published by S&P Global is also provided at **Annexure-C**.

¹⁸ World Bank (2023). [State and Trends of Carbon Pricing Dashboard](#).

¹⁹ Keeping in view the fact that any carbon tax may also affect the market competitiveness including sales and operating expenses of the firm, banks / DFIs are encouraged to incorporate these potential effects into EBIT calculations.

$$ICR_{ps} = \frac{EBIT - \text{Carbon Tax}}{\text{Interest Expenses}}$$

36. Map fund based outstanding exposures / financing with the post-tax ICRs. For the purpose this shock, the exposures with $ICR_{ps} < 1$, may be considered as NPLs. Finally, adjust the capital for incremental NPLs and calculate post-shock CAR.
37. Segregate the exposures into sectors, identify vulnerable sectors and the sectors affecting bank's solvency due to potential transition to low carbon economy.
38. **Encouraged Set of Stress Tests:** All Banks / DFIs are also encouraged to perform transition risk stress tests; they may also use other techniques such as estimating stressed Probabilities of Default (PD) due to imposition of Carbon tax and calculate the Expected Credit Losses (ECLs). In this regard, banks may refer to [Box 4.1: Climate Risk Scenario Analysis \(FSR 2023\)](#) and [Box 4.1: Climate Transition Risk and Financial Stability in Pakistan \(FSR 2024\)](#) and other SBP analysis on Climate Stress Testing published from time to time. Furthermore, all banks / DFIs are encouraged to conduct climate stress testing over relevant time horizons by considering any scenarios identified by Network for Greening the Financial System.
39. Apart from the scenarios prescribed above, banks / DFIs are encouraged to explore other scenarios for transition risk such as policy changes, technological advancements, market shifts, evolving consumer preferences, increased supervision and asset repricing risks etc. which impact their strategic objectives, business model, operations and loan / financing and investment portfolios over relevant time horizons. Furthermore, banks / DFIs are encouraged to explore the impact of transition risk on credit risk, market risk (for example, variation in liquidity across assets exposed to climate-risk and variation in the speed at which exposures could be impacted), operational risk and liquidity risk.

Macro Stress Testing (MST) / Scenario Analysis for Sample D-SIBs

40. The Sample D-SIBs under [FSD Circular No. 1 of 2020](#), shall design scenarios that will invariably include climate-related risks in their MST exercises by considering the potential impact of climate change on the domestic economy when determining the magnitude / severity of stress applied to risk drivers.²⁰

²⁰ See Chapter 4 – Resilience of the Banking Sector in various editions of SBP FSR for guidance.

Annexure – A: List of Sectors with Vulnerability Score

Table-1: List of Vulnerable Sectors for Banks / DFIs for PRCS-1 and PRCS-2		
S. No.	Sector Code (Based on ISIC 4 Classifications of Private Sector Business)	Name of Sector
1	4100000000	Agriculture, Forestry and Fishing
2	4110000000	Mining and Quarrying
3	4121000000	Manufacture of food products
4	4121300000	Manufacturing – Textiles
5	4121400000	Manufacture of wearing apparel
6	4121500000	Manufacturing - Leather and Related Products
7	4121600000	Manufacture of wood and of products of wood
8	4121700000	Manufacturing - Paper and Paper Products
9	4150000006	Construction
10	4174900000	Land transport and transport via pipelines
11	4185500000	Accommodation
12	4200000000	Real estate activities
13	6020000000	Consumer Financing

Note: This dataset of advances on ISIC-IV sectors with district-wise detail is compiled and reported by regulated FIs to SBP via DWH DAP-portal on a quarterly basis.

S. No.	Sector Code (Based on ISIC 4 Classifications of Private Sector Business)	Name of Sector	Vulnerability Score	
			Physical Risk	Transition Risk
1	4100000000	Agriculture, Forestry and Fishing	3	3
2	4110000000	Mining and Quarrying	2	3
3	41210107200	Manufacturing - Sugar	2	2
4	41213000000	Manufacturing - Textiles ²²	2	2
5	41212000000	Manufacturing - Tobacco Products	2	2
6	41215000000	Manufacturing - Leather and Related Products	2	2
7	41217000000	Manufacturing - Paper and Paper Products	2	2
8	41220000000	Manufacturing - Chemicals and Chemical Products	2	2
9	41222000000	Manufacturing - Rubber and Plastics Products	2	2
10	41224000000	Manufacturing - Basic Metals	2	3
11	41232000000	Manufacturing - Others	2	3
12	41300000000	Electricity, gas, steam and air conditioning supply (Other than Thermal & Coal Based)	2	2
13	41335351020	Electricity (Thermal)	2	3
14	41335351030	Electricity (Coal Based)	3	3
15	41500000006	Construction	3	3
16	41600000000	Wholesale and retail trade; repair of motor vehicles and motorcycles	2	1
17	41700000000	Transportation and storage	2	3
18	41900000000	Information and communication	1	1
19	42000000000	Real estate activities	2	2
20	60200000000	Consumer Financing	3	2
21	70000000000	Others	2	1

Note: This dataset of advances on ISIC-IV sectors with district-wise detail is compiled and reported by regulated FIs to SBP via DWH DAP-portal on a quarterly basis.

