

# ASSESSING THE RESILIENCE OF FINANCIAL INSTITUTIONS

As part of BNM's financial stability framework to assess and mitigate risks, BNM conducts a multi-year, top-down macro solvency stress test annually to evaluate the potential impact of adverse macroeconomic conditions and the resultant financial strains on individual banks and insurers, and the broader financial system. The latest macro solvency stress test was conducted in early 2024, covering a three-year horizon up to end-2026. Two hypothetical adverse scenarios, which feature two different paths of economic contraction or slowdown, were applied under the stress test exercise to assess the resilience of financial institutions. It is important to note that these scenarios are not indicative of BNM's actual economic forecasts but are designed to assess the capacity of financial institutions to withstand extremely severe shocks.

The first adverse scenario (AS1) is designed to test the resilience of financial institutions against a temporary but deep shock in economic conditions. It assumes a severe contraction in the domestic economy in 2024 followed by a rapid recovery in 2025 and a normalisation of GDP thereafter. Meanwhile, the second adverse scenario (AS2) assesses financial institutions' ability to withstand a persistently challenging operating environment over an extended period. Compared to AS1, AS2 assumes a milder but more prolonged economic contraction where GDP records negative growth in 2024 and 2025 before

commencing a sluggish recovery in 2026. Under both simulated environments, GDP growth is assumed to be between the rate seen during the Asian Financial Crisis (AFC) and Global Financial Crisis (Table 2.1).

Under both AS1 and AS2, it is assumed that major economies maintain a higher-for-longer policy rate environment amid elevated inflationary pressure. This, coupled with tighter global financial conditions, results in large and volatile portfolio outflows from emerging market economies. Bond yields are assumed to increase substantially, up to two times the rise seen during the AFC. The ringgit weakens against the US dollar to levels beyond historical lows in both scenarios, with more pronounced adjustments in 2024 under AS1. The FBM KLCI loses about a third of its value under both scenarios, with a sharp rebound observed from 2025 onwards under AS1 while recovery remains sluggish under AS2. Headline inflation is assumed to remain high, leading to OPR hikes in both scenarios despite the weak economic growth. AS1 witnesses a more substantial OPR increase in the first half of 2024, while AS2 experiences a gradual yet prolonged series of rate hikes throughout 2024. All rate hikes are assumed to occur within the first year of stress and maintained throughout the next two years.

Similar to the previous exercise,<sup>14</sup> the current stress test exercise prioritises conservatism in its assumptions over strict coherence with the broader macroeconomic scenario to account for potential additional downside risks.<sup>15</sup> The stress test assumes a steep contraction

**Table 2.1: Macro Stress Test – Key Assumptions and Shock Parameters Applied Under Assumed Adverse Scenarios**

Key Assumptions	AS1	AS2
Annual domestic real GDP growth	Up to -6.0%	Up to -3.5%
Annual unemployment rate	Up to 5.4%	Up to 6.0%
Market risk shocks - Increase in 10Y MGS yield - Increase in 10Y AAA corporate bond yield - Decline in FBM KLCI	Up to 296 basis points Up to 422 basis points Up to 32%	Up to 266 basis points Up to 369 basis points Up to 31%
OPR hike <sup>(i)</sup>	Up to 100 basis points	Up to 100 basis points
MYR depreciation against USD	Up to 31%	Up to 22%

Note: <sup>(i)</sup> The assumption of an OPR hike may not, in certain circumstances, be consistent with the broader macroeconomic scenarios but is assumed by design to account for potential downside risks.

Source: Bank Negara Malaysia

<sup>14</sup> Refer to the macro solvency stress test exercise published in the BNM Financial Stability Review for Second Half 2022.

<sup>15</sup> For further details on the stress test methodology, please refer to the boxes on 'Key Features of the Enhanced Macro Solvency Simulation for Banks', 'Forecasting Business Impairments: Two-pronged Approach', and 'Forecasting Households' Time to Default' in the BNM Financial Stability Review for First Half 2020.

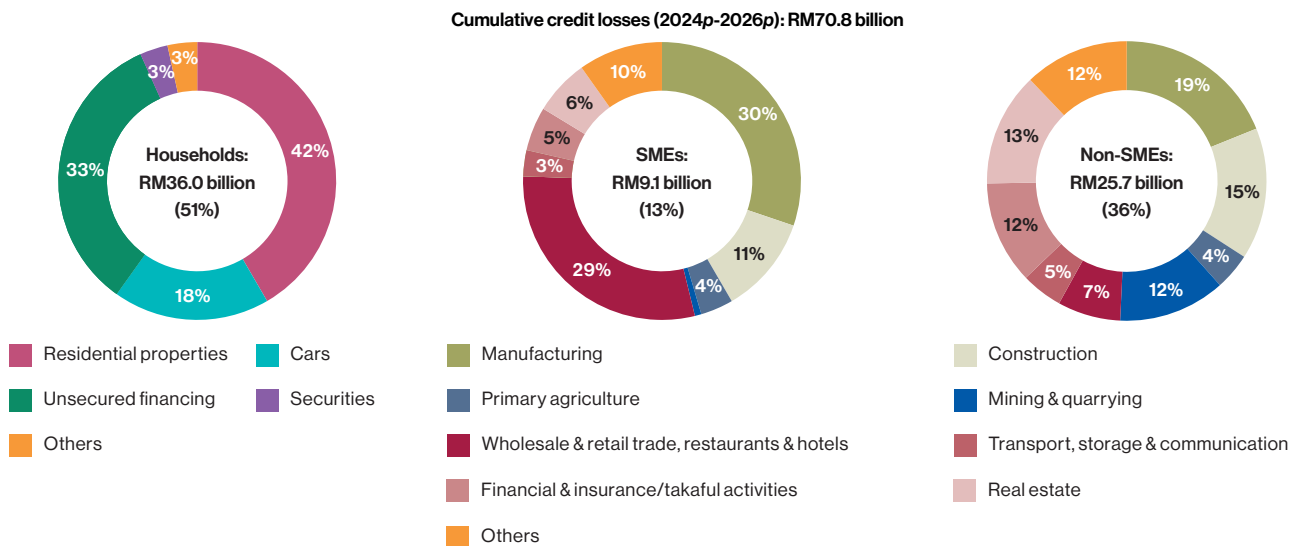
in GDP, coupled with high unemployment. These are then exacerbated by a series of OPR hikes, instead of a rate cut that could provide support to the economy. The higher OPR is assumed to adversely impact the debt-servicing capacity of borrowers but has no positive bearing on banks' profitability. Where relevant, judgemental overlays based on company-specific developments are incorporated into the assessments of potential impairments for selected large non-SME borrowers. Furthermore, non-SME borrowers that fail the simulation are assumed to trigger a cross-default across their entire business group, even though their other subsidiaries may be financially strong. Similar assumptions on cross-default are also applied to household borrowers who default on their loans. No reversal in the loan staging classification by banks is assumed throughout the stress horizon, even if defaulted borrowers' debt-servicing capacity improves. Similar to the previous exercise, the current stress test assumes that no loan repayment assistance or policy support measures are made available to borrowers. The exercise also incorporates projected losses from significant overseas operations of the domestic banking groups (DBGs).

### Stress test results reaffirm the resilience of financial institutions even under severe simulated shocks

While the macroeconomic and financial shocks applied in the 2024 macro solvency stress test exercise are broadly similar to that applied in the 2023 exercise, revisions were made to some of the parameters along with further conservatism built into judgemental overlays to capture additional downside risks.

Over the 3-year stress test horizon, the banking system is projected to incur substantial losses arising mainly from credit risk and revaluation of securities held at FVOCI. The cumulative credit costs are estimated to be RM63.1 billion and RM70.8 billion under AS1 and AS2 respectively (or 53% and 57% of total losses) (Chart 2.26). Losses from DBGs' overseas operations account for less than 20% of the cumulative credit costs, stemming primarily from defaults of large non-SMEs. Meanwhile, the stress test yield shocks are expected to

**Chart 2.26: Macro Stress Test: Banking System – Drivers of Cumulative Credit Losses Under Adverse Scenario 2**



p Projected

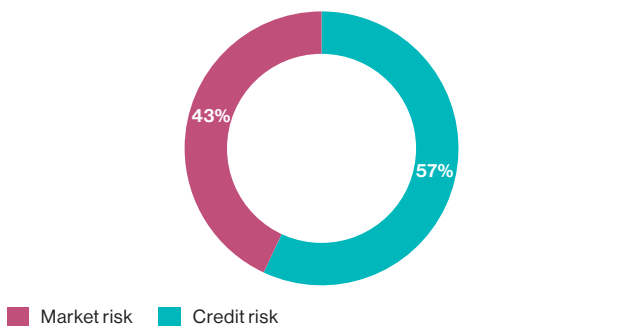
Note: 1. (...) refers to % of overall cumulative credit costs.  
2. Figures may not add up due to rounding.

Source: Bank Negara Malaysia

cause sizeable revaluation losses for bonds in the FVOCI portfolio (RM54.7 billion or 45% and RM51.7 billion or 41% of total losses under AS1 and AS2 respectively), directly reducing the banking system's capital buffers (Chart 2.27). In contrast, market risk losses attributed to banks' trading books are minimal, accounting for only about 2% of total losses. Similarly, losses from FX movements remain limited under both scenarios (AS1: 0.2% of total losses; AS2: 0.1%) due to the relatively small net open positions of banks.

By the end of the stress horizon in 2026, overall impairments are projected to rise to 7.8% and 8.6% of total banking system loans under AS1 and AS2 respectively, driven mainly by household impairments (Chart 2.28). Under AS1 and AS2, household borrowers earning less than RM5,000 per month account for the largest share (64%) of borrowers at risk of defaulting given their thinner financial buffers (Chart 2.29). However, in value terms, these borrowers form a smaller share (41%) of new impairments, reflecting lower amounts borrowed relative to higher-income groups. Borrowers earning between RM5,000 and RM10,000 monthly also remain vulnerable to economic downturns given their relatively high indebtedness compared to other income groups. They constitute up to 30% of borrowers at risk of defaulting and 43% of new impairments by value. Meanwhile, 61% of the projected increase in business impaired loans under AS2 are attributable to non-SMEs, the bulk of which are borrower groups with pre-existing weak financials. SMEs comprise the remaining 39% of business impairments with projected defaults notably higher under AS2 (1.6% of total banking system loans; AS1: 1.2%). This is to be expected given the erosion of SMEs' limited financial buffers during a prolonged economic downturn, leading to more defaults.

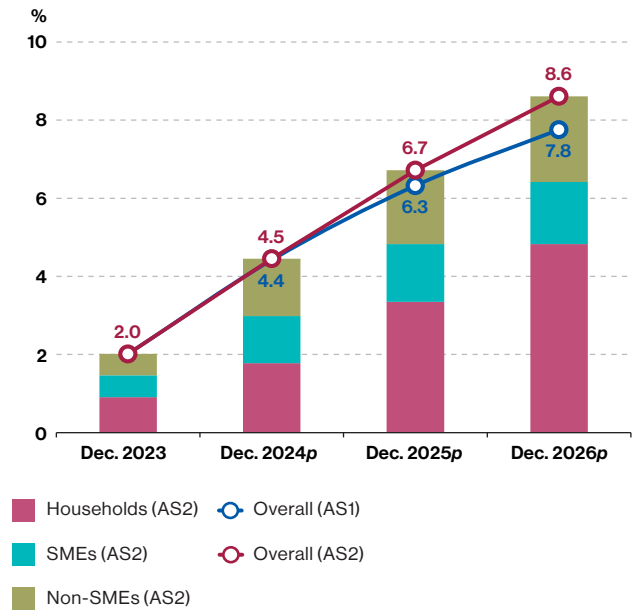
**Chart 2.27: Macro Stress Test: Banking System – Key Loss Drivers under Adverse Scenario 2**



Note: Market risk includes revaluation losses on bonds held in the fair value through other comprehensive income (FVOCI) portfolio.

Source: Bank Negara Malaysia

**Chart 2.28: Macro Stress Test: Banking System – Impaired Loans Ratio Under Adverse Scenarios 1 and 2**

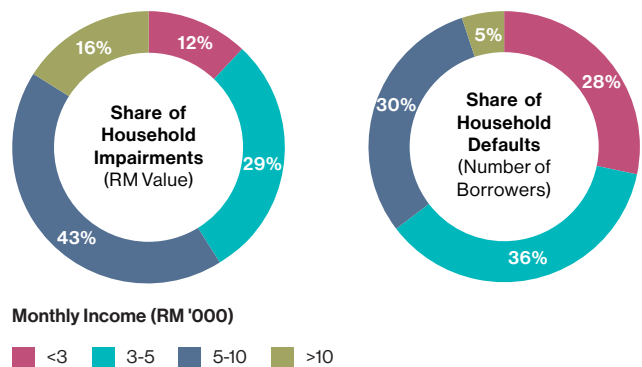


p Projected

Note: Impairment figures are inclusive of exposures from selected DBGs' overseas operations.

Source: Bank Negara Malaysia

**Chart 2.29: Macro Stress Test: Household Sector – Impairment Profile Under Adverse Scenario 2**

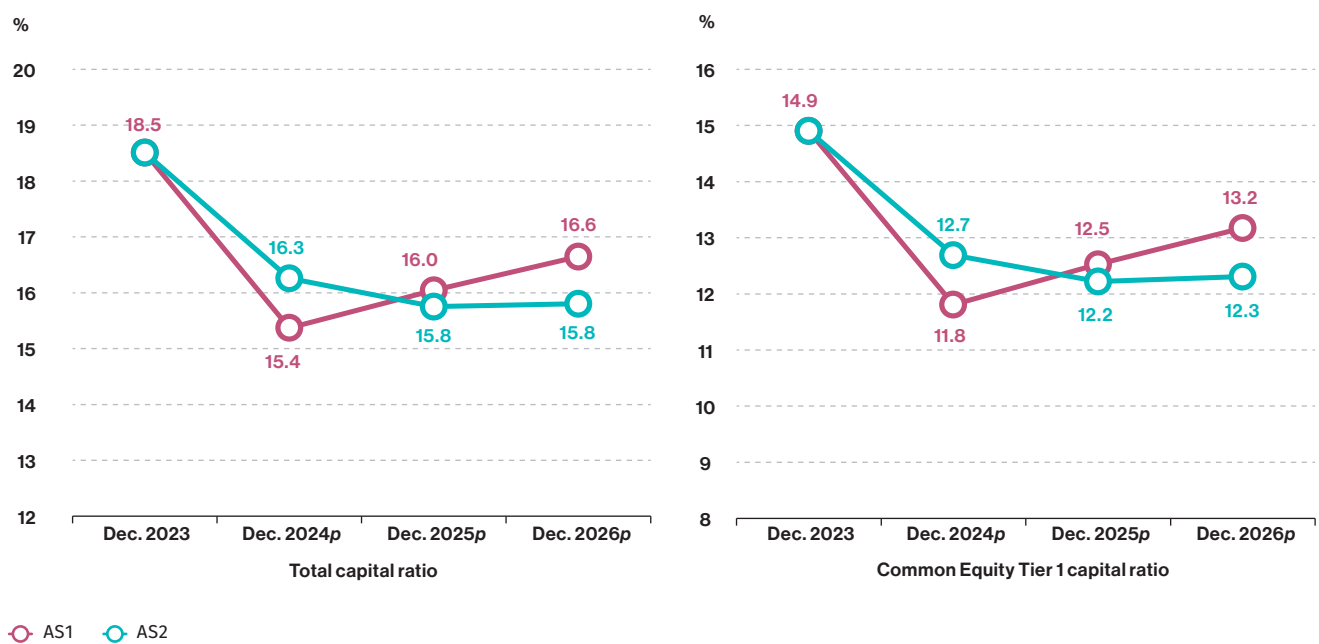


Note: Figures may not add up due to rounding.

Source: Bank Negara Malaysia

Under the severe stress test shocks, the aggregate banking system's profitability would decline sharply in the initial year of stress, driven mainly by increased credit costs. Net interest income would also decline sharply amid elevated funding costs without the corresponding interest income gains assumed from the OPR hikes. However, net interest income is expected to gradually rebound in the subsequent years, leading to a recovery in profits and capital buffers. Losses incurred from overseas operations, while notable for large DBGs,

Chart 2.30: Macro Stress Test: Banking System – Capital Ratios Under Adverse Scenarios 1 and 2



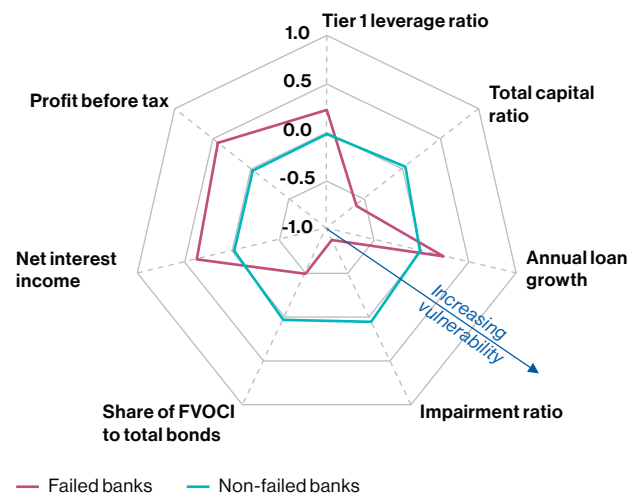
AS1 AS2  
 p Projected  
 Source: Bank Negara Malaysia

are not expected to pose major risks to overall DBGs’ resilience because of the healthy capital buffers held by the respective overseas entities.

Overall, the banking system’s capital ratio will remain above the regulatory minima under both scenarios (Chart 2.30). Three banks,<sup>16</sup> however, would breach the minimum regulatory capital requirements. These banks, which account for less than 2% of total banking system assets, share common traits of weaker profitability and net interest income as well as higher loan growth leading to higher leverage levels at the onset of the stress test (Chart 2.31).

To further stress the resilience of banks, additional liquidity shocks<sup>17</sup> were applied to banks that incurred persistent losses<sup>18</sup> or whose capital ratios dipped below regulatory minima. All banks maintained sufficient HQLA to meet the heightened cashflow demands, with nine banks recording LCR below 100% following the liquidation of their HQLA.

Chart 2.31: Macro Stress Test: Banking System – Common Characteristics of Failed Banks’ Pre-stress Position (2023)



Note: 1. Failed banks refer to banks which would breach the minimum regulatory capital requirements under stress test scenario.  
 2. Chart values are standardised using z-score, where larger values along a given axis signify more risks along that characteristic.  
 3. 'Tier 1 leverage ratio' refers to Tier 1 capital divided by total assets.

Source: Bank Negara Malaysia

<sup>16</sup> Refers to the banking group or standalone bank if it does not belong to a larger banking group, as the case may be.  
<sup>17</sup> Stressed outflows applied vary by bank depending on the bank’s historical deposit outflow volatility and deposit composition (residents vs non-residents and retail vs corporate). The resultant outflow is at least 300% higher than each bank’s historical average monthly outflow since 2016.  
<sup>18</sup> Refers to banks that incurred at least two consecutive quarters of losses, or a minimum two years of annual losses.

Taken together, the solvency and liquidity stress test exercises continue to affirm that banks remain highly resilient in the face of severe macroeconomic, financial, and liquidity shocks.

The macro solvency stress test for insurers also incorporates identical AS1 and AS2 scenarios, with additional insurance-specific assumptions (Table 2.2). Under both scenarios, the insurance sector is assessed to maintain an aggregate CAR above the regulatory minimum (Chart 2.32). Market risk remains the key loss driver for both life and general insurers (Chart 2.33), as the rising bond yields and the weak equity market weigh on their significant holdings of financial assets. Notwithstanding this, the downward revaluation of liabilities due to the increase in bond yields is expected to partly cushion the impact on the CAR for life insurers. Sustained underwriting income from new business premiums further supported the CAR despite higher

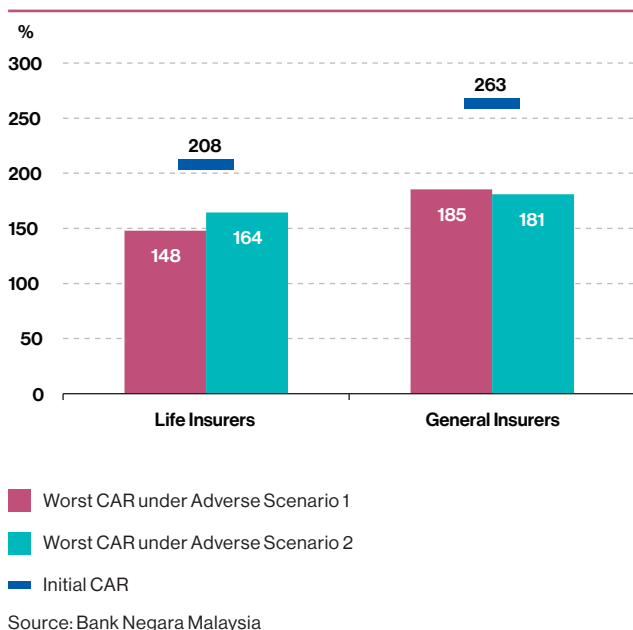
assumed medical and health insurance payouts. For general insurers, lower premium income amid intensified competition, and higher claims from the motor and fire segments also contributed to the decline in CAR. Two insurers, accounting for less than 3% of total insurance assets, are projected to breach the regulatory minimum post-shock. The insurance macro solvency stress test exercise is supplemented with a liquidity assessment to evaluate insurers' ability to meet short-term liquidity needs under stressed conditions arising from elevated medical-related payouts, surrenders and higher motor and fire claims including that arising from floods. The liquidity assessment affirms that insurers have sufficient liquid assets and are able to fulfil these obligations.

**Table 2.2: Macro Stress Test – Additional Assumptions in Insurance Stress Test**

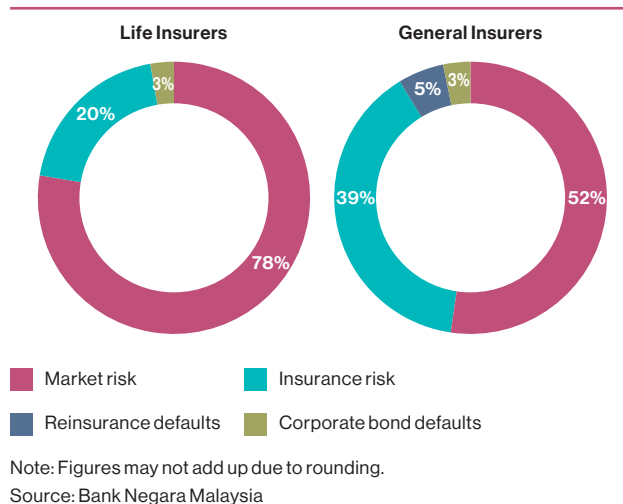
<b>Payouts for medical and health insurance policies</b>	Elevated claims payouts from medical and health insurance policies due to increasing incidence rate and size of claims.
<b>General insurance premiums</b>	Lower premium rates due to intensified competition in the motor and fire segments and the hardening of the reinsurance market due to lower global reinsurance capacity.
<b>General insurance claims</b>	Elevated general insurance claims and expenses attributable to higher motor parts costs due to supply disruptions and increased import costs, coupled with significant flood events every year-end.