²¹ The vulnerability scores are based on feedback received from the industry. Vulnerability scores of 1, 2 and 3 denote 'Low', 'Medium' and 'High' risk, respectively.

²² Banks / DFIs are encouraged to use higher vulnerability score for transition risk in respect of such sub-segments of textile sector that involve significant use of steam/thermal fuels, high emissions, strict buyer requirements, high liquid effluent, complex use of chemicals etc.

Table-3: List of Sectors for MFBs for PRCS-1, PRCS-2 and PRCS-3			
S. No.	Reporting Chart of Account (RCOA) Code	Sector	Physical Risk Vulnerability Score
1	061200001	Enterprises	2
2	061200002	Agriculture	3
3	061200003	Livestock	3
4	061200004	Long Term Housing Finance	2
5	061200005	Consumer Lending	3
6	061200006	Others	2

Note: MFBs report sector-wise data of advances with district-wise breakdown to SBP vide DWH-DAP on a quarterly basis (ISIC-IV). This district-wise data may be mapped along above-mentioned sectoral categories.

Annexure B1 – List of Flood Affected Districts (PRCS-1 & PRCS-2)

List of Flood Affected Districts in 2022 Floods along with NDMP Flood Hazard Score																	
District	NDMP Score	Vulnerability	District	NDMP Score	Vulnerability	District	NDMP Score	Vulnerability	District	NDMP Score	Vulnerability	District	NDMP Score	Vulnerability	District	NDMP Score	Vulnerability
Abbottabad	3	Low	Ghanche	3	Low	Khairpur	4	Medium	Lower Dir	4	Medium	Okara	3	Low	Sohbatpur	5	High
Astore	3	Low	Ghizer	3	Low	Khanewal	3	Low	Manshra	4	Medium	Panigur	3	Low	Sujawal	4	Medium
Badin	3	Low	Ghotki	5	High	Kharan	3	Low	Mastung	3	Low	Pishin	3	Low	Sukkur	5	High
Bahawalpur	3	Low	Gujranwala	5	High	Khuzdar	3	Low	Matiari	4	Medium	Poonch/Rawalakot	4	Medium	Swabi	4	Medium
Bahwalnagar	3	Low	Harnai	3	Low	Killa Abdullah	3	Low	Mianwali	5	High	Quetta	4	Medium	Swat	5	High
Barkhan	2	Extremely Low	Hyderabad	4	Medium	Killa Saifullah	3	Low	Mirpur Khas	3	Low	Rahim Yar Khan	5	High	Tando Allahyar	3	Low
Batagram	3	Low	Jacobabad	4	Medium	Kohistan	4	Medium	Multan	4	Medium	Rajanpur	5	High	Tando Muhammad Khan	4	Medium
Bhakkar	4	Medium	Jaffarabad	5	High	Kohlu	3	Low	Musakhel	3	Low	Sahiwal	3	Low	Tank	5	High
Chaman	3	Low	Jamshoro	4	Medium	Kolai Palas	3	Low	Muzaffargarh	5	High	Sanghar	3	Low	Thatta	4	Medium
Charsadda	4	Medium	Jhang	5	High	Kurram	4	Medium	Nagar	4	Medium	Sargodha	3	Low	Umer Kot	3	Low
Chinot	5	High	Kachhi/Bolan	3	Low	Lakki Marwat	3	Low	Narowal	4	Medium	Shaheed Benazirabad	4	Medium	Upper Chitral	5	High
D.I.Khan	5	High	Kalat	3	Low	Larkana	5	High	Nasirabad	5	High	Shangla	4	Medium	Upper Dir	4	Medium
Dadu	5	High	Kambar/Shahadat Kot	5	High	Lasbela	4	Medium	Naushahro Feroze	5	High	Sheikhupura	4	Medium	Usta Muhammad	5	High
Der Ghazi Khan	5	High	Karak	3	Low	Layyah	4	Medium	Neelum	4	Medium	Shikarpur	5	High	Vehari	3	Low
Dera Bugti	3	Low	Kashmore	5	High	Loralai	3	Low	Nowshera	5	High	Sialkot	4	Medium	Zhob	3	Low
Diamer	4	Medium	Kasur	3	Low	Lower Chitral	5	High	Nushki	3	Low	Sibi	3	Low	Ziarat	4	Medium