Source: Bank Negara Malaysia

**Chart 2.32: Macro Stress Test: Insurance Sector – Capital Adequacy Ratio (CAR) Under Adverse Scenarios 1 and 2**



**Chart 2.33: Macro Stress Test: Insurance Sector – Loss Drivers Under Adverse Scenario 2**



# The Imperatives for Strengthened Regulation and Supervision of Liquidity Risk in Malaysia

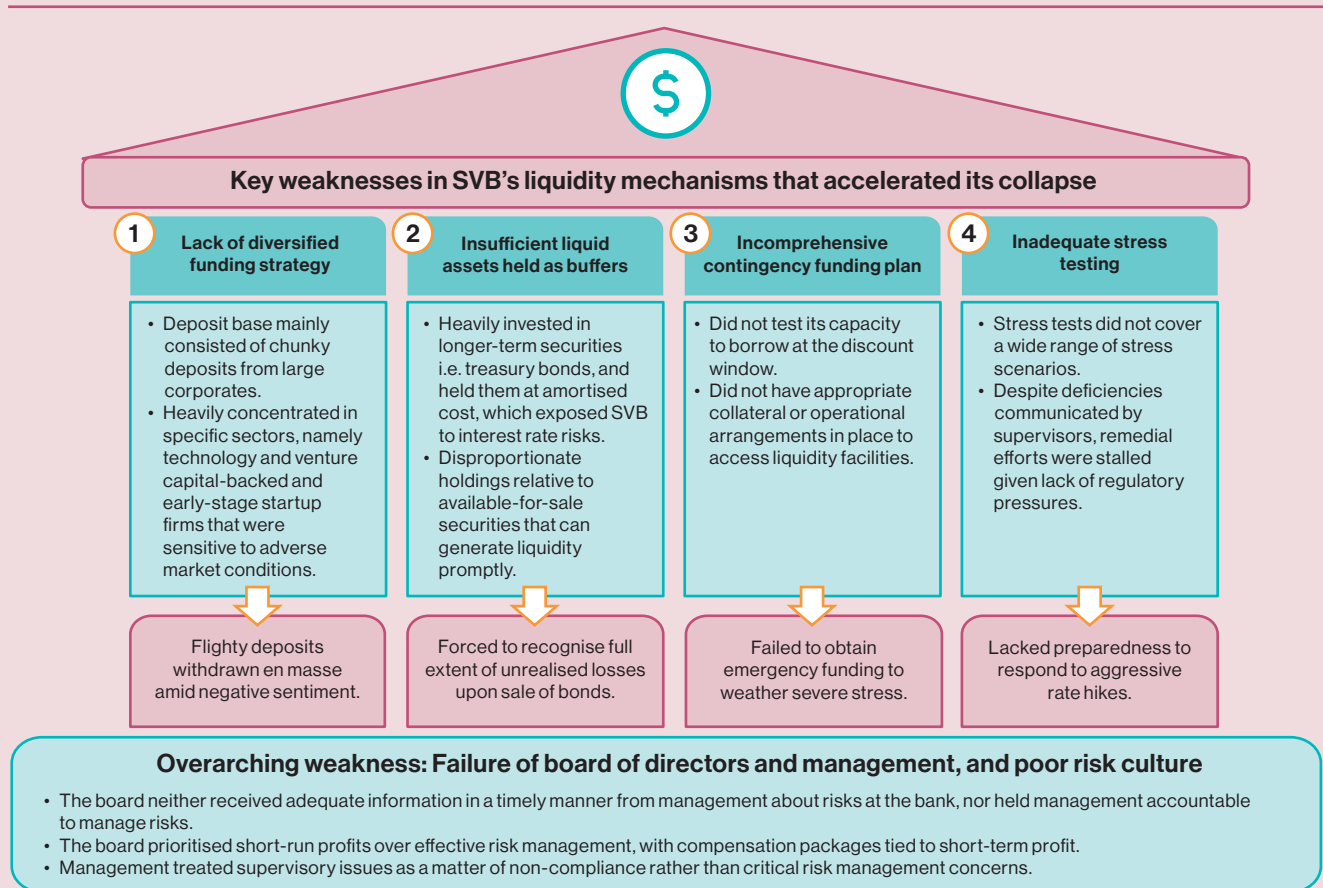
## The Silicon Valley Bank (SVB) crisis

The global financial crisis in 2007–09 saw a raft of global regulatory reforms put in place to improve the banking sector’s ability to absorb financial and economic shocks. This includes Basel III which comprises measures to strengthen global capital and liquidity standards. The higher quality and levels of capital and liquidity held by banks have helped ensure the continued resilience of the banking system against various financial and economic shocks, including the COVID-19 pandemic.

In early 2023 however, a number of notable bank failures in several advanced economies triggered what has been termed the most significant system-wide banking stress since the global financial crisis in terms of scale and scope.<sup>1</sup> One such bank failure was that of SVB in March 2023, which experienced a sharp outflow<sup>2</sup> of its deposits within just a few days, leading to its collapse.

Various observers have pointed out that while SVB’s collapse was precipitated by rapidly changing macroeconomic conditions, its fragility was ultimately rooted in its core weaknesses in liquidity risk management (summarised in Diagram 1).

**Diagram 1: Key Weaknesses in SVB’s Liquidity Mechanisms that Accelerated its Collapse**



Source: Board of Governors of the Federal Reserve System

<sup>1</sup> Basel Committee on Banking Supervision, 2023.

<sup>2</sup> Withdrawals peaked on 9 March 2023, which on that day alone saw USD42 billion in deposit outflows. SVB was subsequently placed into receivership on 10 March 2023, which resulted in deposit withdrawals being temporarily suspended. It is estimated that had it remained open, SVB would have seen a further USD100 billion in deposit outflows that day, resulting in total withdrawals amounting to 85% of its deposits.

The collapse of SVB also revealed how the dynamics of liquidity have evolved with the digitalisation of finance, heightening the challenges faced by banks in managing liquidity. First, the increased prevalence of online and mobile banking, as well as instant payments, while bringing about greater customer convenience, also enabled customers to easily move funds in and out of any bank. Second, the rapid and widespread dissemination of information through the use of social media has heightened the sensitivity of banks to reputational risks and shifting public sentiment, especially in times of uncertainty. These factors amplify the speed and magnitude of bank runs, increasing the challenge of managing liquidity risk for banks.

### The global regulatory and supervisory response

The effects of the turmoil arising from the events at SVB and other bank failures in 2023 were relatively contained, with limited impact on global financial system stability. This affirms the effectiveness of Basel III and other financial reforms implemented in the aftermath of the global financial crisis to increase the quality and levels of capital and liquidity of banks. It also underscores the critical importance for all banks to adopt sound liquidity risk management practices.

At the global level, the Basel Committee on Banking Supervision (BCBS) has conducted a stocktake of regulatory and supervisory lessons arising from the failure of SVB and the turmoil. The BCBS is also pursuing analytical work to determine whether features of the Basel Framework, specifically those related to liquidity risk and interest rate risk in the banking book (IRRBB), had performed as intended during the crisis.

### Developments in the regulation and supervision of liquidity risk in Malaysia

While events at SVB and the broader banking turmoil have had only a limited impact on Malaysia, Bank Negara Malaysia (BNM) has taken measures to further strengthen the regulation and supervision of liquidity risk (summarised in Diagram 2). These include implementing a number of initiatives in 2023, many of which were either planned for or initiated prior to the SVB crisis. The banking turmoil however provided additional impetus and surfaced new dimensions of risks to consider.

As part of ongoing supervision, BNM conducted **targeted supervisory reviews of liquidity risk and funding management practices** during the year by looking at how banks manage deposit concentrations and set monitoring thresholds for key risk indicators, as well as evaluating their liquidity stress test assumptions and contingency funding plans.

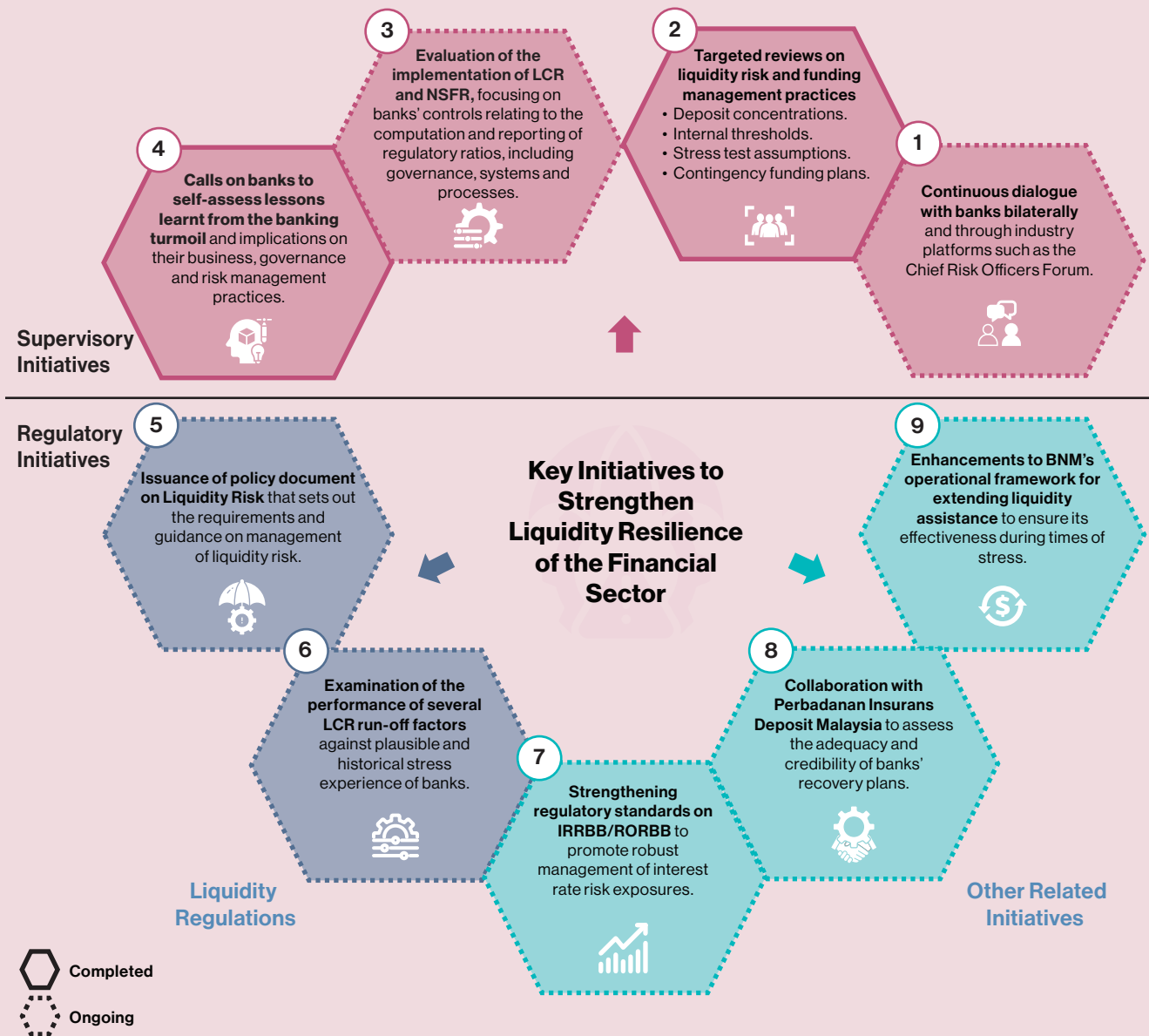
In addition, BNM also conducted a **thematic assessment of the implementation of the Liquidity Coverage Ratio (LCR)<sup>3</sup> and Net Stable Funding Ratio (NSFR)<sup>4</sup>** by banks, focusing on the effectiveness of controls, including governance, systems and processes, surrounding the computation and reporting of the ratios. While controls were generally found to be adequate and effective, the review identified some areas for improvement at individual banks. These include enhancing internal policies and procedures to ensure adequate oversight and periodic review of the computation and reporting processes.

Banks were also tasked to perform **self-assessments, reflecting on the lessons learnt from the banking turmoil** and implications on their business, governance and risk management practices. Following these reviews, banks have taken steps to further enhance and fine-tune aspects of their liquidity risk management practices. These have largely focused on enhancing the parameters used to monitor and model depositor concentrations; requiring internal monitoring thresholds to better account for liquidity risks associated with online channels; and testing of contingency funding plans.

<sup>3</sup> A quantitative requirement that seeks to ensure that banks hold sufficient high-quality liquid assets to withstand an acute liquidity stress scenario over a 30-day horizon.

<sup>4</sup> A minimum standard that requires banks to maintain a stable funding profile to support their assets and off-balance sheet activities.

Diagram 2: Key Initiatives to Strengthen Liquidity Resilience of the Financial Sector



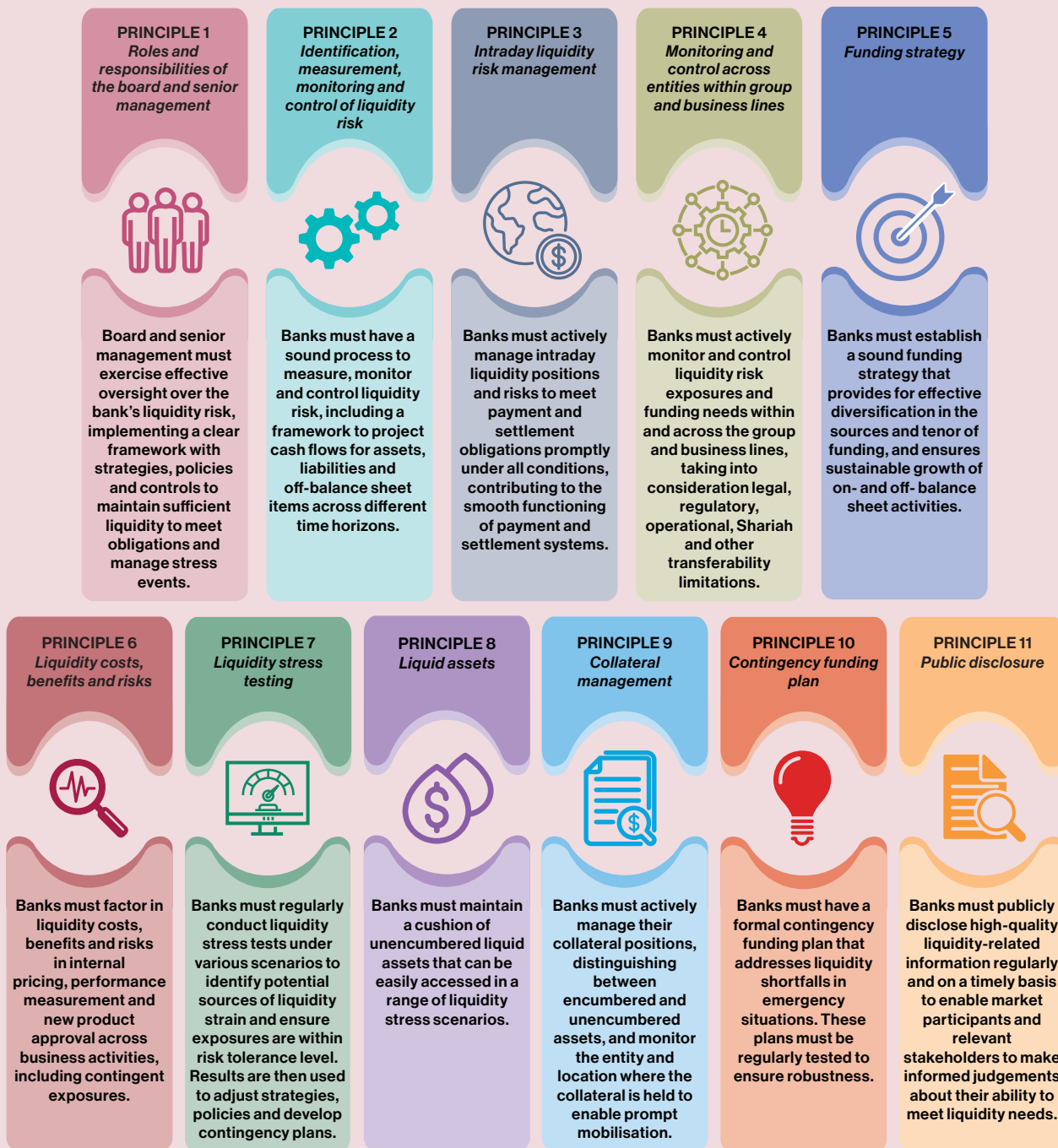
Source: Bank Negara Malaysia

In August, BNM issued an **exposure draft on Liquidity Risk** for public consultation. The exposure draft sets out standards on sound liquidity risk management practices for banks (summarised in Diagram 3), thus complementing the minimum regulatory liquidity requirements specified by the LCR and NSFR.

Expectations in the exposure draft are also consistent with principles<sup>5</sup> issued by the BCBS and Islamic Financial Services Board, and aligned with BNM's long-standing approach to the supervision of liquidity risks in the banking system. They aim to establish a common baseline for sound practices, while also incorporating lessons learnt from the recent banking turmoil. This includes specific expectations for banks to adequately assess and manage concentration risks, and to evaluate the quality of liquid assets from multiple dimensions. Banks are also expected to accord due focus to emerging risks such as those associated with online withdrawals and negative public sentiment on social media, considering the changing dynamics of withdrawal behaviour brought about by digital finance. BNM targets to finalise the requirements and issue the policy document in the second half of 2024.

<sup>5</sup> This refers to the *Principles for Sound Liquidity Risk Management and Supervision*, issued by the BCBS on 25 September 2008. More recently in 2019, the BCBS completed a review of the principles and found them to remain fit for purpose. <https://www.bis.org/publ/bcbs144.htm>

Diagram 3: Summary of Key Principles of Liquidity Risk Management



Source: Bank Negara Malaysia

Concurrently, as part of efforts to ensure the efficacy of BNM's minimum regulatory liquidity requirements, we conducted an **examination of the performance of LCR run-off factors** to determine whether their calibration is reflective of plausible and historical stress experiences of banks. The study revealed that for some banks, actual historic outflows observed under extreme scenarios for certain deposit types – such as that for SMEs – exceeded that of LCR prescribed run-off rates. Nonetheless, banks which experienced such outflows also reported high overall LCR ratios, typically ranging between 148% and 300%, thus providing sufficient buffers to withstand potential deposit outflows.

BNM is also **strengthening regulatory standards on IRRBB/rate of return risk in the banking book (RORBB)**, as part of its efforts to promote robust management of interest rate/rate of return risk exposures and more broadly, stronger asset-liability management (ALM) practices in banks. More specifically, BNM is working towards enhancing industry

practices in identifying and measuring the sensitivity of their assets and liabilities to interest rate/rate of return risk and consequently, taking actions to address any emerging vulnerabilities. This work is expected to draw on parallel efforts by the BCBS to update its calibration and methodology used to calculate the impact of interest rate shocks.

BNM's recent efforts on this front also include ongoing collaboration with Perbadanan Insurans Deposit Malaysia (PIDM) to strengthen capacity and preparedness in responding to crises. In 2024, BNM and PIDM will conduct a **review to assess the adequacy and credibility of recovery plans** prepared by banks to respond to liquidity stress. In parallel, BNM is also working on efforts to **enhance and clarify various aspects of its operational framework on liquidity assistance** to banks in the event of a liquidity crisis.<sup>6</sup>

### Addressing structural challenges in the management of liquidity risks by Islamic banks

Islamic banks face a number of structural challenges in managing liquidity risk. These challenges include that relating to the differences in the asset and liability profiles of Islamic banks compared to their conventional peers. In particular, Islamic banks tend to see higher concentrations in wholesale funding, given their traditional reliance on corporate deposits to support financing growth. The market depth of Shariah-compliant liquidity instruments also remains more limited given the shallower pool of market participants and Shariah-compliant money market products relative to conventional options.

BNM has been working closely with the banking industry over the years to address these challenges through a number of measures (summarised in Diagram 4). As part of these efforts, BNM is also undertaking a holistic review of the role and operation of investment accounts with the industry to address the funding imbalances observed in Islamic banks.

**Diagram 4: Key Initiatives Pursued to Address Challenges Faced by the Islamic Banking Industry**



Source: Bank Negara Malaysia

### References

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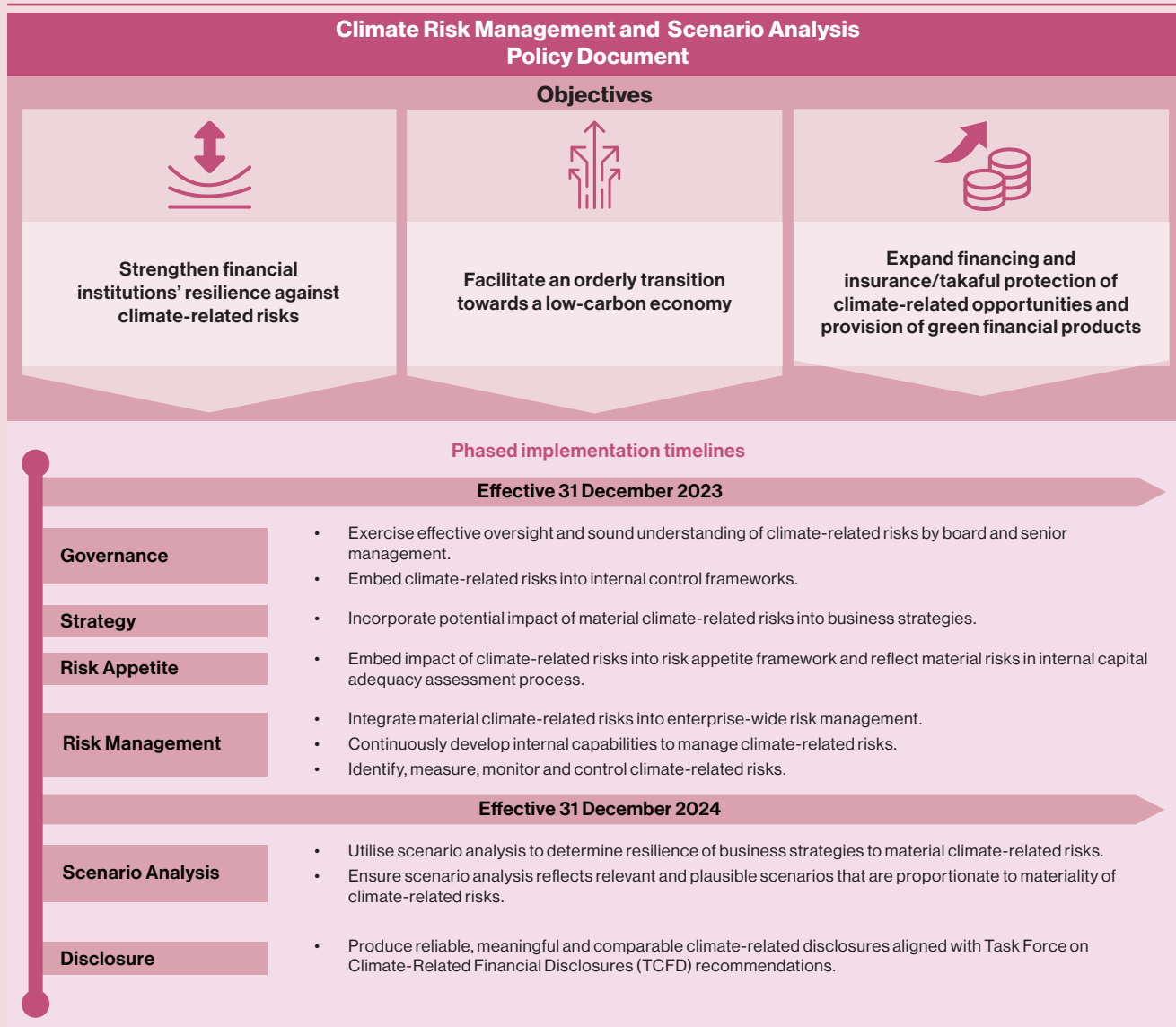
Silicon Valley Bank Financial Group. (2023). 'Q4 2022 Financial Highlights'. Retrieved from <https://ir.svb.com/financials/quarterly-results/default.aspx>

<sup>6</sup> Refer to the box article on 'The Bank's Liquidity Operations to Achieve its Mandate' in BNM Quarterly Bulletin Vol. 38 No.1 for further details. [https://www.bnm.gov.my/documents/20124/10644344/qb23q1\\_en\\_box1.pdf](https://www.bnm.gov.my/documents/20124/10644344/qb23q1_en_box1.pdf)

## Progress in Strengthening Climate Risk Management Practices

The Climate Risk Management and Scenario Analysis policy document (CRMSA PD)<sup>1</sup> sets out the principles and requirements for financial institutions to manage climate-related risks. An overview of the CRMSA PD is illustrated in Diagram 1.