Source: NDMA, PDMA

List of Flood Affected Districts in 2025 Floods along with NDMP Flood Hazard Score														
District	NDMP Score	Vulnerability	District	NDMP Score	Vulnerability	District	NDMP Score	Vulnerability	District	NDMP Score	Vulnerability	District	NDMP Score	Vulnerability
BAHAWALNAGAR	3	Low	HYDERABAD	4	Medium	KHANEWAL	3	Low	NAROWAL	4	Medium	SHEIKHUPURA	4	Medium
BAHAWALPUR	3	Low	JACOBABAD	4	Medium	KOHLU	3	Low	NASIRABAD	5	High	SHIKARPUR	5	High
CHINIOT	5	High	JAFFARABAD	5	High	LARKANA	5	High	NAUSHAHRO FERROZE	5	High	SIALKOT	4	Medium
DADU	5	High	JAMSHORO	4	Medium	LEHRI	4	Medium	OKARA	3	Low	SIBI	3	Low
DERA BUGTI	3	Low	JHAL MAGSI	5	High	MANDI BAHAUDDIN	4	Medium	PAK PATTAN	3	Low	SUJAWAL	4	Medium
FAISALABAD	4	Medium	JHANG	5	High	MATIARI	4	Medium	RAHIM YAR KHAN	5	High	SUKKUR	5	High
GUJRANWALA	5	High	KACHHI(BOLAN)	3	Low	MIRPUR	2	Extremely Low	RAJANPUR	5	High	TANDO ALLAH YAR	3	Low
GUJRAT	4	Medium	KALAT	3	Low	MULTAN	4	Medium	SANGHAR	3	Low	TOBA TEK SINGH	4	Medium
HAFTZABAD	4	Medium	KASHMORE	5	High	MUZAFFARGARH	5	High	SHAHDAD KOT	5	High	VEHARI	3	Low
HARNAI	3	Low	KASUR	3	Low	NANKANA SAHIB	3	Low	SHAHEED BENAZIRABAD	4	Medium			

Source: Districts where more than 3% of Land Areas was Flood Affected according to Satellite Data

Annexure B2 – List of Flood Affected Districts (PRLS)

List of Flood-Affected Districts for Physical Risk Liquidity Shock (PRLS)*			
Districts	Provinces	Flood Hazard Score	Flood Hazard Ranking
Bajaur	KP	5	High
Chiniot	Punjab	5	High
Chitral	KP	5	High
D.G. Khan	Punjab	5	High
D.I. Khan	KP	5	High
Dadu	Sindh	5	High
Ghotki	Sindh	5	High
Gujranwala	Punjab	5	High
Jaffarabad	Balochistan	5	High
Jhal Magsi	Balochistan	5	High
Jhang	Punjab	5	High
Kashmore	Sindh	5	High
Larkana	Sindh	5	High
Mianwali	Punjab	5	High
Muzaffargarh	Punjab	5	High
Naseerabad	Balochistan	5	High
Naushero Feroze	Sindh	5	High
Nowshera	KP	5	High
Peshawar	KP	5	High
Qambar Shahdadt	Sindh	5	High
Rahim Yar Khan	Punjab	5	High
Rajanpur	Punjab	5	High
Shikarpur	Sindh	5	High
Sohbatpur	Balochistan	5	High
Sukkur	Sindh	5	High
Swat	KP	5	High
Tank	KP	5	High
Usta Muhammad	Balochistan	5	High

* List of Flood Affected Districts is based on districts with flood hazard score of 5 as per National Disaster Management Plan 2025, as updated from time to time.

Annexure – C: Carbon Emission Intensity by Sector

Carbon Emissions by Sector published by S&P Global²³

Sector Emission intensities per Million USD revenue*	
Sector	Emission Intensity (Million USD) **
Auto	16
Cement	888.0
Chemical	888.0
Food	111.7
Fuel & Energy	2036.0
Paper Products	888.0
Sugar	111.7
Textile	21.6
Others ***	25.0

Source: Standard & Poor's Global
 *Emission intensities in Metric tons of Carbon dioxide per million US dollars.
 ** Sectoral Carbon Emissions Intensity is based on S&P (2021), "Transition Risk: Historical Greenhouse Gas Emissions Trends for Global Industries"
 *** For 'Others' category, estimates are based on median of different sectors in S&P (2021).

²³ See S&P (2021), "[Transition Risk: Historical Greenhouse Gas Emissions Trends for Global Industries](#)" for sectoral emission intensities.