Diagram 1: CRMSA PD Objectives and Implementation Timelines



Source: Bank Negara Malaysia

As part of Bank Negara Malaysia's (BNM) ongoing supervisory approach, financial institutions update BNM regularly on their implementation plans in adopting the CRMSA PD.

This article reviews the progress reported by financial institutions in implementing the CRMSA PD requirements – including the range of practices observed, drivers of financial institutions with better progress and the initiatives put in place to strengthen the financial sector's resilience to climate-related risks.







<sup>1</sup> Issued on 30 November 2022.

## Steady progress in the implementation of CRMSA PD

Generally, we observed that all financial institutions<sup>2</sup> are making meaningful progress in adopting the requirements in the CRMSA PD and integrating climate-related risks into their existing practices. Diagram 2 provides an overview of the common practices observed, and practices that continue to evolve as financial institutions strengthen their capability to better manage climate-related risks.

**Diagram 2: Financial Institutions' Progress in Managing Climate-Related Risks**

### Financial institutions are showing steady progress in integrating climate-related risks into existing practices

	Common practices...	Evolving practices ...
<b>Governance</b> 	<ul style="list-style-type: none"> <li>Defined roles and responsibilities of board and senior management for overseeing climate risk management.</li> <li>Established reporting cadence to the board to facilitate monitoring of progress on climate risk initiatives.</li> </ul>	<ul style="list-style-type: none"> <li>Continuous capacity building to ensure effective oversight.</li> <li>Establish relevant metrics for meaningful escalation and reporting.</li> <li>Establish dedicated board/senior management committees to oversee and drive climate risk initiatives.</li> </ul>
<b>Strategy</b> 	<ul style="list-style-type: none"> <li>Qualitative Environmental, Social And Governance (ESG)/ sustainability strategies are embedded in business strategies.</li> </ul>	<ul style="list-style-type: none"> <li>Climate strategies to be driven more by data and quantitative assessments.</li> <li>Clearer localisation of group-level strategies.</li> </ul>
<b>Risk Appetite</b> 	<ul style="list-style-type: none"> <li>Developed qualitative risk appetite statements (RAS).</li> <li>Use of Climate Change and Principle-based Taxonomy (CCPT) classifications to inform risk limits.</li> <li>Short-term risk assessment undertaken among general ITOs to cap exposure to flood-related risks.</li> </ul>	<ul style="list-style-type: none"> <li>With greater access to data, RAS reflects more quantitative assessments, incorporates time horizons of climate risks and is more directly linked to capital management.</li> </ul>
<b>Risk Management</b> 	<ul style="list-style-type: none"> <li>Integrated climate-related risks into financial institutions' risk processes and ability to map transmission of these risks into existing risk types (i.e. credit, market, operational, legal, strategic and reputational).</li> <li>Developed internal climate data capabilities by improving data collection processes and leveraging data collated by external data providers.</li> </ul>	<ul style="list-style-type: none"> <li>Development of quantitative risk modelling methodologies.</li> <li>Develop transition plans at institutional and sectoral levels.</li> <li>Develop forward-looking metrics such as climate-adjusted probability of default/loss given default under various climate scenarios.</li> </ul>
<b>Scenario Analysis</b> 	<ul style="list-style-type: none"> <li>Inclusion of short-term climate scenarios to incorporate natural disaster events (e.g. flood).</li> </ul>	<ul style="list-style-type: none"> <li>Use of more granular scenario analysis to inform business and risk strategies.</li> </ul>
<b>Disclosure</b> 	<ul style="list-style-type: none"> <li>Advanced preparations to produce TCFD-aligned disclosures.</li> </ul>	<ul style="list-style-type: none"> <li>Further improve quality and coverage of climate disclosures to meet investors and stakeholders needs, especially around risk management, metrics and targets.</li> </ul>

Source: Bank Negara Malaysia

Across the six pillars of the CRMSA PD, financial institutions demonstrated the most progress in the area of governance. Almost all financial institutions have augmented existing governance structures and internal policies to enable better oversight of climate-related risks. Among larger financial institutions, dedicated board-level committees to oversee the financial institution's response to climate-related risks are common. In smaller financial institutions, this responsibility is assumed by existing committees, under expanded terms of reference. We also observed improved reporting mechanisms to update the board and senior management on climate-related risks. In some institutions, this is supported by responsibility for climate risk and strategy assigned to a dedicated member of senior management. Most institutions also have in place climate-related key performance indicators that are tracked and monitored.

<sup>2</sup> Banks (including commercial, Islamic and investment banks as well as developmental financial institutions), insurers and takaful operators (ITOs).

In the area of strategy, financial institutions are beginning to incorporate climate-related risk considerations into their existing sustainability frameworks,<sup>3</sup> processes and business strategies. Although most financial institutions are still developing their climate strategies, some have begun to introduce high-level green financing commitments and investment targets that are aligned with their risk appetites and business strategies. These are sometimes, though not always, accompanied by clear portfolio decarbonisation strategies and capital allocated to fund climate-aligned assets. More generally, financial institutions are taking concrete steps to increase engagement levels and the due diligence process with counterparties.

Data availability remains a key challenge identified by all financial institutions. Given the challenges posed by the lack of sufficiently granular and credible data, as well as relatively underdeveloped quantitative climate risk models, most financial institutions are building qualitative approaches to develop their risk appetite, risk management policies and practices, scenario analysis and disclosures. Some examples include:

- i. Utilising the Climate Change and Principle-based Taxonomy (CCPT) classifications to set risk tolerance thresholds and estimate exposures.
- ii. Incorporating better insights obtained through due diligence surveys conducted on counterparties to improve judgements on exposures to physical and transition risks.
- iii. Utilising conceptual assumptions underpinning climate risk models to sharpen initial assessments of how climate-related risks may impact their risk exposures, internal operations and business strategies.

Some common characteristics can be observed among financial institutions that have achieved better progress in implementing the CRMSA PD:

- i. Evidence of a strong tone from the top, with the board of directors and senior management playing a pivotal role. An appointed board member or member of senior management provides active sponsorship of the financial institution's climate response. This includes actively steering the direction to align resources, frameworks and incentives which in turn, accelerates efforts taken to implement climate-related strategies across the organisation.
- ii. Better access to skilled resources to help build internal capabilities. Leading financial institutions actively work with experts within or outside their financial group, and are deeply engaged in collaborative platforms<sup>4</sup> to tap multi-disciplinary insights and keep abreast of sectoral, national and global developments.
- iii. High commitment of financial and non-financial resources. This includes making meaningful investments in systems to capture granular climate-related data, a comprehensive and thoughtful approach to strategic pivots and a sustained focus on structured training to elevate staff capability.

### Regulatory authorities' initiatives to support implementation

Domestically, the Joint Committee on Climate Change (JC3),<sup>5</sup> co-led by BNM and Securities Commission Malaysia (SC), continues to play an important role in supporting efforts by financial institutions to strengthen their climate risk management practices and expand financial solutions for climate transition and adaptation activities. In helping to bridge critical data gaps, the JC3 will continue to expand the Climate Data Catalogue<sup>6</sup> to capture more granular data sources, while working with data partners to improve the quality, accessibility and usability of available data. The JC3 has also recently established the physical and transition risk working groups to develop relevant guidance and tools to assist with the construction of physical and transition risk assessment methodologies and models. In February this year, BNM issued the Methodology Paper on Climate Risk Stress Testing (CRST) with inputs from the industry including JC3 members, to guide financial institutions in using stress testing to better understand risks coming from climate change. A stronger focus on transition plans and planning will also be pursued in 2024 to promote critical alignment between financial institutions' climate strategies and targets, national policies, macroeconomic risk impacts and developments in the supervisory and prudential framework.

<sup>3</sup> These include Environmental, Social and Governance (ESG) frameworks and policies.

<sup>4</sup> Including platforms such as the JC3 and United Nations Environment Programme Finance Initiative.

<sup>5</sup> The JC3 is a platform established in September 2019 to pursue collaborative actions for building climate resilience within the Malaysia financial sector. The JC3 is co-chaired by BNM and SC, and the members include Bursa Malaysia and 21 financial institutions.

<sup>6</sup> Climate Data Catalogue was issued in end-2022 by the JC3 to serve as a source of reference on climate and environmental data for the financial sector.

On the international front, the Financial Stability Board (FSB) continues to promote a globally consistent supervisory and regulatory response to climate change.<sup>7</sup> Similarly, the Basel Committee on Banking Supervision (BCBS) is undertaking a holistic approach to address climate-related risks across all three pillars of regulation, supervision and disclosure.<sup>8</sup> The International Association of Insurance Supervisors (IAIS) has also included climate change as a key theme within the IAIS Strategic Plan, focusing on sharpening risk assessments and developing supervisory capacity.<sup>9</sup>

## The path forward

Building on the ongoing progress in implementing the CRMSA PD by financial institutions, the near-term regulatory and supervisory priorities will focus on:

- i. Addressing fragmented approaches to managing climate-related risks that are still being observed in some financial institutions. We expect financial institutions to ensure implementation of their climate risk management frameworks are well integrated across all functions. Financial institutions' risk reporting systems should reflect this in order to enable integrated monitoring and escalation of climate-related risks within the organisation.
- ii. Ensuring financial institutions develop credible transition plans. It is crucial for financial institutions to align their business and risk strategies with their climate commitments, the transition plans of their customers and national aspirations. Financial institutions will be expected to demonstrate how they operationalise climate targets in their business and risk strategies. An aggregate view of transition plans will also be important to identify potential disproportionate impacts of climate-related measures on vulnerable groups, such as low-income communities, hard-to-abate sectors, and small and medium enterprises. This in turn will enable mitigating actions to ensure an orderly transition of the economy.
- iii. Ensuring financial institutions produce climate disclosures that meet the needs of investors and stakeholders. Disclosures that are accurate and adhere to international standards are important to manage greenwashing risk. The Advisory Committee on Sustainability Reporting (ACSR)<sup>10</sup> is conducting a public consultation<sup>11</sup> on the proposed implementation of the sustainability disclosure standards issued by the International Sustainability Standards Board (ISSB) in Malaysia. Consistent with that, we expect financial institutions to continue to make progress towards producing climate disclosures that are fully aligned with the Task Force on Climate-Related Financial Disclosures (TCFD) recommendations and the sustainability disclosure standards issued by the ISSB.

<sup>7</sup> Supervisory and regulatory approaches to climate-related risks: Final report. (2022). Financial Stability Board.

<sup>8</sup> Basel Committee Work Programme and Strategic Priorities for 2023/24. (2022). Basel Committee on Banking Supervision.

<sup>9</sup> Climate risk. International Association of Insurance Supervisors. Retrieved March 1, 2024 from <https://www.iaisweb.org/activities-topics/climate-risk/>

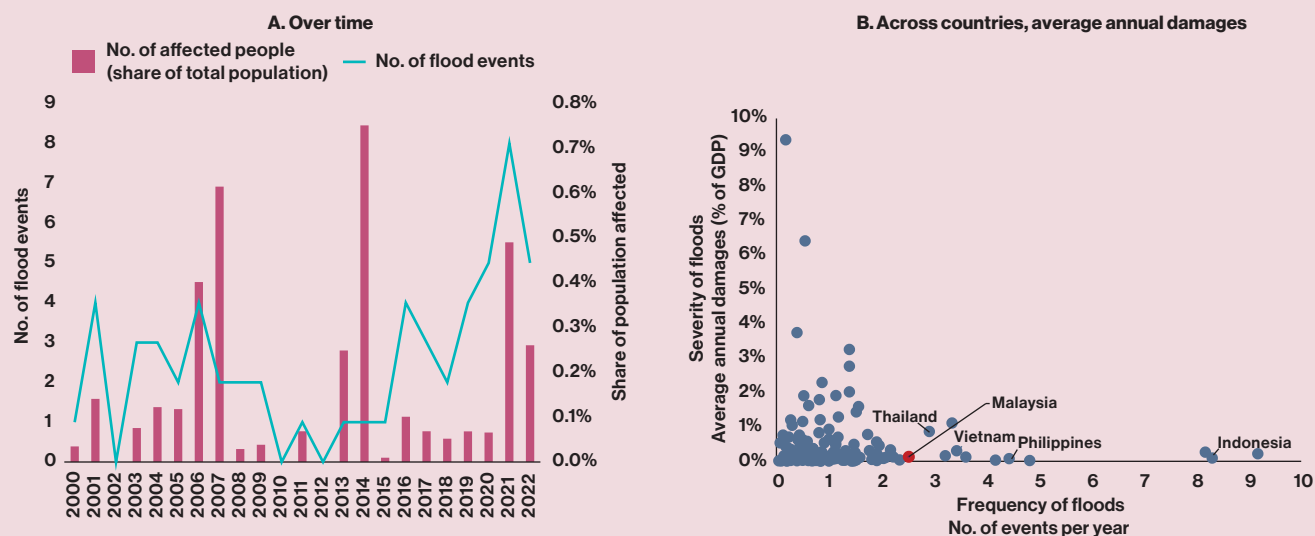
<sup>10</sup> The ACSR, chaired by the SC and formed with the endorsement of the Ministry of Finance, comprises representatives from BNM, Bursa Malaysia Berhad, Companies Commission of Malaysia, Audit Oversight Board and Financial Reporting Foundation.

<sup>11</sup> The public consultation period is from 15 February 2024 to 21 March 2024. The consultation paper seeks feedback on the scope and timing for implementation, the transition reliefs required and issues related to assurance for sustainability disclosures.

## Floods and Finance: Building Resilience of Malaysian Businesses

Since 2000, floods have been the cause for 85% of all natural disasters in the country.<sup>1</sup> The frequency of these events has also increased since 2020. Eight large floods were recorded in 2021 alone compared to the predicted average of two flood events a year (Chart 1A). The severity of these floods may be relatively modest on a global scale. But for Malaysia, flood events have the largest economic impact and affect the highest number of people among all natural disasters (Chart 1B). Economic losses from floods amounted to 0.13% of annual gross domestic product (GDP) on average, and displaced 935,000 Malaysians, both temporarily and permanently, between 2008 and 2022.<sup>2</sup>

Chart 1: Frequency and Severity of Floods in Malaysia



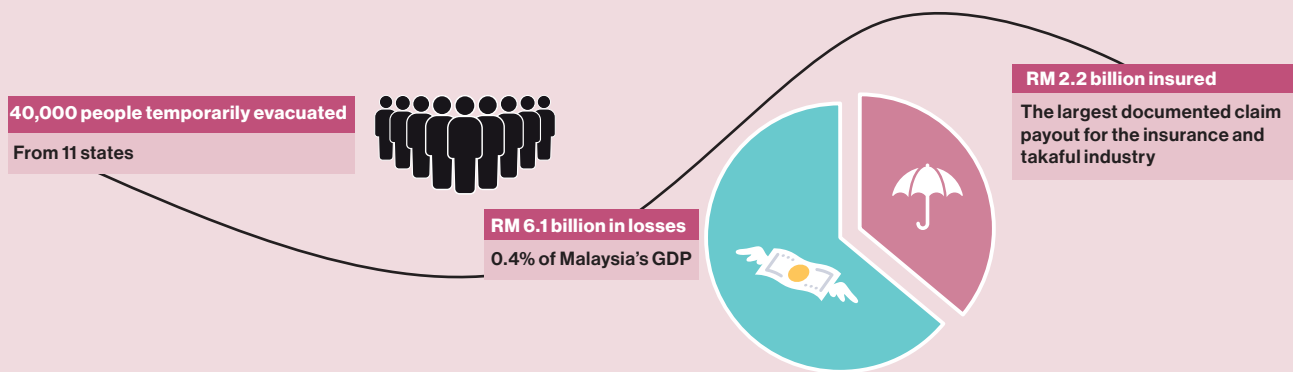
Source: EM-DAT Database, downloaded in May 2023

The catastrophic floods experienced in December 2021 highlight the potential for unabated climate change to have more significant impacts on the Malaysian economy and financial sector going forward (Diagram 1). The non-linearity of climate-related risks further underscore the importance of intensifying ongoing actions to improve flood risk management and mitigate potential consequences to Malaysia. Against this backdrop, the World Bank and Bank Negara Malaysia have worked together to analyse how adversely businesses can be impacted by floods, exposures of the financial sector and its role in supporting businesses to manage flood risks. The study also identified several key policy priorities to develop an enabling ecosystem for effective flood management. Key findings are published in the joint report entitled 'Managing Flood Risks: Leveraging Finance for Business Resilience in Malaysia' (the Report).

<sup>1</sup> Source: EM-DAT database, International Disaster Database

<sup>2</sup> Source: Internal Displacement Monitoring Centre (IDMC) database

Diagram 1: Impact of 2021 Floods



Note: Losses cover those from public assets and infrastructure, living quarters, vehicles, manufacturing, business premises and agriculture.

Source: Department of Statistics Malaysia, Bank Negara Malaysia

## Overview of Malaysia's Flood Risk

Malaysia experiences two monsoon seasons: Southwest Monsoon (June through August) and Northeast Monsoon (November through February). The South and East Coasts of Peninsular Malaysia are particularly prone to frequent floods during the year-end monsoon season. Flash floods have become more common in major cities like Kuala Lumpur, Kuching and the state of Penang due to rapid urban expansion that leads to deforestation and insufficient drainage. Precipitation levels increased steadily between 1951 and 2020 and more than one climate model predicts further yearly increases by the end of the 21st century. Without adaptation efforts, this will expose Malaysia to increased flood risks. This means that historically 1-in-100-year floods could become as frequent as 1-in-50 or 1-in-25 years,<sup>3</sup> with more damaging impacts to be expected.

## Macroeconomic Impact of Flood Risk

In the Report, the macroeconomic impact of future floods was assessed using a two-stage input-output model. This can be equated to a simulation tool that links hazard data on floods with estimated economic impacts at the sectoral level. The model uses estimates of the share of assets at risk to floods in Malaysia for the year 2030, based on expected development patterns and potential climate change effects.<sup>4</sup> This is combined with flood risk projections to calculate expected losses on aggregate output and employment.<sup>5</sup> Malaysia is estimated to lose up to 4.1% of GDP or up to 4% of gross output<sup>6</sup> in 2030 based on the impact of a theoretical 1-in-20-year flood. This takes into account direct losses from floods such as damages to physical assets and infrastructure, and indirect losses such as loss of income from supply chain disruption and diversion of tourism, nation-wide. This also does not consider reconstruction and rebuilding activities post flood event which would likely result in a more moderate impact on GDP and gross output for the year. The agriculture sector in particular could be severely impacted by floods due to its wide geographical coverage. Manufacturing and services sectors would also record a huge impact due to their large size in the Malaysian economy (Chart 2). The estimated impact to gross output<sup>7</sup> (i.e. 4%) is applied to outstanding bank loans to show the segment of bank loans in each sector that would potentially be exposed in this flood scenario (Chart 3). Collectively, these represent very conservative estimates of the impact given the lack of granular level data especially on assets and bank exposures. BNM intends to refine its methodology for the computation of flood-related impacts to provide greater precision and granularity in future estimations.

<sup>3</sup> World Bank Climate Change Knowledge Portal.

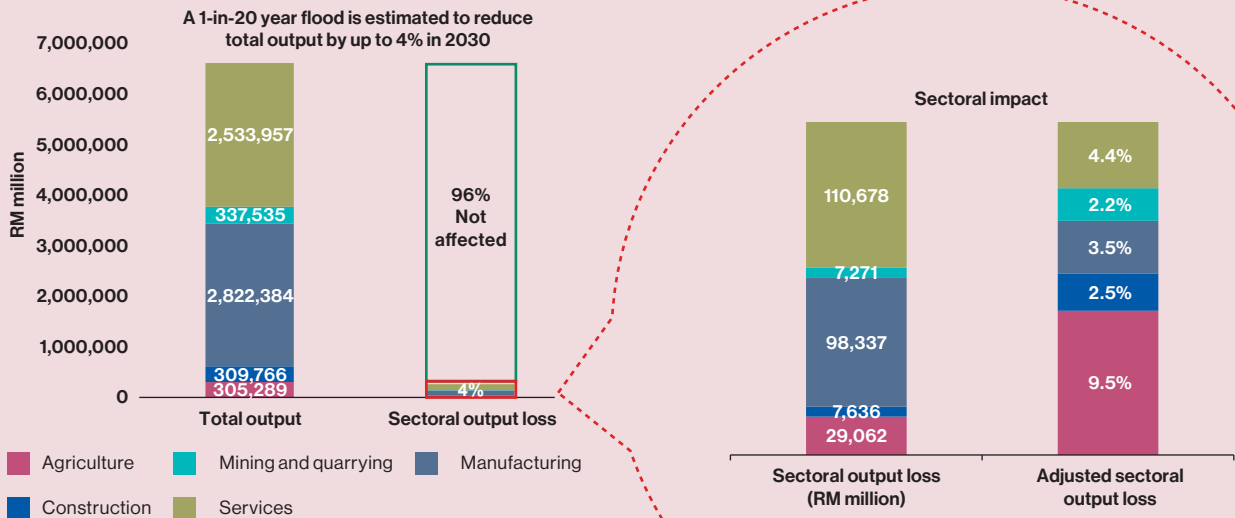
<sup>4</sup> The main source of data used is the Fathom database, a proprietary database of flood risk maps widely used for flood risk research.

<sup>5</sup> This model has been validated by comparing the results for several countries against different macro-economic models.

<sup>6</sup> Gross output is a measure of the total economic activity in the production of goods and services including raw materials, production process and distribution. E.g. where a furniture manufacturer buys wood for RM100, and adds value to it to produce a piece of furniture sold for RM300. GDP is the value of the final product sold (i.e. RM300), whereas gross output is the value of the final product sold plus intermediate consumption (wood as the raw material) (i.e. RM300 + RM100 = RM400).

<sup>7</sup> Gross output is used to take into account the impacts to supply chains, including nuances between sectors. For example, manufacturing has more intermediate demands that would count towards gross output but not GDP.

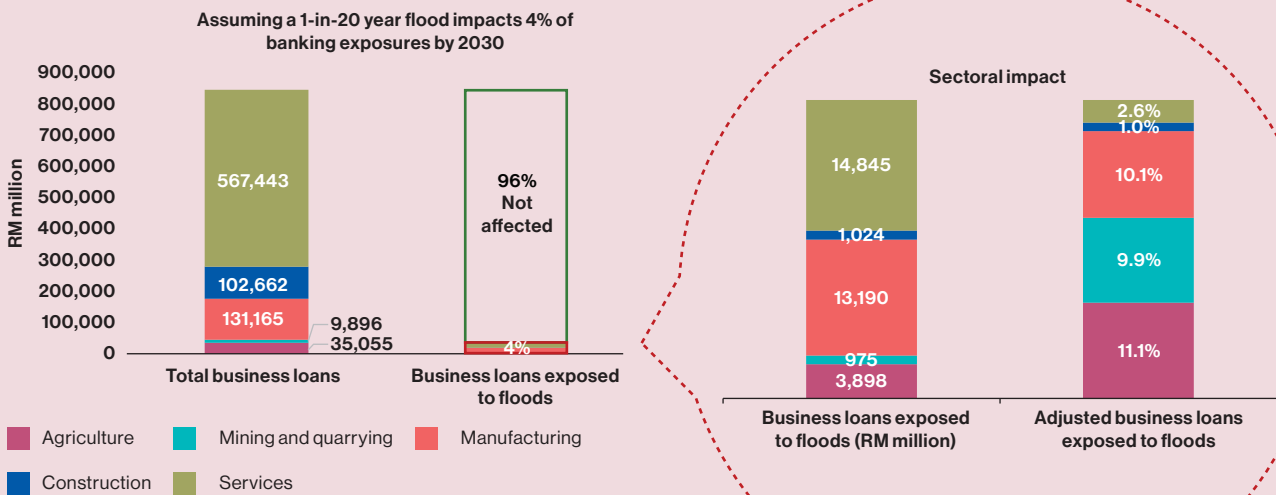
**Chart 2: Losses in Output in a 1-in-20-Year Flood**



Note: 1. **Adjusted sectoral output loss** refers to the proportion of output potentially lost in a 1-in-20 year flood, by sector.

Source: World Bank and Bank Negara Malaysia, Managing Flood Risks: Leveraging Finance for Business Resilience in Malaysia

**Chart 3: Banking Loan Exposures to Flood Risks in a 1-in-20-Year Flood**

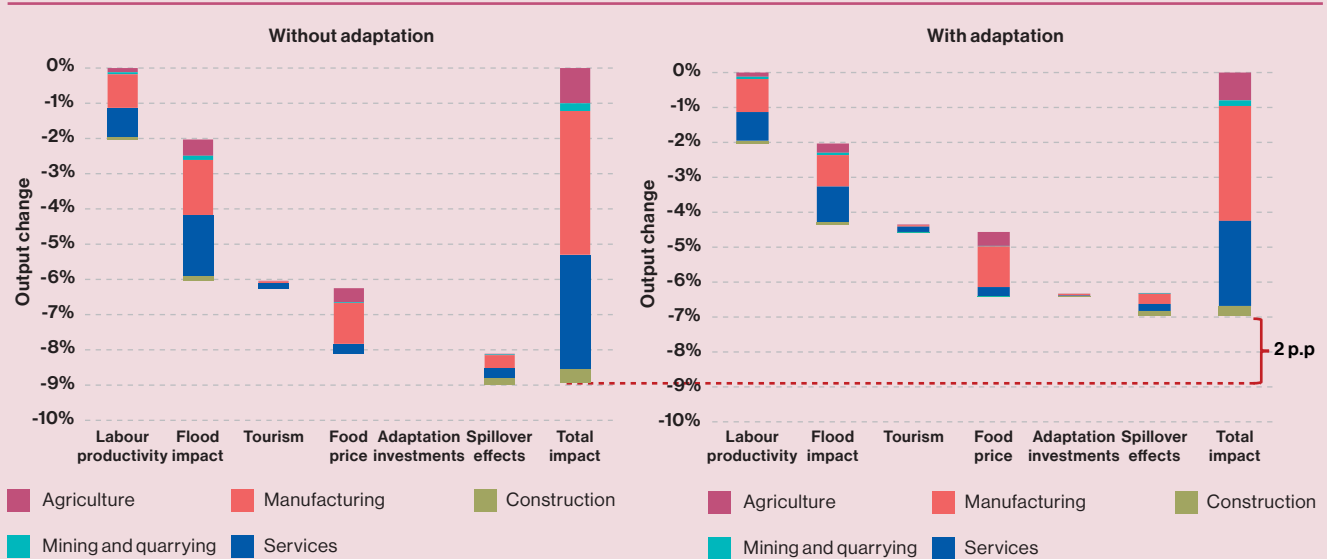


Note: 1. **Business loans exposed to floods** refers to the business loans potentially exposed to floods.  
 2. **Adjusted business loans exposed to floods** refers to the proportion of loans potentially impacted by floods, by sector.  
 3. Assuming static balance sheet as of December 2023.

Source: World Bank and Bank Negara Malaysia, Managing Flood Risks: Leveraging Finance for Business Resilience in Malaysia

For comparison, the model was also run separately for a similar flood scenario where Malaysia undertakes additional climate adaptation measures between now and 2030. Such measures include improved land planning, enforced building standards, more flood resilient infrastructure and improvements to natural ecosystems that retain water. The results indicated that fully-implemented adaptation measures could reduce the economic impact of floods by more than 40% i.e. from loss of up to 4.1% of GDP (in the absence of adaptation efforts) to up to 2.3%. Such adaptation measures are estimated to cost up to 0.2% of annual GDP<sup>8</sup> (Chart 4).

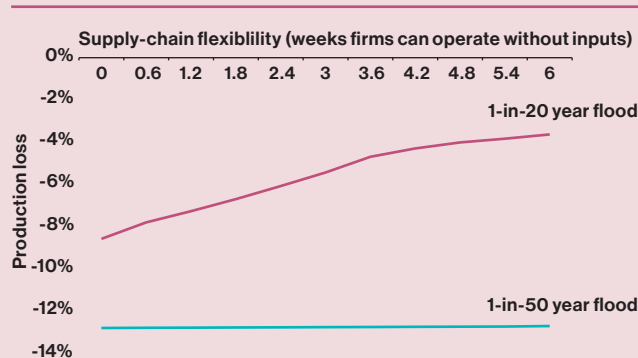
**Chart 4: Climate Change Impacts on Output**



Source: World Bank and Bank Negara Malaysia, Managing Flood Risks: Leveraging Finance for Business Resilience in Malaysia

Further estimates show that actions by businesses themselves are essential to reducing the risk of flooding. Building supply chain resilience, such as diversifying input sources and holding inventory, can reduce expected losses of firms by over 50% in a 1-in-20-year flood. However, the offsetting role of supply chain flexibility is muted in the case of longer or more severe floods (Chart 5). The financial sector too is key in enhancing resilience by providing access to credit and protection as well as advisory services, to support adequate planning and speedy recovery of businesses.

**Chart 5: Impacts of Floods on Output with Supply Chain Flexibility**



Source: World Bank and Bank Negara Malaysia, Managing Flood Risks: Leveraging Finance for Business Resilience in Malaysia

<sup>8</sup> The data used is estimated based on a regional and global dataset due to lack of information on the specific set of adaptation measures needed in Malaysia. The modelled scenario assumes that all adaptation measures would need to be fully implemented; therefore, estimates can be interpreted as an upper bound for potential benefits of adaptation measures.

### Businesses' financial resilience to floods

Based on a survey conducted amongst 1,500 Malaysian companies,<sup>9</sup> about a quarter were affected by floods in the past three years. While a greater proportion of large firms<sup>10</sup> were affected, small and medium enterprises (SMEs) are likely to incur more damage and disruptions, in particular with respect to indirect impacts of floods.<sup>11</sup> Across sectors, businesses operating in the agriculture and manufacturing (particularly automotive, machinery, and equipment) sectors and utility companies, were significantly affected. The latter indicates potential indirect impacts due to disruptions in infrastructure services. Affected firms attributed their losses mainly to a lack of awareness and understanding of flood risks (in particular, among smaller businesses) and inaction to strengthen preparedness to respond to such risk.

There is a range of coping strategies businesses can take to mitigate their vulnerabilities and ensure robust business performance, reduce losses, speed up recovery, and smooth expenses over time. Such strategies include adaptation measures that reduce the impact of floods (e.g. flood walls) and insurance<sup>12</sup> coverage. Our research looked into the factors affecting adoption of these strategies among businesses. The survey showed that businesses that considered floods as a recurring risk were more likely to take measures to strengthen resilience (Chart 6a,6b). Further, regressions indicate that once individual risk exposures are controlled for, the sector or location of businesses does not make them any more likely to take measures, including obtaining insurance. While SMEs and large businesses face common challenges in implementing adaptation strategies, the challenges are generally greater for SMEs due in large part to capacity constraints (Diagram 2). SMEs are less likely to have protection cover or supply chain resilience strategies compared to large businesses.

**Chart 6a: Flood Risk Awareness and Adoption of Disaster Preparedness Strategies**



Source: World Bank and Bank Negara Malaysia, Managing Flood Risks: Leveraging Finance for Business Resilience in Malaysia

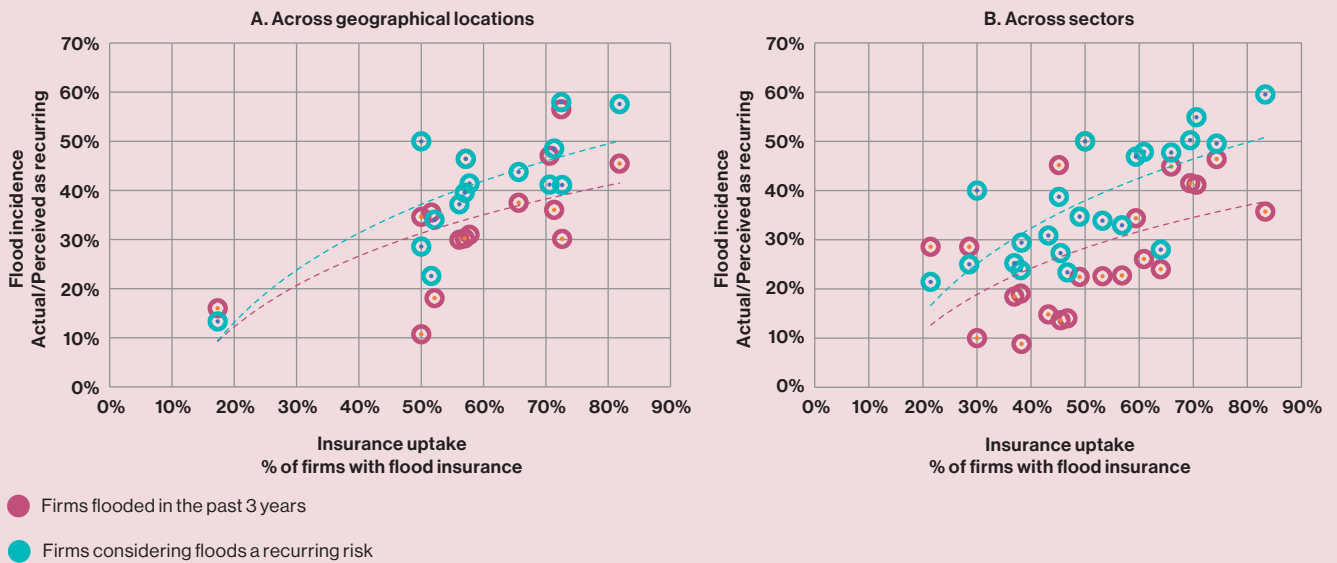
<sup>9</sup> The survey was conducted in the first half of 2023, and results are representative of Malaysian companies in terms of firm size, business sector and geographic regions.

<sup>10</sup> Defined as businesses with revenues above RM50 million.

<sup>11</sup> This includes impacts to customers, employees, supply chains and financial transactions.

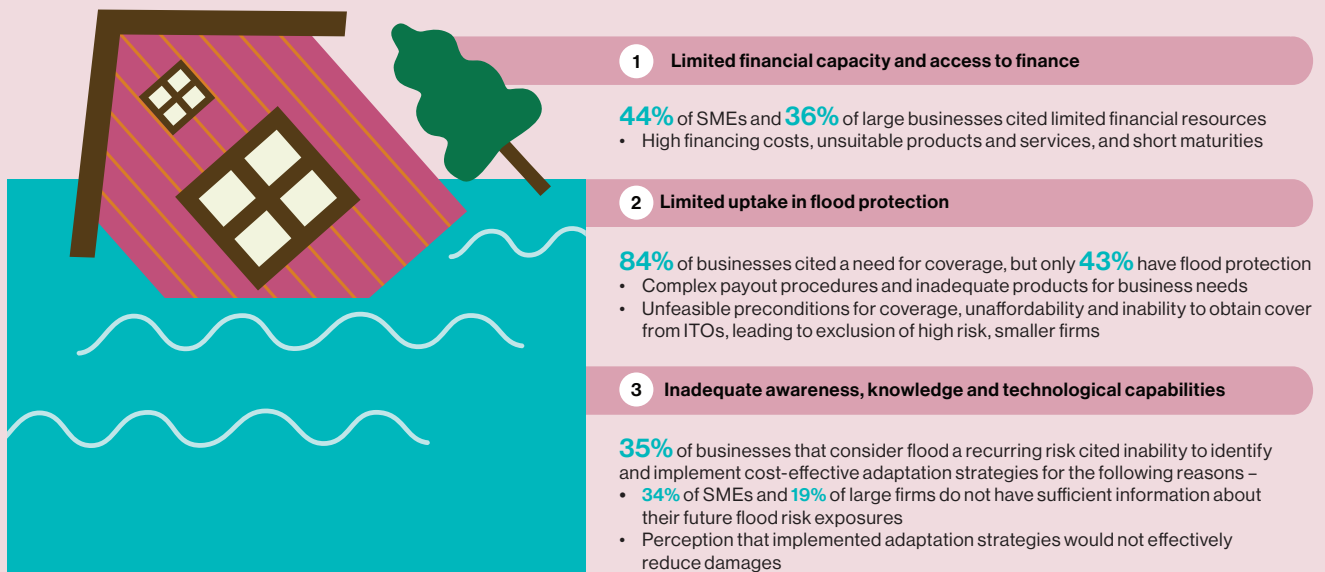
<sup>12</sup> The term insurance in this article refers to both insurance and takaful protection.

Chart 6b: Flood Insurance Uptake



Source: World Bank and Bank Negara Malaysia, Managing Flood Risks: Leveraging Finance for Business Resilience in Malaysia

Diagram 2: Challenges for Businesses in Developing Adaptation Strategies



Source: World Bank and Bank Negara Malaysia, Managing Flood Risks: Leveraging Finance for Business Resilience in Malaysia

### Adaptation finance solutions by the financial sector

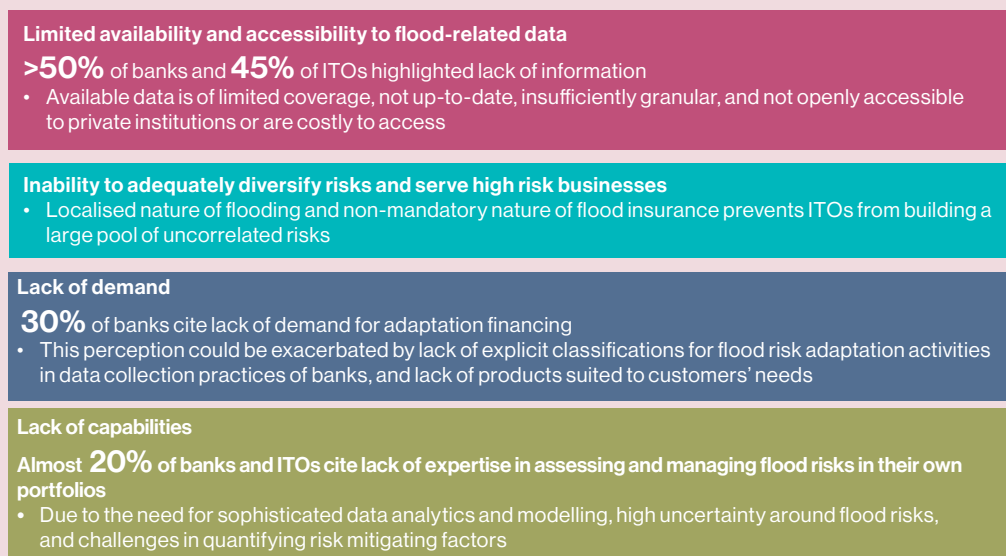
Globally, adaptation finance solutions remain under-developed for a range of reasons. Investments in flood resilience are often unattractive due to high upfront costs aside from longer payback periods and uncertain returns. Flood resilience projects also may not offer clear revenue streams or source of income for investors. In Malaysia, there is a limited project pipeline as resilience actions are not prioritised by businesses themselves. This is particularly the case for SMEs, which typically have high entry and exit rates. Inadequate action can also stem from the high uncertainty about the effectiveness of potential climate adaptation strategies. Additionally, limited information about government investment and initiatives in flood adaptation can hinder effective coordination between public and private sectors.

In Malaysia, adaptation finance largely exists in the form of revolving credit lines and term financing, bond and sukuk financing for natural disaster prevention measures and insurance/takaful coverage. Around 80% of surveyed banks offer such financing, with scope for further expansion in offerings. 60% of banks have started to assess flood risks of business clients. While the integration of such risk considerations into credit risk assessments remains in early stages, banks are increasingly engaging higher risk customers on flood cover or adaptation measures to mitigate exposures to flood risks as part of financing terms. Monitoring and reporting flood risks within banks are also in early stages. About 30% of banks are currently reporting these risks in internal or external assessments. The full implementation of BNM’s Climate Risk Management and Scenario Analysis (CRMSA) and the industry-wide climate risk stress testing are expected to enhance flood risk management and capacity within banks. This in turn is expected to expand opportunities to enhance financing solutions, but it could also increase challenges for businesses if financing needs for adaptation activities are not adequately supported.

Emergency financing following a flood event is typically offered by the Government but is limited to households. Businesses are thus reliant on the financial sector for financing for recovery and reconstruction efforts as well as debt servicing assistance in the aftermath of a flood event. At present, this largely takes the form of temporary moratorium on financing instalments. In the context of the 2021 flood, BNM stepped in to provide emergency funding with the Disaster Relief Facility (DRF). The DRF offers RM500 million in financing facility to micro and small and medium enterprises (MSME) affected by floods.

Flood insurance/takaful in Malaysia is typically offered as a non-mandatory ‘add-on’ peril to fire and motor protection products and is largely location-dependent. 80% of insurers and takaful operators (ITOs) currently consider flood risks when assessing business clients. Banks and ITOs highlight similar challenges in providing financing and protection to businesses (Diagram 3).

**Diagram 3: Challenges Faced by Banks and ITOs in Providing Flood Financing and Protection**

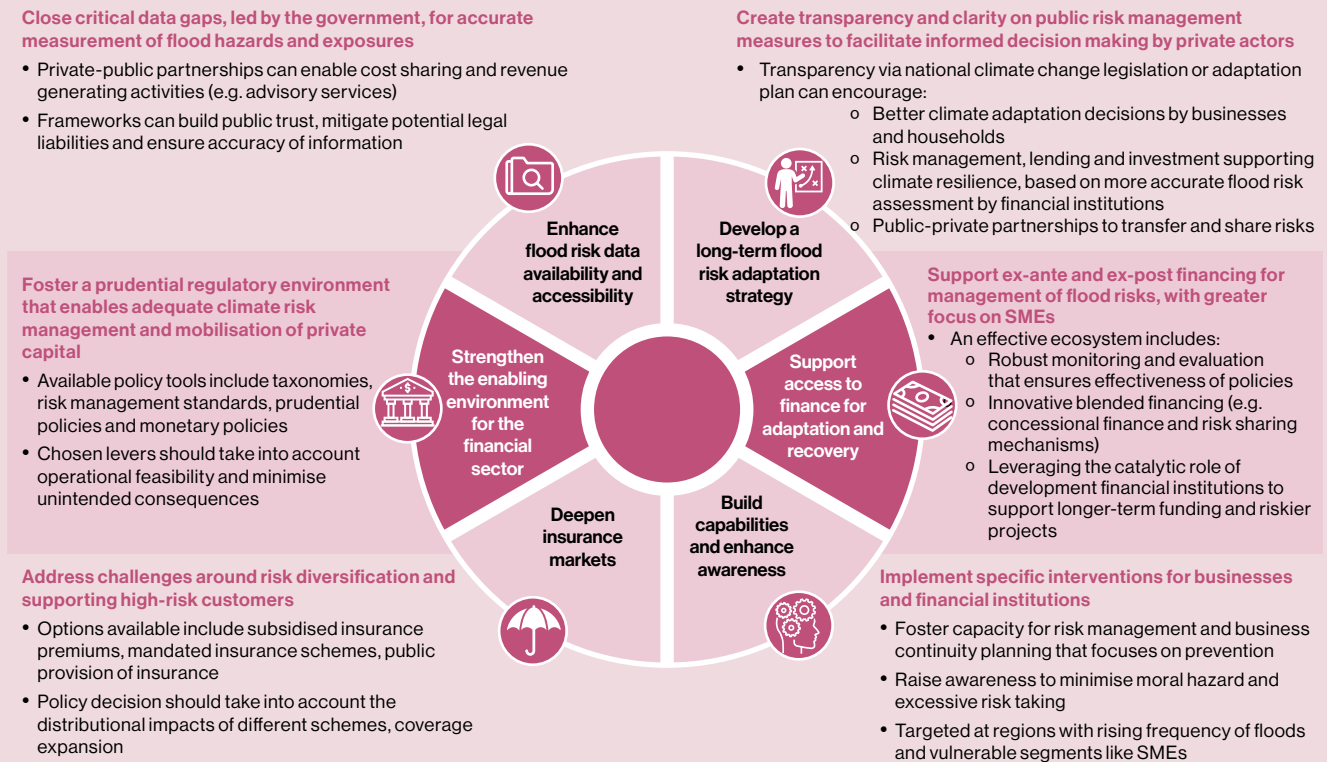


Source: World Bank and Bank Negara Malaysia, Managing Flood Risks: Leveraging Finance for Business Resilience in Malaysia

### Public policies to support the management of flood risks

The Government plays a crucial role in developing comprehensive climate adaptation policies that enable and align incentives for businesses to adopt more resilient practices, and for the private sector to play a bigger role in financing adaptation activities. This in turn is vital to encourage the flow of private capital towards adaptation progress. The Report identifies six key policy priorities to ensure a facilitative ecosystem for effective flood management in Malaysia (Diagram 4).

**Diagram 4: Key Recommendations for an Enabling Ecosystem for Effective Flood Management**



Source: World Bank and Bank Negara Malaysia, Managing Flood Risk: Leveraging Finance for Business Resilience in Malaysia

## Moving forward

This study is a first attempt by BNM to assess the macroeconomic and financial stability impact of flood events. BNM will continue to refine our methodology and assessment of the financial sector and economy's exposure to flood risks. This will also entail pursuing efforts together with the industry to address key challenges surfaced by the Report, such as data, capacity, products and solutions.

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